

1-1-2003

## The effect of ambient scent on affiliation behaviors and social interactions

Dina Marie Victoria Zemke  
*University of Nevada, Las Vegas*

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THE EFFECT OF AMBIENT SCENT ON AFFILIATION  
BEHAVIORS AND SOCIAL INTERACTIONS

by

Dina Marie V. Zemke

Bachelor of Science  
Cornell University  
1985

Master of Business Administration  
University of Minnesota  
1990

A dissertation submitted in partial fulfillment of the  
requirements for the

**Doctor of Philosophy in Hotel Administration**  
**William F. Harrah College of Hotel Administration**

**Graduate College**  
**University of Nevada, Las Vegas**  
**August 2003**

UMI Number: 3102468

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## Dissertation Approval

The Graduate College  
University of Nevada, Las Vegas

June 26, 2003

The Dissertation prepared by

Dina Marie V. Zemke

### Entitled

The Effect of Ambient Scent on Affiliation Behaviors and Social  
Interactions

is approved in partial fulfillment of the requirements for the degree of

Doctor of Philosophy in Hotel Administration

Examination Committee Chair

Dean of the Graduate College

Examination Committee Member

Examination Committee Member

Graduate College Faculty Representative

## ABSTRACT

### **The Effect of Ambient Scent on Affiliation Behaviors and Social Interactions**

by

Dina Marie V. Zemke

Dr. Stowe Shoemaker, Examination Committee Chair  
Associate Professor

William F. Harrah College of Hotel Administration  
University of Nevada, Las Vegas

The intent of the study was to explore if the focus group and the meetings industries can provide meeting environments that would be more conducive to communication and more productive. The concepts tested in this study are based in environmental psychology, or the study of how the physical environment affects individual and group behavior within the environment. Past studies have examined various ambient conditions and other aspects of the physical environment and their effects on retail environments. However, the characteristics that set services businesses apart from product marketing and retail businesses require new techniques to evaluate the effect of the physical environment on the people within the environment. This study proposed a new methodology for examining the effect of one of the ambient conditions, scent, in a services environment.

The study was quasi-experimental, using a 2 x 2 factorial design. The two independent variables under study were the presence or absence of a pleasant ambient scent and the type of participant group, defined as either Tryer-Acceptors or Tryer-Rejecters of a particular slot machine game, as defined by the sponsor of the study, a gaming machine manufacturer. The experiment involved focus group participants spending fifteen minutes in the experimental environment. The time spent in the experimental environment was videotaped for content analysis of behaviors exhibited while in the treated/untreated room.

Scent had a statistically significant effect on the social interaction behaviors exhibited by the participants. Specifically, the addition of the scent to the waiting room resulted in more social interaction behaviors than were exhibited in the unscented room.

In contrast, the participant group type had a statistically significant effect on the Social Interaction and Affiliative Interactions behaviors exhibited and on the focus group output. The study offers evidence that a pleasant ambient scent can have a positive effect on the effectiveness of a meeting environment.

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## ACKNOWLEDGEMENTS

I would first like to thank my committee, especially my chair, Stowe Shoemaker, for their help in making this dissertation happen. Your assistance in finding funding and helping to develop the study is appreciated more than you know.

I would also like to thank Mikohn Gaming for their support for this project, particularly Olaf Vancura. My eternal thanks go to Becky Lundmark and Ruth Moderhak for their assistance with the casino intercepts, which is possibly the hardest work there is.

Most of all, I would like to thank my parents, David and Norma Zemke, my sister Jill, and all the Rosenquists for their tireless support during the entire process. I also thank my friends for their encouragement and support, particularly Carola Raab and Clark Kincaid, who did not kill me while sharing office space with me.

## CHAPTER 1

### INTRODUCTION

#### Purpose

This study sought to test a factor of the physical environment that affects the formation of social interactions. Two main areas were explored in this study:

1. Does the physical environment promote/create social interactions among strangers under controlled conditions?
2. How do prior social interactions among strangers affect their behavior/participation in a focus group session?

The study used Bitner's (1992) "Servicescapes" framework to study the relationships between the physical environment and social interactions.

#### Research Questions

Research questions in environmental psychology typically fall into one of two main categories (Bonnes & Secchiaroli, 1995). The first category consists of questions that are intended to address concerns about behaviors that people exhibit in a particular environment. The second category of questions examines the way that individuals "know" and "evaluate" an environment. The research questions posed in this study fall into the former category. They were essentially designed to identify whether a specific

component of the environment, in this case, ambient odor, would impede or facilitate the behaviors and actions of individuals while in a particular environment.

Two primary research questions were posed in this study. These questions are:

Research Question 1: Does the physical environment, specifically, the ambient scent, impact the social interactions among strangers in a focus group waiting room environment?

Research Question 2: Does the physical environment affect the contributions of participants during a focus group session?

To answer these questions, four propositions are proposed in this study:

P1: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of affiliation behaviors exhibited by focus group participants.

P2: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of social interactions that will be initiated by focus group participants.

P3: The presence of a pleasant ambient scent in the focus group waiting room will increase the combined number of affiliation behaviors and social interactions, or Affiliative Interactions, exhibited by focus group participants.

P4: The presence of a pleasant ambient scent in both the focus group waiting room and in the focus group room itself will increase the number of contributions that will be generated by focus group participants, i.e., focus group output, during the actual focus group session.

### Significance

The results of this study provide value to the field of services marketing as the study proposes a new methodology for testing an important environmental factor, ambient scent, in an area not previously tested. First, the area of atmospherics, or the study of the physical environment's effect on the individuals within the environment, has been studied in retail and consumer product marketing, but relatively little research has been conducted in a services marketing context. The services industry is different from retail and consumer marketing in that the customer who purchases a product usually has a tangible item that can be evaluated and used or consumed at some point in the future following the purchase of the item. The consumer who purchases a service both purchases and consumes the product simultaneously, in the same environment.

Atmospherics, or the effect of the physical environment on the people within the environment, becomes crucial to the successful operation of many services industry because the simultaneous purchase and consumption characteristic, also known as inseparability, results in the physical environment becoming a key element of the product itself. The intangible characteristics of the services industry make it difficult for researchers to develop a methodology to measure the effect of atmospheric variables on the purchase, delivery, and consumption of services.

Second, the specific environmental variable of ambient scent has also had relatively little research performed in a services marketing context. Various researchers (Gulas & Bloch, 1995; Baron, 1990; Bitner, 1992; Spangenberg, Crowley, & Henderson, 1996) have called for further research on ambient scent in the field of atmospherics research. Gulas and Bloch (1995) examined past research in the area of ambient scent and

proposed a model for studying it. However, their research continues to focus on consumer product marketing and retail applications and does not mention the services industry. Again, the special features that characterize the services industry have made it difficult to identify a methodology for evaluating ambient scent's effect on people in the environment.

Third, there have been several calls for future research to test the effect of ambient scent on social interactions and affiliation behaviors, as proposed by Bitner (1992). However, very little research has been conducted in this area. Baron (1990) has experimented with ambient scent and behavior in mock interviews, and has examined if a pleasant scent can lead to a more positive affective state. He suggests future research to examine the effect that a pleasant scent may have on increasing positive affect as a means of overcoming confrontational situations.

Social interactions are a necessary factor in business and particularly in the services delivery industry. The success of a services business often lies in the interactions between the different people in the environment. There are three types of interactions that can occur – 1) customer-employee, 2) customer-customer, and 3) employee-employee. The services company that understands and manages these interactions well will have a greater chance for success and profit through customer loyalty and repeat business (Shoemaker & Lewis, 1999; Bowen & Shoemaker, 1998).

Focus group operators will find this information valuable because the quality and quantity of information generated by focus groups will improve with very little operational change or investment. This study will also assist virtually all lodging property managers in developing a competitive advantage for their small meetings

business. The implementation of the measures tested in this study would be easy to manage at very little expense. Specifically, hospitality managers will be able to use the results of this study to:

- 1) Enhance the use of meeting spaces in a way that will add value for meeting customers, by providing a mediating factor that would increase the likelihood of meeting participants connecting and developing social interactions and networking linkages more effectively;
- 2) Generate new business and increase repeat business both at the property level and company-wide by providing a benefit to meeting customers that will add value to their meetings.

### Delimitations

The proposed study specifically excludes the following conditions, factors, and issues:

**Recorded conversation.** The recording of the participants included videotape only. Sound was not recorded, due to technological and budgetary constraints.

**Prior acquaintances.** The focus group participants in the study were strangers to each other, so prior experience or familiarity with others in the environment might have a significant impact. This was outside the scope of this study.

**Multiple environmental variables.** The only environmental variable under study was ambient scent. Other ambient variables, such as temperature, lighting, and seating arrangements, were controlled in the quasi-experimental design, but manipulating these

other variables might produce different results. They were outside the scope of this study.

Seasonal conditions. The data were collected during a relatively short period of time. Any seasonal factors that might have affected participation or participant characteristics were not measured in this study.

Broad application. The use of focus group participants reduced the generalizability of the results for several reasons. First, the sample for this study included demographic characteristics that might not represent the total population. Second, the people who agreed to participate in a focus group may have had a higher tendency to affiliate with others, which might have influenced their willingness to interact and contribute during the focus group. Finally, since the participants were given an incentive for participating in the group, this reward may have introduced several types of bias, particularly social desirability bias.

## CHAPTER 2

### LITERATURE REVIEW

The purpose of this study was to examine how the physical environment contributes to the formation of social interactions among strangers who are focus group participants. A portion of Bitner's (1992) Servicescapes framework for understanding environment-user relationships in service organizations was tested. This literature review begins with a discussion of the field of environmental psychology, which examines the effect of the physical surroundings on human response. The work of Mehrabian and Russell, who proposed the Pleasure-Arousal-Dominance dimensions of emotional response to environmental stimuli, is then explored. Bitner's Servicescapes model is then discussed, followed by an overview of the application of atmospherics to the area of consumer product marketing. A discussion of atmospherics research in the area of services marketing, under which the hospitality industry is categorized, is presented, and the chapter then concludes with an overview of the study.

#### Environmental Psychology

Bell, Fisher, and Loomis (1978) offer the following abbreviated definition of environmental psychology: "the study of the interrelations between behavior and the built or natural environment (p. 6)." The definition is abbreviated because of the

interdisciplinary nature of the field, with its elements of various types of psychology, ecology, environmental and urban sociology, architecture and design, behavioral geography, and natural resources management (Bonnes & Secchiaroli, 1995). It is highly complex, as it includes not only the physical environment, both natural and built, but the movement and actions of individuals within the environment as well. As Ittelson (1976a) states, “the human environment is also transient and constantly undergoing fundamental change. The subject matter which we study today is not the same as that which we studied yesterday (p. 57).”

Environmental psychology emerged as a field of study as an offshoot of the European Gestalt School of perceptual psychology in the 1940's (Bonnes & Secchiaroli, 1995). It branched out into the area of behavioral psychology when the so-called American “New Look” school of psychology countered the strictly perceptual, phenomenological view of the Gestalt school.

The most recent incarnation of environmental psychology is the “transactional” school, which acknowledges the perception of the spatio-physical aspects of an environment, the behaviors within the environment, and the individual's motivations for being in the environment (Bonnes & Secchiaroli, 1995). The complexity of individuals' environmental behavior is well stated by Ittelson (1976a) when he writes, “While it may be true that environments produce behaviors, it is certainly true that behaviors produce environments (p. 53).” The transactional view attempts to examine the constant interchange among the numerous variables in any given setting.

An example of these concepts can easily be found during a visit to a restaurant. If a customer enters a typical casual-service restaurant, the first action is to perceive the

physical environment, e.g., how it is decorated; the type and volume of music playing; the odors emanating from the bar, kitchen, or dining room; the level and color rendition of the lighting; and noise from the patrons inside the restaurant. The customer's next action is often a rapid cognitive assessment of this environmental data that leads to some type of initial reaction to the environment. If the music is too loud or the lighting level is too low, the customer might become irritated and exhibit behaviors that indicate irritation.

The customer may then encounter a greeter (host or hostess). The greeter will provide visual and aural information that must be processed and will also exhibit behaviors that will be processed by the customer. If the greeter dresses in an appropriate way and behaves as the customer expects, the customer will react and behave differently than if the greeter had dressed or acted in an inappropriate or unexpected way.

Upon entering the dining area, the customer will perceive and process information provided by other customers (or a lack of other customers) in the restaurant. If other patrons are acting as the customer in question expected, the reactions and ensuing behaviors may be very different than if the other patrons were acting in an unexpected or unpleasant way. For example, if the other diners in the dining room were speaking very loudly, the customer observing this might become dissatisfied and exhibit behaviors indicating dissatisfaction such as frowning, complaining to the server, or leaving the restaurant.

The customer's motivations for choosing the restaurant may also influence his or her perceptions of the physical space, the restaurant employees, and the other customers in the restaurant. If the motivation is to grab a quick meal between business appointments

and to review paperwork, dim lighting and noisy fellow diners might be irritating and result in dissatisfaction behaviors. Environmental conditions and fellow diners might provide a good environment for the person who is visiting the restaurant to celebrate a family birthday and might result in the customer exhibiting behaviors that indicate satisfaction, such as smiling, social interactions, laughing, and stating an intent to return to the restaurant in the future.

On a final note, the customer in question in each of these examples will have an effect on the environment, as other restaurant customers and restaurant employees will react to or interact with this customer. Their behaviors will be influenced by their perceptions, processing of the perceptions, and reactions to the customer. The diagram shown below offers a brief representation of the overall concept of environmental psychology and how the various components of the environment – the individual, other people, and the space itself – influence each other.

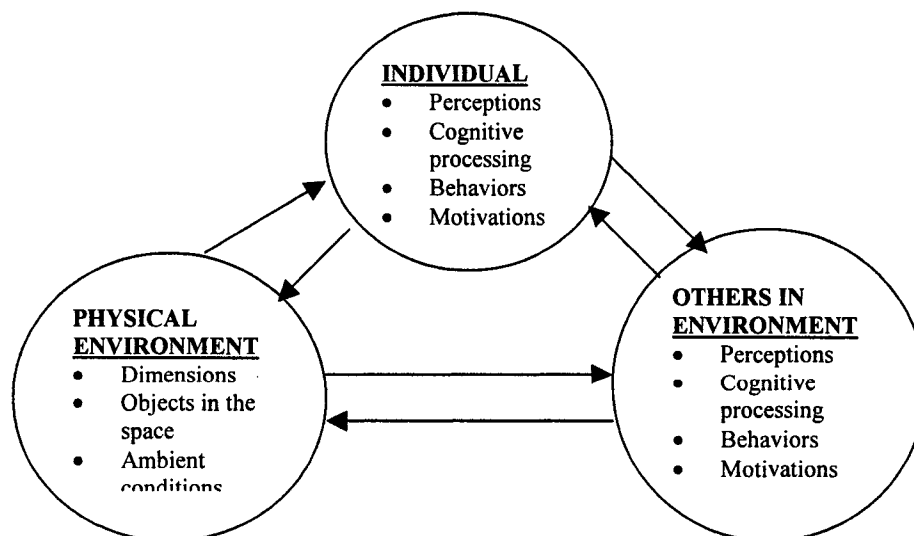


Figure 1. *Factors influencing the physical environment and the individual*

### *A Brief History of Environmental Psychology*

Four primary schools of psychology appear in the environmental psychology literature: perceptual, cognitive, behavioral, and transactional. This is the approximate order in which the field of environmental psychology evolved over the past 80 years. Each school will be highlighted in the following section, followed by a brief discussion on the role of environmental sciences in environmental psychology.

#### *Perceptual Psychology*

Perceptual psychology was the approach used for most of the first half of the 20<sup>th</sup> century. Perceptual psychology focuses on awareness of some form of physiological stimulus. For example, a stimulus might consist of the level of lighting having a physiological effect on the retina. The eye perceives the stimulus after the light hits the retina, initiating a reaction of photoreceptors, which sends information to the brain. Perceptual psychology, in combination with observing phenomena in an environment and also acknowledging context, was the focus of the Gestalt School. The apparent shortcomings of the perceptual approach are that the act of perception is limited to a “single, unitary, and immediate response of a nervous system whose complete workings could be elucidated in any specific example (Ittelson, 1976b, p. 141).” This rules out any possibility of variation among individuals, since perceptual psychology focused on the physiological act of perceiving objects and/or forms, and thus the physiological response must be consistent among all individuals.

In the latter part of the 20<sup>th</sup> century, perceptual psychologists acknowledged that there is a difference between perception of a stimulus and the information provided by perception of the stimulus (Ittelson, 1976b). In other words, the physical act of seeing,

feeling, or hearing something is not the same thing as understanding what the sight, sensation, or sound means. A gradual shift occurred and perceptual psychologists moved to examine the linkage between perception and cognition, the next step in understanding the information that an environmental stimulus provides.

Additionally, environmental psychologists acknowledged the difference between perceiving an object and perceiving a space. An environmental space has four characteristics that distinguish it from an object: 1) a space surrounds, while an object is a unitary item, 2) environments are multimodal, i.e., they impact a variety of senses while an object may only impact one sense, 3) environments are peripheral, meaning that they are always present for an individual inside the environment (an object can be ignored by shutting one's eyes and no longer perceived), and 4) environments always provide more information than an individual can consciously process (Ittelson, 1976b). A discussion of cognitive psychology, as it is related to environmental psychology, is presented next.

### *Cognitive Psychology*

If perceptual psychology provided the link between the external world and the internal person (Bonnes & Secchiaroli, 1995), cognitive psychology focused on the internal processes that help individuals to understand their environment. The focus of cognitive psychology, as applied here, is on “knowledge” and “knowing” the environment. The specific difference between perceptual and cognitive psychology is that the first focuses on spatial perception, or how an individual sees/feels the environment, while the second focuses on spatial cognition, or how the individual organizes information perceived into coherent representations that facilitate location and movement within the environment. The information is organized to provide a general frame of

reference for relating to the environment (Hart & Moore, 1976). Spatial cognition is developed over time and helps to provide a useful framework for organizing information about that specific environment as well as for reference in future, similar environments.

### *Behavioral Psychology*

Kurt Lewin was a pioneer in the environmental aspect of behavioral psychology. He recognized the bridges between psychology and ecology. The common usage of ecology refers to the natural, outdoor environment. However, ecology is considered to be the same thing as the environment in this study (Barker, 1976). A famous equation proposed by Lewin is  $B = f(P \times E)$ , where behavior (B) is a function of the interaction between the environment (E) and the person in the environment (P) (Bonnes & Secchiaroli, 1995).

In 1947, Roger Barker, a student of Kurt Lewin, conducted groundbreaking research in ecological psychology when he established the Midwest Psychological Field Station in Oskaloosa, Kansas (Bonnes & Secchiaroli, 1995). The intent was to develop new methodologies for the study of ecological (or environmental) psychology in a “real world” setting. The new methodologies were developed because Barker was unhappy with the predominantly laboratory-based methodologies that existed at the time and the attending problems with external validity from which laboratory research suffers. His study introduced environmental psychology to the use of field observation and other forms of fieldwork. Techniques such as observation and behavioral mapping, a method of tracking observed behavior, are used in this study.

The methodologies introduced by Barker include observation techniques, identifying and regulating behavior settings, and developing taxonomies from observed data (Barker,

1976). Behavioral data can be obtained in both a natural setting as well as in a laboratory setting (Altman, 1976).

One of the major theories resulting from behavioral psychology research is the Stimulus-Response theory (Berry, 1976). The full model of the theory is the stimulus-organism-response model, also known as “SOR”. The SOR theory suggests that a stimulus that is introduced to an organism will be perceived by the organism (individual). The individual will provide some sort of response and then exhibit a behavior. Different stimuli elicit different types of responses. Responses to stimuli may be physical or emotional responses. Mehrabian (1980) proposed three basic emotional responses to stimuli: pleasure, arousal, and dominance. Mehrabian’s work and the concepts of pleasure, arousal, and dominance will be discussed in greater detail in the next section of this paper.

Just as the perceptual psychology approach began to integrate the cognitive approach in recognition of the need to examine how humans organize information about an environment, the use of cognitive methods gave way in favor of using behavioral methods to obtain richer data for analysis of how humans function within a space (Altman, 1976).

### *Transactional Psychology*

The most recent shift in environmental psychology saw the behavioral approach move into a transactional mode. Transactional psychology, as it is used in environmental psychology, is a holistic approach to explain the continuous loop in which the individual responds to the environment and, through the individual’s behavior within the environment, the environment in turn responds to the individual (Ittelson, 1976a).

Ittelson (1976b) suggests a transaction consists of five levels of analysis to form a response to an environmental stimulus. The levels are affective, orientation, categorization, systematization, and manipulation. The affective level is the direct emotional impact of the stimulus. Orientation takes place when an individual performs initial environmental cognitive mapping to identify locations of objects within the space, escape routes, potential threats, and opportunities for further exploration. Categorization involves organizing the information gathered so far and developing taxonomies to facilitate quick and efficient information processing. The systematization level involves deeper analysis of the information gathered to gain a sense of harmony and constancy to set a pattern of solidity against which to gauge change within the environment. The final level of analysis, manipulation, involves the individual changing the environment through behavior, which may include action but may also include inaction as well. The very presence of an individual in an environment changes the environment. These five steps show the procession of perception of environmental stimuli through performance of behaviors within the environment.

The restaurant customer in the example provided earlier may have experienced the five levels of analysis in the following manner. First, the customer entered the restaurant and had an immediate “gut” reaction to the interior space (affective level). Next, the customer scanned the restaurant to obtain information to place herself in the space. She used this information to understand where important objects, such as tables, doors, and other people are placed (orientation). The customer next organized this information for easy mental reference (categorization). She then mentally processed the information to

see if it measured up to expectations, based on previous experience at that particular restaurant or similar restaurants (systematization).

Finally, the customer moved further into the restaurant and interacted with the host/hostess. The presence of the customer had a physical effect on the environment by adding sound, humidity, heat, visual stimulus, and taking up space. She also affected the other people in the restaurant through her actions and interactions with the restaurant staff and possibly with the other restaurant patrons (manipulation).

Stokols (1978) proposed that the transactional approach focuses on the continual “exchange and reciprocity which characterizes the relationship of the individual with his/her environment” as well as the active and intentional role of the individual within the environment (Bonnes & Secchiaroli, 1995, p. 65). The transactional approach acknowledges the lack of stability in an environment, caused by the constant change that occurs as people and objects move in and out of the environment over time. Transactional perspectives are also often linked with the concept of contextual perspectives since examining how individuals act within an environment should consider the reason, or context, for which the individual is in the environment (Bonnes & Secchiaroli, 1995). This aspect plays an important role in this study, as the participants inhabited the subject environment, a focus group waiting room, under a relatively unusual (i.e., not an everyday) context.

### *Environments*

The physical environment is defined as the material surroundings of a place. For example, the physical environment may be the lobby of a hotel or the swimming pool/spa

area of a property. For this study's purposes, it is considered to be a waiting area and a meeting room used to conduct a focus group in a building on the University of Nevada, Las Vegas campus.

### *Environmental Structure*

Each environment is part of an environmental structure, proposed by Bronfenbrenner in 1977 (Bonnes & Secchiaroli, 1995). The structure consists of the microsystem, the mesosystem, the exosystem, and the macrosystem. The microsystem is the relationship between an individual and a particular space, with emphasis placed on the individual's experience in and with the space. The mesosystem may be considered a "system of microsystems", which could be the various environments that an individual experiences and their interrelationships. The exosystem refers to environments that an individual does not enter but associated others may enter. An example of this might be a spouse's workplace, where the individual does not enter the space but may be influenced by his or her spouse's actions/experiences in the space. Finally, the macrosystem is a collection of all the previously mentioned systems. For example, the United States might be the macrosystem for the students at the University of Nevada, Las Vegas. Every environment is a component of another environment, in a nesting arrangement (Barker, 1976). The system to be examined in this study, a focus group waiting room, is a microsystem.

Environments are broken into three primary dimensions: spatial, temporal, and environmental perception (Bonnes & Secchiaroli, 1995). The first two dimensions are physical-biological dimensions and are directly measurable. The spatial dimension may be measured in terms of the physical dimensions of the space, the objects within the

space (each of which can be measured in a variety of ways), and the space's relationship to other spaces. The second dimension, the temporal dimension, relates to the changes in a specific environment that occur at a specific point in time or over a period of elapsed time (Barker, 1976).

The third dimension, environmental perception, is the human component (Bonnes & Secchiaroli, 1995). Environmental perception is not directly measurable (outside pure perceptual/cognitive research techniques used on targeted objects under laboratory conditions) since each perception by an individual is processed and interpreted as environmental knowledge. Two individuals standing side by side in an environment still have slightly different conditions under which each perceives the environment. For example, the individuals will be of different heights, have different viewing angles of the space, and may perhaps have visual or hearing impairments that cause them to perceive the space differently. Each individual may sense an odor in the environment, eliciting different reactions. Ambient noise may be consciously audible or inaudible and may cause physiological responses. Both individuals will also have different past histories in similar or different types of places, which would also affect their perceptions of the space. Each individual would develop different types of environmental knowledge based on individual experience in the environment as well as accumulated past experience. As stated by Proshansky, Ittelson, and Rivlin (1974), "Each individual interprets and gives meaning to his environment, and to this extent the real differences among individuals and groups lie not in how they behave but in how they perceive" (p. 171).

The environment performs a supporting role for behavior (Barker, 1976). The role may be permissive, supportive, or resistive. Permissive means that the environment is

not an impediment to a behavior; the behavior may occur freely. Supportive means that the environment will facilitate or enhance a particular behavior. Resistive means that the environment provides an impediment to a behavior or will create an unfriendly environment for the behavior to occur. This study is supportive, as it examines the hypothesized supporting role that a pleasant ambient scent plays in facilitating social interactions and encouraging affiliative behaviors.

The specific behaviors examined in this study are affiliation behaviors, social interactions, and the production of suggestions among focus group participants. The study involves manipulation of an environmental variable, ambient odor, and examination of the responses/behaviors of the focus group participants. The next section of this paper will focus on the work in environmental psychology conducted by Albert Mehrabian and James A. Russell, who proposed a framework for examining the environment that is often used in marketing and consumer behavior studies.

### *Mehrabian and Russell*

Extensive research has focused on the effect of the physical environment on human beings. Early research in environmental psychology focused on workplace, educational, and penal institutional/correctional settings (Mehrabian & Russell, 1974). Mehrabian and Russell (1974) proposed a framework for studying the effect of the environment on behavioral responses. They suggest the three emotional response dimensions of pleasure, arousal, and dominance, or “PAD” in their framework. Dominance, in this instance, refers to feelings of dominance, not to actual power in a particular situation. This three-factor theory of emotional response to environmental stimuli suggests that a combination

of environmental variables and personality characteristics will result in an individual's emotional response to the physical stimuli encountered in an environment. This emotional response will influence the individual's behavior in the environment, leading the individual to approach, to avoid, to explore, to affiliate with others, or take other actions.

### *Pleasure-Arousal-Dominance*

The three dimensions of emotional response to an environmental stimulus are often measured using a scale developed by Mehrabian and Russell (1974). These dimensions will be measured as part of this study, as they have been used in numerous environmental psychology studies since the 1970's (Mehrabian, 1980; Mehrabian & Russell, 1974; Bitner, 1992, Morrin & Ratneshwar; 2000, Machleit & Eroglu, 2000; Sherman, Mathur, & Smith, 1997). Each dimension will be discussed, including the development of the semantic differential scales that were developed to measure each dimension. Table 1, lists the semantic differential pairs for each of the factors.

### *Pleasure*

Dahl (1979) proposes as that emotions are a three-part integrated package, consisting of "1) a distinctive *perception*; 2) an *implicit wish* and *implied action* (motive); and 3) a typical *expression* (facial and/or postural) that is species-specific (and in man also culturally adapted)" (p. 211, emphasis in text). Pleasure is a feeling state that is a manifestation of a situation that produces a "positive me" feeling, meaning that the situation has a positive outcome for the individual, leading to a pleasure feeling (Dahl, 1979).

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Table 1. *Pleasure-Arousal-Dominance Scale Items*

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| <u>Dimension</u> | <u>Semantic Differential Pair</u>  |
|------------------|--|
| Pleasure         | Happy-unhappy<br>Pleased-annoyed<br>Satisfied-unsatisfied<br>Contented-melancholic<br>Hopeful-despairing<br>Relaxed-bored              |
| Arousal          | Stimulated-relaxed<br>Excited-calm<br>Frenzied-sluggish<br>Jittery-dull<br>Wide awake-sleepy<br>Aroused-unaroused                      |
| Dominance        | Controlling-controlled<br>Dominant-submissive<br>Influential-influenced<br>Important-awed<br>Autonomous-guided<br>In control-cared for |

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*Note.* From "An Approach to Environmental Psychology," by A. Mehrabian and J. F. Russell, 1974, The MIT Press, Cambridge, MA, p. 26.

The pleasure dimension in the Mehrabian and Russell (1974) PAD model is measured using a semantic differential scale with term pairings such as pleasure-displeasure, and pleased-annoyed (Mehrabian & Russell, 1974; Mehrabian, 1980). The degree of pleasure can also be observed in the form of smiling and frowning or laughing and crying. Pleasure is not associated with preference, liking, or approach-avoidance in this model.

The scale proposed by Mehrabian and Russell to measure pleasure-displeasure is a six-item, 9-point scale, ranging from -4 to +4 (Mehrabian & Russell, 1974; Mehrabian, 1980). The scale was developed over the course of three studies, each designed to

identify the semantic differential terms that would most parsimoniously represent the dimension. In the final factor analysis, Mehrabian and Russell (1974) found that the six variables loaded on the Pleasure factor, with loadings ranging from .79 to .92, with an  $R^2$  of 27%. The Pleasure scale items are shown above in Table 1.

### *Arousal*

Arousal is the state of alertness that an individual feels. It may be defined, in physical terms, as the general state of central nervous system activity (Ashby, Valentin, & Turken, 2002). The semantic differential scale uses term pairings such as stimulated-relaxed, excited-calm, and alert-peaceful. People can be aroused or not aroused, and active or inactive. Arousal can be measured physiologically through measurement of galvanic skin response, rises in blood pressure, dilation of pupils, and brainwave activity (Mehrabian & Russell, 1974; Mehrabian, 1980). The Arousal scale items are shown above in Table 1.

Arousal is generated in the brain by electrical impulses to different parts of the brain (Mehrabian & Russell, 1974). These impulses result in the release of chemicals that create the aroused state (Ashby, et al., 2002). There are five basis neurotransmitters that facilitate the brain's reaction to a stimulus: norepinephrine, acetylcholine, serotonin, histamine, and dopamine. Different stimuli result in the release of varying amounts of these chemicals to different parts of the brain. The area of the brain to which the neurotransmitters are sent may affect physical responses, such as increased heart rate and blood pressure, or different types of information processing and response formation, such as increased awareness, attention, problem-solving ability, and creative ability (Ashby, et al., 2002). The impulses that trigger the neurotransmitter release may be generated by a

wide array of stimuli, such as an emotional situation, fatigue or hunger, physical exercise or drugs (Mehrabian & Russell, 1974; Ashby, et al., 2002).

Arousal affects various activities, such as attention intensity, development of attitudes, performance, working memory, and affiliation. Ashby et al. (2002) have found that low to moderate doses of the neurotransmitters norepinephrine, acetylcholine, and dopamine facilitate working memory tasks. However, higher doses actually impair working memory tasks. Their work confirms that the relationship between these types of activities and arousal follows an inverted U-shaped function, where the activities are maximized at moderate levels of arousal (Kahneman, 1973; Kardes, 1999; Mehrabian and Russell, 1974). This study was intended to test the participants' affiliation, social interaction, and focus group production by introducing an ambient scent that was expected to raise arousal levels to increase these behaviors.

Human beings have an optimal level of physiological arousal that will make them receptive and alert (Kardes, 1999). Humans can be too aroused, or physiologically stimulated. Too high a level of arousal can lead to lack of attention, inability to focus on issues, and extreme mood conditions. The highest levels of excitement can be characterized by frantic excitement (Mehrabian & Russell, 1974). Low arousal states can also result in lack of focus and attention. Low arousal may be characterized as a feeling state closer or further away from being asleep (Mehrabian & Russell, 1974).

High arousal also lends transience to emotions (Kardes, 1999). For example, a high state of arousal can result in a person being very frightened one minute and then extremely amused the next during a scary movie. Zillman discussed this phenomenon in 1978 and proposed the term "excitation transfer" (Kardes, 1999). The scale used to

measure arousal-nonarousal is also a six-item, 9-point, semantic differential rating scale ranging from  $-4$  to  $+4$  (Mehrabian & Russell, 1974; Mehrabian, 1980). In the final factor analysis conducted, Mehrabian and Russell (1974) found that variables loaded on the Arousal factor with loads ranging from .75 to .82, and an  $R^2$  of 23%.

### *Dominance*

The dominance-submissiveness dimension refers to the amount of perceived control that an individual has in a given situation. The semantic differential scale used to measure feelings of dominance-submissiveness includes descriptive pairs such as controlling-controlled, important-awed, influential-influenced. Dominance can also be observed through an individual's postural relaxation (Mehrabian, 1980).

The scale used to measure dominance-submissiveness is also a six-item, 9-point, semantic differential rating scale ranging from  $-4$  to  $+4$  (Mehrabian & Russell, 1974; Mehrabian, 1980). In the final factor analysis conducted, Mehrabian and Russell (1974) found that variables loadings on the Arousal factor ranged from .75 to .82, and an  $R^2$  of 23%. The Dominance scale items are shown above in Table 1.

Researchers frequently propose revisions to these scales to adapt them for a particular application. For example, James A. Russell, one of the original authors of this theory, worked with Geraldine Pratt (Russell & Pratt, 1980) to modify the Pleasant-Unpleasant scale for use in measuring the "unpleasant" quality of a place. Later, Baker, Levy, and Grewal (1992) used Russell and Pratt's adaptation and added an additional variable to measure both the pleasantness and the unpleasantness of a place.

### *Affiliation*

The desire for affiliation refers to the increased desire to be with another person in a space (Mehrabian & Russell, 1974) or the “need to be *with people*” (McClelland, 1985, emphasis in text). This study examined the individual’s tendency to affiliate as well as the individual’s actual affiliation behaviors. Affiliation behaviors, or the physical exhibition of affiliation, will be discussed first. Tendency to affiliate will then be discussed.

Affiliation behaviors can be visually observed when individuals choose to be in closer proximity to one another. Two types of affiliation behaviors can be considered, one positive and the other negative (Mehrabian, 1976). The positive affiliation behaviors may also be referred to as approach behaviors. The negative affiliation behaviors may be referred to as avoidance behaviors. Positive affiliation or approach behavior leads to an increase in “communication channels” (Mehrabian & Russell, 1974). Positive affiliation is sometimes divided into two categories – affiliation and social interaction (Mehrabian & Russell, 1974; Bitner, 1992). Mehrabian and Russell (1974) describe affiliation as approaching another person, or increasing the physical immediacy with another. They also suggest that affiliation is a primary factor in a social interaction. Bitner (1992) describes affiliation as one of several approach behaviors that an individual may display in an environment. While she does not provide further definition of affiliation, she does mention it as a distinct part of approach behaviors and discusses it separately from social interactions. Mehrabian and Russell (1974) describe social interaction as a set of verbal and non-verbal behaviors or a series of personal exchanges. Bitner (1992) also describes social interaction as a collection of behaviors, but she lists behaviors such as small group

interaction, friendship formation, participation, aggression, withdrawal and helping. The suggestion that positive affiliation behaviors may consist of the two distinct categories directed the decision in this study to consider each category separately, and then as a unified whole.

Positive affiliation behaviors include verbal or non-verbal exchanges (Campbell, 1997). Verbal exchange is one form of communication between people. Verbal exchange is an outright sharing of spoken words between two or more individuals. In addition to verbal exchange, the non-verbal aspects of communication play a great role in how we interact with others. Campbell (1997) details three areas of non-verbal communication that affect our interactions with each other: proxemics, paralanguage, and kinesics.

The first area, proxemics, involves the concepts of crowding and personal space. The level of crowding that is experienced can enhance or detract from an individual's ability to communicate. For example, Mehrabian and Russell (1974) suggest that if individuals are in close proximity in a pleasant situation, affiliative behavior and mutual liking may result. However, if two individuals are in close proximity in an unpleasant situation, avoidance behaviors may result that could even become hostile behaviors, such as complaining, shouting, and physical violence.

Paralanguage is the way that verbal communication is delivered. Paralanguage is not the words themselves, but the pitch, tone, and rate at which the words are delivered (Campbell, 1997). The paralanguage that is expressed can radically change the way a message is received by another.

Finally, kinesics refers to what is commonly referred to as “body language”. Kinesic movements are non-verbal cues that may include posture, facial expression, and body gestures (Birdwhistel, 1970). The kinesics displayed when communicating with another person can affect the other person’s reception and interpretation of the message (Campbell, 1997).

Positive affiliation behaviors in a space may be observed when two people sit closer to one another, lean towards the other person, make eye contact, smile, greet the other person, or initiate a conversation (Mehrabian, 1976). Increases in affiliation tend to lead to increased liking for another person, which has been examined in numerous studies, including work conducted by Festinger, Schachter, and Black (1963), who examined the issue of geographic proximity and the formation of sociometric choices, or social interactions. Mehrabian and Diamond (1971) found that differences in proximity and body orientation between two strangers in a controlled environment affected the way that the subjects affiliated and interacted with each other. Negative affiliation, or avoidance, behaviors may include actions such as ignoring others, avoiding eye contact, increasing the physical distance from other people, turning the body away from other people, and rebuffing others’ attempts at conversation (Mehrabian, 1976).

Researchers who studied the phenomenon of affiliation have established a connection between the need for affiliation as a response to a person’s fear of rejection (McClelland, 1985). People high in need for affiliation often excel on performance tasks in a manner similar to people with a high need for achievement. McClelland (1985) cites several studies including Atkinson and Raphelson (1956), French (1955), Atkinson and O’Connor (1966), and McKeachie (1961) that compared the performance of people with

a high need for achievement to people with a high need for affiliation. The participants with a high need for achievement performed best when the goal of the performance was the achievement itself. Participants with a high need for affiliation had the best performance when the goal was pleasing the person conducting the experiment, rather than the task completion itself.

McClelland (1985) also reported a study by Gallimore in 1985 that suggests that motivation to obtain affiliative incentives has a cultural basis. The Gallimore study found that students of Hawaiian ancestry are more likely to respond to affiliative incentives, such as social approval or affection, than for individual achievement incentives such as grades. The studies that suggest that people with a high need for affiliation are more likely to work to please others confirm the relationship with the fear of rejection.

#### Mehrabian and Ksionzky's (1974) Measure of Affiliative Tendency Scale

Mehrabian and Ksionzky (1974) attempted to develop a scale to measure an individual's tendency to affiliate with others that is separate from an individual's fear of rejection. They defined two attributes as "(1) a person's tendency to perceive others and expect them to be sources of positive reinforcement (affiliative tendency), and (2) his tendency to perceive and expect others to be sources of negative reinforcement (sensitivity to rejection)" (Mehrabian & Ksionzky, 1974, p. 24). While past test measures existed at that time, the measures were usually thematic apperception tests, which are difficult to administer and analyze. Mehrabian and Ksionzky, in an attempt to find a test that would be economical and easy to administer, developed two separate scales for tendency to affiliate and sensitivity to rejection. The resulting Measure of Affiliative tendency scale is a twenty-six item scale that can be administered as a paper-and-pencil

survey. The scale has relatively low correlation with sensitivity to rejection and social desirability. It also has an internal reliability coefficient of 0.80, indicating relatively consistent measurement of the scale items.

This research presented in this paper uses the Measure of Affiliative Tendency to identify the affiliative tendency of the focus group participants. The framework proposed by Mehrabian and Russell serves as a framework for the general environmental psychology field. Mary Jo Bitner applied many of the principles from Mehrabian and Russell's framework to the business world, in the form of the "Servicescapes" framework. Bitner's framework is presented in the next section.

#### *Bitner's Servicescape Framework*

Bitner (1992) proposed a framework for examining the effect of the physical environment on human response in commercial settings, specifically, a services delivery situation. The framework was developed using Mehrabian and Russell's 1974 work in environmental psychology.

The "Servicescapes" framework identifies several environmental variables, divided into three general factors: ambient conditions, space/function, and signs, symbols, and artifacts. Individuals perceive these variables, as well as other people, in the environment, resulting in internal responses that lead to external behaviors. The individuals in the environment include both customers and employees. Bitner proposes that further study be conducted examining each of these factors and the variables within each factor to develop knowledge on how each influences the customer's experience and perception of service quality.

### *Servicescapes Model*

The Servicescapes model consists of environmental dimensions, perceived servicescape, response moderators for both employees and customers, internal responses for both employees and customers, and finally, behavior. A discussion of each of these components follows.

*Environmental Dimensions.* The physical environment consists of ambient conditions, space/function, and signs, symbols, and artifacts. Ambient conditions are conditions that affect the five senses: touch, taste, smell, vision, and sound (Bitner, 1992). Ambient conditions include such factors as odor, lighting, color, background noise, flavor, and texture.

Signs, symbols, and artifacts may include signage in a space, artwork, general style of decoration, personal items belonging to individuals within a space, or the attire of people within a space (Bitner, 1992). Due to the extreme variability of this dimension, which changes constantly as a result of people entering and leaving a space, it is considered to be outside the scope of this study.

The space/function dimension of the physical environment is the layout of an area, as well as the equipment and furniture within the area (Bitner, 1992). Some of the interesting aspects of the space/function dimension include spatial arrangements of objects and/or furniture in the space and the presence of other people in the space. Our interactions with others and with our environment may be influenced by the dimensions (size, largeness, smallness) of the physical environment, by the placement of objects within the physical environment, or by our proximity to other people in the environment.

One interesting aspect of space/function that is particularly relevant to this study is

the arrangement of furniture within a space and how the arrangement acts as a facilitator for affiliative behaviors. An early study examining this was conducted first by Osmond and then Sommer in 1959 (as reported by Hall, 1976). The study involved comparing the interactions among female geriatric ward patients in a hospital in two different environments within the hospital, the ward itself and the hospital's cafeteria. The ward's arrangement consisted of chairs lined up on opposite walls. The cafeteria initially had rectangular tables. Conversations between patients sitting in the ward and in the cafeteria were observed and counted. The most significant result of the study was that people who sit at the right angles of a table's corner have six times the number of conversations as the people who sat face-to-face across the table from one another. Corner conversations also produced twice as many conversations between patients as when the patients sat side-by-side.

The ward was rearranged, with the addition of small, square tables and the chairs were moved from against the wall to table positions. After a period of adjustment to the new furniture arrangement, the patients were again observed and it was discovered that the number of conversations had doubled.

The arrangement of furniture or other features that encourage or discourage social interactions are described as either "sociopetal" or "sociofugal". These terms were coined by Osmond (1959), with "socio-" meaning social; "-petal" referring to the Latin verb *petere*, or to seek (The Merriam Webster Dictionary, 1997, p. 134); and "-fugal" referring to the Latin verb *fugere*, or to flee (The Merriam Webster Dictionary, 1997, p. 134). Body orientation, as a display of affiliation, may have different meanings at different proximal distances. It may also have different meanings when the individuals in

the observation are seated, standing, or engaged in some type of movement (Mehrabian & Russell, 1974). Mehrabian and Russell report the results of a study conducted by Russo in 1967 that confirmed that in most cases closer distances between two individuals indicated greater affiliation.

The research in the female geriatric ward, reported by Hall, was conducted to find a way to reduce the withdrawal from society that often occurs in the elderly. Facilitating social interactions is thought to have a healthy effect (Hall, 1976). While the study presented in this paper will not focus on the elderly and socialization, the concepts of using the semi-fixed objects, i.e., the furniture, in the focus group waiting area was arranged and controlled based on these principles. The intent was to facilitate social interactions among the focus group participants as well as to provide control over a potential covariate, furniture layout, in the study.

*Perceived Servicescape.* The next component of Bitner's (1992) Servicescape model is the perceived servicescape, or the perceived environment. Bitner does not explore this in great detail other than to review some of the literature that has been conducted in cognitive psychology. The perception of the servicescape results in an emotional response and also helps to provide cues for the individual to form beliefs about the space or the company whose space it is. The function of environmental perception is to establish a link between the external world (i.e., the perceived environment) with the "internal" world of the individual (Bonnes & Secchiaroli, 1995).

*Customer Response Moderators.* The next component of the Servicescapes model is customer response moderators (Bitner, 1992). Once the physical environment has been perceived, an internal response is formed. Examples of internal response may include

feelings of liking or disliking, or the desire to remain in or leave the space. However, Bitner suggests that certain factors will moderate the formation of the internal response. Moderators may include personal and situational factors.

*Personal factors.* Bitner discusses personal factors in the form of individual personality traits. Two such traits that Bitner discusses were proposed by Mehrabian and Russell (1974) and Mehrabian (1976). The first trait is “arousal-seeking”, where arousal-seekers look for stimulating, high load environments, while arousal-avoiders prefer environments with lower levels of stimulation. An individual with high levels of the arousal-seeking trait might seek out a high-risk, high-load environment for entertainment, such as a trendy nightclub or a weekend of skydiving. An individual with preferences for arousal-avoidance might seek out a quiet jazz club or a weekend of relaxation on the beach.

The other trait proposed by Mehrabian (1976) is the level of environmental “screening” that the individual does. Environmental stimulation is often referred to as the “load” of the environment, or the amount of environmental information that is being offered. For example, a high-energy disco is a high-load environment because individuals in the environment experience a high rate of information to process in the form of music, flashing lights, crowded conditions, multiple odors, and temperature differences. A low-load environment offers fewer pieces of information to process. A quiet den in an individual’s home probably provides a low-load environment because there is relatively limited information, or at least new information, to be processed.

People who are “low screeners” have a more difficult time screening out large amounts of environmental stimulation and may find high-load environments unpleasant

(Mehrabian, 1976). High screeners “screen out” high amounts of environmental stimulation. High screeners may find low-load environments to be boring and often seek high-load environments to be stimulated. Mehrabian (1976) suggests that use of the arousal-seeking tendency scale (Mehrabian & Russell, 1974) is useful in understanding peoples’ screening abilities. However, the most reliable way to test one’s screening level is to check a variety of biometric levels, such as pulse, brainwave activity, and vasoconstriction. While tools to measure these variables are not readily available to the public, Mehrabian offers a “fairly easy way to discover whether you are a screener or a nonscreener” (Mehrabian, 1976, p. 28). Since physiological arousal is associated with vasoconstriction (constriction of the capillaries) in the body’s extremities, a person who is very aroused will have cold hands and feet. If a person takes the temperature of his or her hands and feet in a variety of situations over time, he or she should be able to determine if he or she is a screener or nonscreener. Additional indicators of screening ability are measurements of empathy levels (low screeners are generally more empathetic than high screeners). Mehrabian also says that research indicates that women tend to be lower screeners than men.

The levels of screening and arousal preference are proposed to moderate the internal response to the environmental stimuli (Bitner, 1992; Mehrabian & Russell, 1974). A high screener and arousal-seeker will not be affected by a high-load environment and may not form strong internal responses to the stimuli presented. However, a low screener, who is probably an arousal-avoider, may have an extreme response to a high-load environment.

More recent research has focused on other aspects of personal factors. In 1985, Costa and McCrae proposed a new personality inventory, the NEO Personality Inventory, as part of an exploration of trait psychology (McCrae & Costa, 1996). Trait psychology strives to determine how personality traits of humans are developed, particularly the degree that traits can be inherited or acquired through nurture and if traits are static or dynamic. The five factors in the this model are 1) Basic Tendencies, such as neuroticism, extraversion, openness, agreeableness, and conscientiousness; 2) Characteristics Adaptations, such as personal strivings, attitudes, and habits; 3) Objective Biography, or reactions to situations that result in behaviors that, in turn, affect the situation; 4) Self-Concept, or the development and maintenance of self-schemas, and 5) External Influences, or situational events that are outside the individual. While all five factors are present in every person, the factor that would be of greatest interest in the context of this study would be the Basic Tendencies factor. The dimensions such as extraversion, openness, and agreeableness may clearly affect the reactions of study subjects in the proposed experimental environment to the room and to others in the room. The NEO Personality Inventory was not used in this study because it contains many scale items and the length of this survey instrument needed to be limited, to guard against participant fatigue. The instrument needed to be long enough to collect all data regarding pleasure, arousal, dominance, affiliation, and mood while not overwhelming the study subjects, who had already spent 15 minutes waiting (patiently) and were about to begin a focus group. There was concern that a longer survey instrument would create frustration or irritation among the study subjects that might negatively affect their participation in the focus group. The decision was made to use, instead, the Affiliative Tendency scale that

is discussed later in this paper, to reduce the participant fatigue. This scale will be discussed later in this chapter.

*Situational factors.* Situational factors may also serve as response moderators. Situational factors are the reasons or plans that an individual has for being in a particular environment (Bitner, 1992). Unlike individual differences or personality traits, which are relatively stable over time, situational factors may constantly change. The purpose for being in the environment will affect what a person remembers about the environment and how he or she behaves within the environment.

Similarly, mood may serve as a situational factor (Bitner, 1992). Again, personality traits are relatively stable over time, but mood is transient. An individual may have a completely different perception of a crowded store if he or she is tired and sad than he or she would if he or she were relaxed and happy.

Expectations of the environment and having the expectations either confirmed or disconfirmed will also affect perception of the environment (Bitner, 1992). Expectations are situational, since expectations change from space to space, situation to situation, and may be influenced by mood as well.

The discussion now turns to the different types of internal responses to the environmental stimuli.

*Internal Responses.* Bitner proposes three internal responses to environmental stimuli – emotional, cognitive, and physiological (1992). She follows roughly the same concepts that were discussed in previous sections. For example, the emotion dimension draws from Mehrabian and Russell's (1974) pleasure-arousal-dominance factors. It should be noted that arousal is non-specific to emotion. This means that arousal can intensify

emotions, either positive or negative, according to Zillman's theory of emotion (Kardes, 1999). For example, a horror-movie fan might watch a movie at home that is moderately scary. The same movie, if viewed at the theatre, with its controlled environment that eliminates most other distractions for the moviegoer and enhances many of the suspense-building features of the movie such as sound volume, may create a more arousing environment for the movie patron. The movie will probably be scarier and the viewer's physiological and emotional reactions to the movie will be more extreme at the theatre than at home.

The cognitive dimension draws from cognitive psychology and includes steps such as the formation of beliefs, categorizing information into heuristic devices, and attaching symbolic meanings to stimuli presented in the environment. Bitner's physiological dimension includes somewhat general characteristics such as pain, comfort, movement, and the physical fit of objects/persons in the environment. These internal responses lead the individual to perform behaviors, which will be considered next.

*Behavior.* The final component in the Servicescapes model is the behavior that is exhibited by individuals in an environment. Bitner (1992) proposes two broad categories of behavior – approach/avoidance and social interactions between and among customers and employees.

*Approach/Avoidance.* Mehrabian and Russell (1974) classified affiliative behaviors into two categories – approach and avoidance. Bitner's (1992) application of the approach/avoidance principle focuses mainly on commercial goals. Approach behaviors include such actions as increased time in an environment, increased liking for the environment, increased spending on purchases in the environment, and increased

interaction with others in the environment. Avoidance behaviors may include such actions as leaving an environment, decreased interactions with others in the environment, expressing little or no intent to return, or avoidance of a place altogether.

Approach behaviors, as applied by Bitner (1992) to employees, include exploration, staying longer, commitment, and carrying out a plan. Avoidance behaviors of employees include the opposites of approach – lack of exploration, leaving the environment more quickly, lack of commitment, and failure to carry out plans.

*Social Interactions.* The social interactions in the Servicescapes model (Bitner, 1992) are the result of the necessity of interpersonal interactions in a service delivery environment. The interactions may happen between employees, between customers, or between customers and employees. Bitner reviews much of the past research in environmental psychology to discuss the effect of the servicescape on the act of affiliation and the directly observable variables that are evidence of affiliation (i.e., proximity, seating arrangements, body orientation, etc.). Employees and customers may have different needs and desires in a physical environment. The environment should be conducive to efficient, successful performance of the tasks that each person expects to perform in the space (Bitner, 1992; Berry, 1981). Berry (1981) discusses the physical environment in a bank. The customer needs the space to be functional and pleasant for business transactions. The employee of the bank may have different needs than the customer, such as increased lighting, access to machines, storage space, and access to supervisors or other tellers. The features that help the employee do his or her job may not provide the customer with a pleasant environment. For example, the equipment that the

employee uses might be noisy or the lighting might be harsh and unflattering to the interior décor. The customer will perceive this negatively.

Bitner (1992) offers two propositions – first, the internal response to the servicescape will “enhance or detract from the nature and quality of social interactions between and among customers and employees (p. 61)”. The second proposition proposes that the optimal design for encouraging approach or avoidance behavior might be unable to facilitate both the needs of the employee or the customer in the space and positive social interactions. The goal of every company should, of course, be to have a workspace that is appropriate and pleasing to the customer but also functional and pleasing to the employee as well.

*Bitner's Extension of Mehrabian and Russell's Work*

While Bitner uses Mehrabian and Russell's model as a basis for the Servicescapes framework, she also adds external elements to the framework that provide a more comprehensive view of the service experience. For example:

*Customers and Employees Interaction.* The model integrates both customers and employees and also acknowledges the influences that each has on the other in a service environment.

*Quality of Interactions.* Mehrabian and Russell acknowledge that the physical environment and the proximity of others influence an individual's response to the stimuli. The responses are either approach or avoidance. Bitner draws from social research in environmental psychology and extends the concept to consideration of the quality of interaction between individuals within the environment in addition to the approach/avoidance behaviors.

*Environmental Design Complexity.* Bitner adds complexity to the model by including the complexity in designing a service environment that is conducive to the needs of both employees and customers, which may require environments that are vastly different to achieve their separate goals.

*Emotional Response Dimensions.* Mehrabian and Russell focus on the behavioral aspects of the stimulus-organism-response model but do not focus on the internal response to the stimuli. They focus on the emotional dimension of response. Bitner expands this to include cognitive, emotional, and physiological dimensions.

Bitner also proposed three dimensions for evaluating the environment in a servicescape. They are ambient conditions, spatial layout and functionality, and signs, symbols, and artifacts. While each element in a dimension may be experienced separately, individuals usually perceive them simultaneously in a holistic package. Each element may have a different effect on the individual's response to the environment and his or her subsequent behavior. A review of the research that has been conducted using the three physical environment dimensions in marketing applications, primarily in the retailing area but also in service delivery environments to a limited extent, will be presented next.

### Atmospherics and Marketing

Research on the effect of "atmospherics" in a consumer shopping experience is a relatively recent phenomenon. The term "atmospherics" was first proposed by Kotler, referring to the study of a store's atmospheric effects on consumer behavior (Turley & Milliman, 2000). The concept is that consumer behavior can be changed or controlled by

manipulating elements in the physical environment. The vast majority of the research in atmospherics has been conducted in retail settings, where the customer goes to a store to purchase tangible products. The intent of this research is to determine the factors that elicit an approach or avoidance behavior from potential store patrons. Once store patrons enter the retail outlet, research is sometimes conducted to assess the effects of several environmental variables on the customer's behavior inside the store, including time spent in the store and effects on store revenue.

Turley and Milliman (2000) classify atmospheric elements into five categories: external variables (the store's exterior appearance), general interior variables (music, scent, color, lighting, temperature), layout and design variables, point-of-purchase and decoration variables, and human variables. The more commonly studied variables are music, ambient odor or aroma, interior color, point-of-purchase and decoration, and human variables. There has been less research performed in the examination of exterior variables, lighting, and layout and design. This may be due to the relative ease of manipulation of the more commonly studied variables within an environment and the difficulty in changing store layout, store design, and exterior appearance.

#### *Ambient Music*

Recent research in retail atmospherics includes studies that examine the effect of different types of in-store music on shopping times (Yalch & Spangenberg, 2000), revenue (Areni & Kim, 1993), and product selection (North, Hargreaves, & McKendrick, 1997). Yalch and Spangenberg (2000) measured shopping time for shoppers who were exposed to background music of varying familiarity. The study participants underestimated the amount of time that they spent shopping when unfamiliar music was

played, whereas they overestimated the amount of time they spent shopping when familiar music was played.

Areni and Kim (1993) report that playing background classical music in a wine cellar resulted in a higher level of wine sales revenue than did playing Top-Forty music in the background. The researchers hypothesized that the selection of classical music was more congruent with a wine cellar patron's lifestyle than was Top-Forty music. This congruence resulted in greater persuasion in the sale which, interestingly, lead not to an increase in the volume of wine sold but in the total cost of the purchase. The presence of classical music resulted in patrons buying more expensive wine. The researchers suspected that the wine store patrons used the music as an external cue for purchasing behavior. The type of music was a proxy for product quality, so when a more sophisticated genre of music was played, the buyer looked for a higher quality (and higher priced) wine.

North, Hargreaves, and McKendrick (1997) report that sales of French wine exceeded sales of German wine when French music was played in a retail outlet, whereas German wine outsold French wine when German music was played. These researchers suggested that the familiarity of the origin of the music had a subtle, subconscious influence on the customer's superordinate knowledge structures concerning the country of origin, which influenced purchase behavior.

In another study, an experiment to determine the effects of types of ethnic music on the sales of certain menu items found that playing ethnic music in a military dining facility increased purchase of the special menu items of the same ethnicity (Feinstein,

Hinkston, & Erdem, in press). The intensity of the music played also affected the probability of purchase of ethnic menu items over non-ethnic menu items.

### *Store Image and Design*

Sharma and Stafford (2000) examine the effect of the environmental atmosphere on customer perceptions of a store's sales people. They offer preliminary research that suggests that stores with an upscale image facilitate the persuasive powers of their salespeople. In addition, the upscale stores may have reduced levels of sales staff without affecting the customer's buying intentions. The study also finds that high salesperson availability in discount-type stores has a significantly positive effect on shoppers' buying intentions over times when there is low salesperson availability. Buying intentions under different levels of sales personnel availability are influenced by the store's atmosphere (upscale or discount).

The effect of ambient, design, and social factors on a shopper's level of irritation in the shopping experience is discussed by d'Astous (2000). His study examines 38 shopping irritants that fall into four categories -- ambient, design, social, and none (i.e., other). Women are reported to be significantly more irritated than men by factors such as "it is too hot inside the store", "crowding", and design factors that include "unable to find what one needs" and the "store is too small". Younger shoppers are significantly more irritated by "bad smell in the store" and "store is not clean", whereas older shoppers are significantly more likely to be irritated by "music inside the store is too loud".

### *Ambient Scent*

Olfaction, or the sense of smell, is one of the least understood and most evocative of the five senses. Olfactory memory has been found to last longer than visual memory and

has been found to be an effective conditioning cue (Gulas & Bloch, 1995). Scent can affect brain wave patterns and may affect the brain in cognitive as well as non-cognitive ways (Gulas & Bloch, 1995).

The senses of smell and taste, along with a third component, chemical sensory irritation, belong to a group called the “chemical senses” (Beauchamp, 1994). The other senses – touch, sight, and hearing, and to a certain extent, taste – are excited and the stimulus information is routed directly to the thalamus, the area of the brain where cognitive processes occur (Nolte, 1999). The stimulus information is cognitively processed and the body/mind reacts to the information. By contrast, olfaction bypasses the thalamus initially.

Olfaction, or the action of smelling, occurs in the nose. The stimulus chemical is transmitted to an area called the olfactory bulb, which is located immediately above the nasal passages. The olfactory bulb is part of the telencephalon, a section of the brain that resides in the limbic system. The chemical stimulus travels to the telencephalon and is believed to affect the autonomic nervous system and the trigeminal systems, which are the parts of the brain that control visceral reactions (Van Toller, 1994). The information sent to this part of the brain results in a reaction that occurs without first undergoing some type of cognitive process. It is believed that this is a vestigial remnant of the time when humans relied more heavily on their sense of smell for survival, such as that of most other mammals today, in obtaining nutrients and avoiding noxious substances (Beauchamp, 1994). Olfactory cues have been found to affect the formation and retrieval of memories (Levine, 2000).

Little consumer research has been conducted that tests the olfactory senses and consumer reactions to ambient scents. Morrin and Ratneshwar (2000) define ambient scent as “scent that is not emanating from a particular object but is present in the environment (p. 67).” Past research in marketing examining scent has focused in large part on “localized” scent (Gulas & Bloch, 1995), or scented objects used as promotional items (Morrin & Ratneshwar, 2000), such as scented perfume sample cards, inserts in magazines, product scents such as scented household cleaners, and shampoos (Bone & Jantranis, 1992). In contrast, little research on ambient, as opposed to object-based, odor has been published. The following is a review of the empirical research on object-based and ambient odor.

*Psychological research.* Early research in scent occurred in perceptual and cognitive psychology. Hess conducted a study of the physiological response to odor in 1965, as reported by Mehrabian and Russell (1974). This study found that arousal was positively affected by pleasant and unpleasant odors when compared to the absence of an odor. The novelty, or unexpectedness, of the odor seemed to be the trigger for arousal. In 1996, the American Trucking Association was testing a new system in trucks that alerted truckers who were exhibiting signs of sleepiness at the wheel (Bounds, 1996). The system included a series of warning sounds and messages as well as a spray of peppermint scent into the truck’s cab. A peppermint scent has been found to be effective in increasing arousal.

The novelty of the odor triggering arousal is consistent with brain chemistry research. A new, unfamiliar stimulus has been found to provide greater firing rates of the cells that release norepinephrine into the frontal cortical areas of the brain (Ashby, et al., 2002).

This results in an increased state of physiological arousal. The chemical “cortical norepinephrine (cortical NE)” specifically has been found to mediate vigilance reactions in humans, which is most likely a precautionary biological response a novel, or potentially dangerous, situation (Winkielman, Schwarz, & Nowak, 2002).

*Ambient scent and social interaction.* Baron (1990) conducted a study to evaluate the effect of a pleasant ambient scent on affect while participants completed various tasks. One task included two mock negotiations, where the participant negotiated with another person who behaved in a relatively confrontational manner. The subjects were exposed to scents that were determined to be either pleasant or neutral before entering the task environment. The task environment was either unscented or scented using pleasantly scented commercially available room air fresheners.

In a 1983 experiment, Baron found that in mock job interviews, “applicants” who wore scent were evaluated higher on job related abilities than were the “applicants” who did not wear scent (Gulas & Bloch, 1995). In another experiment, Baron (1990) found that pleasant scents led to a more positive affective state than did neutral scents. In addition, the subjects in the pleasantly scented environment reported weaker preferences for confrontational styles that could be used if they were to have further interaction with the confrontational negotiators. The subjects in the pleasantly scented environment also reported higher expectations for goals and performance in the tasks assigned. This generally positive affect trend suggests that individuals in a pleasantly scented environment will have more positive approaches to task and other people in the environment. This study examines whether a pleasantly-scented condition leads to increased incidences of affiliation behaviors and social interactions.

Ashby, et al. (2002) proposed the “dopaminergic theory of positive affect”. Affective states are produced by the presence of neuromodulators in the brain (Ashby et al., 2002). Again, one familiar, naturally occurring example of a neuromodulator is dopamine. Artificial chemicals, such as amphetamines or cocaine, introduced into the body can also induce an affective state similar to that of dopamine. The neuromodulators dopamine and serotonin have been used to treat depression. Neuromodulators produce a state of arousal in humans, which can be quite similar to affect. Studies of the two concepts associate both dopamine release and positive affect with increased motor activity (Ashby, et al., 2002). An intense positive state of arousal can be associated with an intense affective state, while a negative state of arousal is often accompanied by a negative affective state.

Affective states are known to influence an individual’s memory, decision-making processes, and problem-solving abilities. However, there are conflicting opinions in this area. For example, Sinclair, Moore, Lavis, and Soldat (2002) report that studies show that “sad” subjects completed analysis tasks more accurately than “happy” subjects did. However, other researchers, including Isen, find that moderate positive affect (or happiness) leads to increased problem-solving ability (Ashby, et al., 2002). Ashby, et al. (2002) cite several studies by Isen that a moderate positive affective state, as opposed to a neutral affective state, lead to greater diversity in word association exercises and greater accuracy in remote association tests and creative thinking tasks. They believe that the cause is an increase in the flexibility of the executive attention system that may be present in a moderately positive affective state.

The role that affect plays, in relation to evaluation, is a factor that lends “fluency” to the evaluation process (Winkielman et al., 2002). The evaluation process is part of a

“metacognitive” process that occurs in an area of the brain that is very close, geographically speaking, to the limbic system, where affect is induced. Affective states lend perceptual fluency to an evaluative or decision-making process. This perceptual fluency leads to a heuristic device that humans use to aid in decision-making.

Winkielman, et al. (2002) refer to the “mere-exposure” heuristic that indicates that prior exposure to an object or person will ease processing information about the person. This ease of processing will result in increased liking for the object or person. It has been tested using neuroimaging techniques and electrophysiological techniques (Winkielman, et al., 2002). The studies show that recognized stimuli lead to relatively small numbers of neurons changing state in the brain, compared to larger numbers of neurons changing state when encountering an unfamiliar stimulus. The patterns of the neurons firing follow a more consistent pattern when the stimulus is familiar than when it is unfamiliar. Over time, repetition of a stimulus that was initially unfamiliar will decrease the inconsistency of the neuron firing patterns, and ultimately leads to a more selective firing of neurons.

Fluency, a result of the mere-exposure concept, may also lead to increased affect because the brain is available to move on to other tasks if it recognizes the stimulus (Winkielman, et al., 2002). This might result in an increase in the neuromodulators (e.g., dopamine, serotonin) that feel good and cause liking. Another explanation proposed by Winkielman, et al. (2002) is that a familiar stimulus is consistent with the brain’s expectations for a particular situation, leading to liking. The familiarity may be in opposition to another process where violations in expectations trigger a negative affective state.

Affect may be cued by external environmental factors. In this study, the pleasant scent was intended to cue the brain for positive arousal and positive affect towards the physical environment and other participants in the group. The pleasant scent may have also served as a proxy for positive qualities in the other people in the environment.

*Ambient scent in consumer product marketing.* Until recently, little published empirical research in consumer product marketing examined ambient scent. Laird experimented with consumer product evaluation in 1932, when he found that consumers rated identical products more highly if they were scented (Gulas & Bloch, 1995).

More recently, Mitchell, Kahn, and Knasko (1995) studied the congruency of an ambient odor and mediation of memory processes. The researchers looked specifically at the use of congruent and incongruent scents in product decision-making tasks, selecting either chocolate assortments or floral arrangements in environments that were either scented with chocolate or floral odorants or were unscented. The presence or absence of a scent did not result in a significant difference in the number of choices made. The congruent odor condition resulted in more time spent in decision-making and spreading decisions across choice groups of products in each category.

Spangenberg, Crowley, and Henderson (1996) found that the presence of a pleasant scent at a moderate intensity in a simulated shopping environment in a laboratory setting resulted in significantly higher incidences of certain approach behaviors than did the unscented control environment. The approach behaviors tested included such variables as actual time spent in the environment, perceived time in the environment, intentions to visit the (theoretical) store, purchase intentions of particular items in the experimental environment, and number of price tags examined. The subjects in scented conditions

reported spending less time in the environment than they actually did. Spangenberg, et al. (1996) attribute this to the concept of an “optimal state of experience”, which explains the distortion of self-evaluation of time spent in an environment that is influenced by the “quality” of the subjective experience. They suggest that the ambient scent enhanced the quality of the experience for the subjects, leading to the distorted perceptions of time in the environment, thus operationalizing the old saying “time flies when you’re having fun”.

Spangenberg, et al. (1996) study also evaluated the effects of the two treatment conditions on the evaluation of the store environment. Virtually all of the variables in evaluating the environment received significantly higher ratings in the scented condition than in the unscented condition. In addition, the products that were displayed in the two treatment conditions were evaluated. The researchers found that certain of the items received higher evaluation ratings in the scented condition than did those same items in the unscented condition, although many of the items were not evaluated significantly differently. They acknowledge the effect of the scent condition but suggest future research to determine the specific mechanism that explains it.

Morrin and Ratneshwar (2000) report that ambient scent affects study participants’ awareness and evaluation of product brands. Participants were exposed to a number of familiar and unfamiliar product brand names in a laboratory setting that was either pleasantly scented or unscented. Most participants in the pleasantly scented environment reported that they were unaware of scent in the room. Participants in the pleasantly scented environment gave significantly higher brand evaluations to both familiar and unfamiliar brands than participants in the unscented environment. This is attributed to

the effect that novelty has on attention. Morrin and Ratneshwar (2000) suggest that the increased attention and effort spent evaluating the brands lead to greater attention in evaluating the brands, resulting in more positive evaluations. They suggest that the positive evaluations were responses to a spontaneous construction of the evaluation rather than a retrieval of an evaluation from memory. Morrin and Ratneshwar (2000) do not mention this, but the results seem consistent with the dopaminergic theory of positive affect, where the release of the neurotransmitters that lead to increased arousal and affect might increase the evaluation and recall of the brands (Ashby, et al., 2002; Winkielman et al., 2002).

In addition, the participants in the pleasantly scented environment recalled unfamiliar brands significantly more often than participants in the unscented environment (Morrin & Ratneshwar, 2000). The researchers attribute this to a suspected “encoding effect” that occurs when a pleasant scent is present. The scent caused participants to spend more time evaluating unfamiliar brand names, and then the scent acted as an external cue during the recall exercise, leading to increased recall in the scented conditions.

Gulas and Bloch (1995) propose a framework to understand the role of ambient scent in consumer product response. The model begins with an ambient scent, which when perceived by an individual is moderated by characteristics such as age and gender. After the ambient scent is perceived, an affective response is formed. This affective response is moderated by past experience, individual preferences, physiological predispositions, other atmospheric elements, and the congruity of the scent to the situation. Finally, the affective response leads to exhibition of approach or avoidance behaviors.

Gulas and Bloch (1995) call for increased consumer research in the area of ambient scent, the least understood and least studied of the ambient conditions in the physical environment dimension of Bitner's Servicescape model. However, they continue to focus on consumer product marketing and retail applications and do not mention the services industry.

*Ambient Scent in Services Marketing.* To date, no published literature has been found that examines ambient scent in a services marketing environment.

### Atmospherics in Services Marketing

Before the topic of atmospherics in services marketing is discussed, a brief overview of marketing, in general, will be presented. The concepts of the "Four P's", services characteristics, and the "Additional Three P's" will be covered.

### *Overview of Marketing*

The "marketing mix" is defined as "the set of marketing tools that the firm uses to pursue its marketing objectives in the target market" (Kotler, 1994, p. 98). The Four P's are the traditional elements of the marketing mix. They consist of product, price, promotion, and distribution (place). McCarthy proposed the Four P's classification in 1981 (Kotler, 1994). Most marketing texts and courses rely heavily on these four elements. A brief review of each element follows.

### *Product*

The product is the actual good or service that is being produced for a customer. The product variables in the Four P's model include product variety, quality, design, features,

brand name, packaging, sizes, services, warranties, and returns (Kotler, 1994). Products in the hospitality industry include guest rooms, meals in a restaurant, slot machines in a casino, and fitness centers in hotels.

### *Price*

Price is the amount of money charged for a good or service (Kotler, Bowen, & Makens, 1999). Pricing needs to be set high enough to maximize profits for the company but not so high that too many potential customers are alienated. If the price is too low, not only will profits not be maximized, but customers may be alienated as well since price is often used as a proxy for quality when customers are making a purchase of a good or service with which they have little other information for evaluation. If the price is too low, the customer might think the quality is too low to make the purchase viable. Variables in the price element may include list price (or rack rate, in hotels), discounts, allowances, payment period, and credit terms (Kotler, 1994).

### *Promotion*

The promotion element consists of advertising, sales promotion, public relations, and personal selling (Kotler, Bowen, & Makens, 1999). A product or service's promotion strategy will vary based on the goals of the company and the needs and access to the target market for the product or service. Variables in the promotion element include sales promotion, advertising, sales force, public relations, and direct marketing (Kotler, 1994).

### *Distribution (Place)*

Place is defined as the various activities that a company engages in to make its product accessible and available to its target market (Kotler, 1994). Variables in the

place element include distribution channels, coverage, assortments, locations, inventory, and transport (Kotler, 1994).

### *Characteristics of Services*

While the place factors are still applicable in both product and services marketing, they are incomplete in the services area. Services marketing requires consideration of four additional characteristics of services – intangibility, inseparability, variability, and perishability – that are not typical in product marketing. These characteristics lead to the proposal for an additional “Three P’s”, which will be discussed in the next section.

*Intangibility.* When products are marketed and sold, the customer takes a tangible item away. The item may be felt, seen, smelled, heard, handled, and tasted. However, when a service is sold, the product is intangible, or does not have a physical mass for a consumer to evaluate. This presents a challenge for marketers, since the product cannot be presented through packaging or possession of an object. For example, hotel rooms, per se, are not sold. It is the right to occupy the room’s space for a period of time that is sold to hotel guests (Kotler, Bowen, & Makens, 1999).

*Inseparability.* When products are sold, there is often a temporal disconnect, or time lag, between the purchase and the use or consumption of the product (Berry, 1980). Services, however, are consumed at the same time as they are purchased. In addition, the customer consumes the service inside the production facility. The customer becomes an inseparable part of the product, being inside the service environment (Kotler, Bowen & Makens, 1999).

*Variability.* Manufacturing a tangible good can be controlled so that a consistent product, conforming to rigid standards, is produced. However, most services are

delivered by people, and people are highly variable. The quality of service can vary from day to day and hour to hour. Quality control becomes difficult not only because of the variability of the service delivery personnel but also because the flow of production changes, based on shifts in demand for the product (Kotler, Bowen, & Makens, 1999).

*Perishability.* Tangible products can be inventoried and sold over time. For example, a can of corn may have a shelf life of one year. If it is not purchased today, it may be purchased tomorrow, or perhaps next week. Services cannot be stored. If the service is not sold on one day, the inventory of that service is gone forever. For example, a hotel room can be sold for one day at a time. If the room is not occupied tonight, we lose the room's potential revenue for today forever. This highly perishable, irretrievable quality of services presents a challenge for marketers (Kotler, Bowen, & Makens, 1999).

#### *Additional Three P's*

Three additional P's have been proposed for services marketing to accommodate these four special characteristics. In 1981, Booms and Bitner proposed the additional three P's to supplement McCarthy's Four P's in the marketing mix (Booms & Bitner, 1992). The characteristics of intangibility, inseparability, variability, and perishability in services mean that the final product will be influenced by the presence of other people, the method of production and delivery, and the physical surroundings. The additional Three P's, participants, process, and physical evidence, have been proposed to help the services marketer better manage his or her product.

*Participants.* Participants are the people who play a part in the service delivery (Zeithaml & Bitner, 1996). The participants may include service company employees, the customer purchasing the service, and other customers in the service environment.

Participants will affect the customer's perception of the service experience.

Employees will affect the customer's perception through their attitudes, behaviors, personal appearance, and manner of dress. The area of internal marketing studies the way that companies market themselves to their own employees. The thought is that if the employees feel good about working at the company, they will make a good impression on the customer, thus providing a good service encounter. Other customers also affect the customer's perception of the service through their appearance and their behavior inside the service delivery environment. Customers will feel comfortable in a service environment if the other customers appear to belong there and act in an appropriate manner. Customers will draw negative conclusions about the service experience if the other customers create an unpleasant or negatively incongruous atmosphere.

*Process.* Process includes "the actual procedures, mechanisms, and flow of activities by which the service is delivered" (Zeithaml & Bitner, 1996). The process is the series of steps that the customer must take or negotiate to complete the purchase and consumption transaction. The customer is inside the production function and acts as one of the people who help create the end experience. Processes may fall along a range from simple to complex.

One basic example of the customer's involvement in the production process is the interaction between the customer and a server in a restaurant. The order-taking activity takes place inside the production facility, as does consumption of the ordered product. Another aspect, related to the next element, the physical environment, is the fact that in many restaurants a display kitchen is prominently built into the dining room design. The customer enters the manufacturing area when he or she enters the dining room. An

example of the customer more actively participating in the production of a service in the hospitality industry is the involvement of the customer in pouring his or her own beverages at a fast food restaurant. A task that was once performed by a store employee is now performed by the customer.

*Physical Evidence.* The lack of a tangible product results in the customer using cues from the physical environment to evaluate the service encounter. Cues from the physical environment include any tangible components inside the service environment such as the physical facility itself, brochures and letterhead, invoices, repair trucks and employee uniforms. Other cues include the attire of other customers in the environment. The customer can use these cues to draw inferences about the company (Zeithaml & Bitner, 1996).

The hospitality industry is very capital intensive and thus relies heavily on the physical environment to make a statement about what the business does, how it provides service, the type of clientele that it caters to, and the like. The physical appearance of a hotel or restaurant will provide an overt indicator of the type of customer it serves and can either encourage the approach of the targeted customer or encourage avoidance by the wrong type of customer. Entering a fine dining restaurant will send a different message about the type of food, service, and pricing than entering a fast-food restaurant.

### *Services Marketing Research*

The research that has predominantly focused on consumer marketing and retailing is limiting because it focuses on the consumer's behavior while purchasing tangible goods. Little research has been conducted that focuses on a services delivery environment.

Early research in examining atmospheric effects in a services environment was conducted in the area of banking and financial services. Some of this work led to the study of internal marketing, whereby a company markets itself to its employees (Berry, 1981). Other work examined sectors of the banking and financial services industry to identify the determinants of perceived service quality (Parasuraman, Zeithaml, & Berry, 1985).

The services industry has been slow to gather empirical data to determine the true effects of the physical environment on customer behavior. When purchasing goods and products, the purchaser can touch, handle, taste, smell, or hear the product after leaving the store environment and can continue to assess the quality of the product long after the purchase experience is concluded (Parasuraman, Zeithaml, & Berry, 1985). However, the lack of a physical product in the services industry results in the need for the physical environment in which the service is delivered to become a “tangibilizing” element to lend tangibility to the service (Kotler, Bowen, & Makens, 1999).

### Theoretical Framework for the Study

The proposed study was developed based on Bitner's (1992) Servicescapes framework. The proposed models for this study may be found in Figures 2 through 5. The study used an experimental design to test whether ambient odor had an effect in facilitating affiliation behaviors, social interactions, affiliative interactions, and focus group output. This study was designed in response to several calls by researchers such as Bitner (1992), Aubert-Gamet and Cova (1999), D'Astous (2000), Mitchell, Kahn, and Knasko (1995), Morrin and Ratneshwar (2000), Sharma and Stafford (2000),

Spangenburg, Crowley, and Henderson (1996), Turley and Milliman (2000), and Yalch and Spangenburg (2000), for further empirical testing of the Servicescapes model.

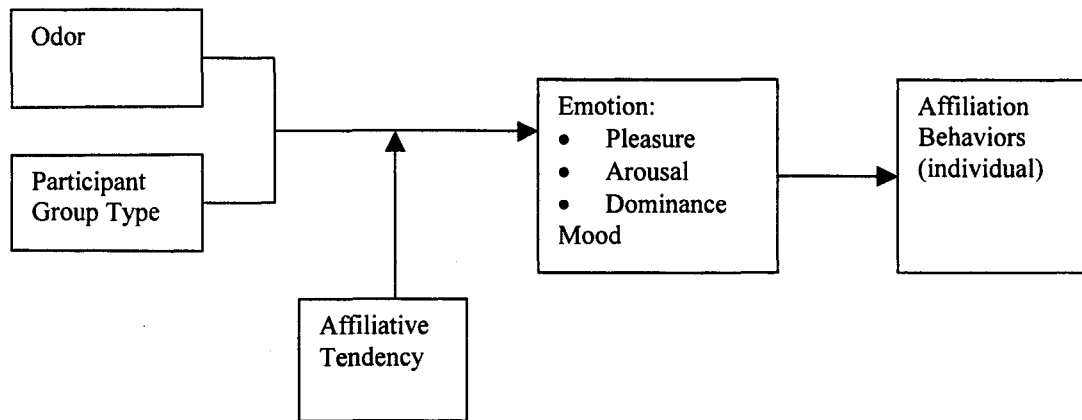


Figure 2. *Model Under Study, Examining Affiliation Behaviors*

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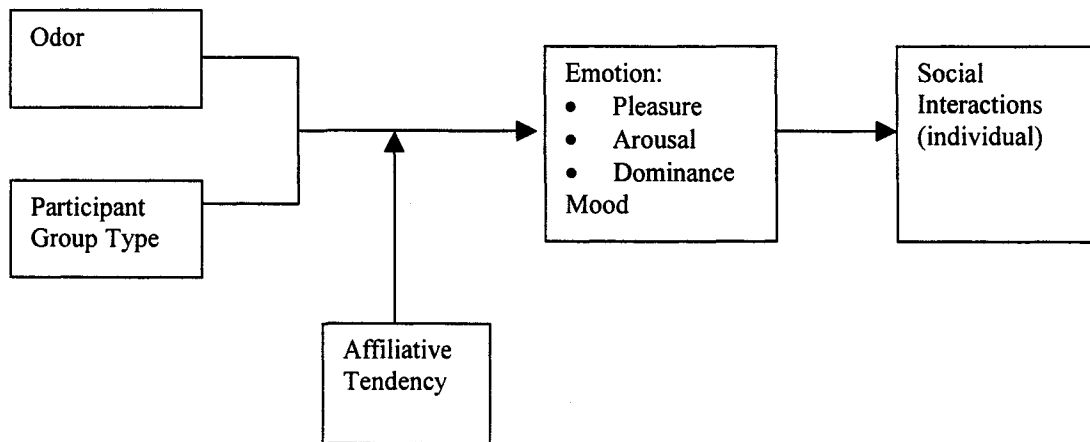


Figure 3. *Model Under Study, Examining Social Interactions*

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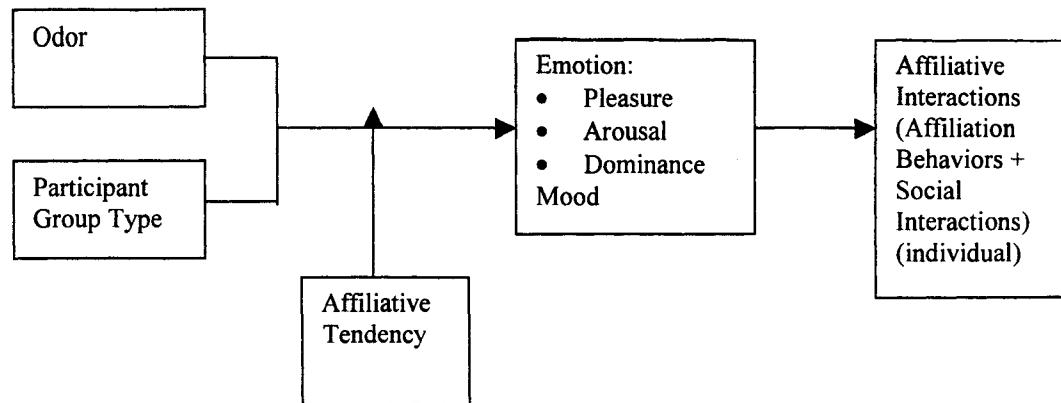


Figure 4. *Model Under Study, Examining Affiliative Interactions*

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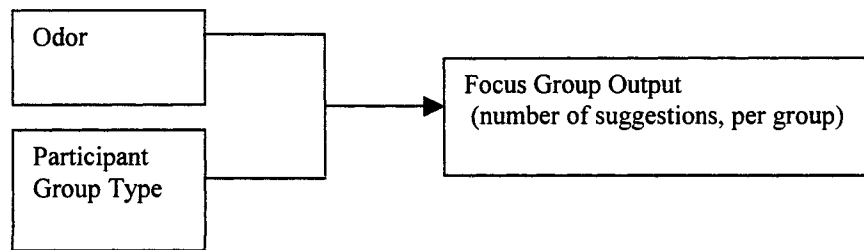


Figure 5. *Model Under Study, Examining Focus Group Output*

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Bitner (1992) and Aubert-Gamet and Cova (1999) call specifically for further study of social interactions and approach/avoidance behaviors in a Servicescape environment.

#### *Theoretical Bases*

There are three theoretical bases for this study, all of which are rooted in brain chemistry research, optimal arousal theory, the dopaminergic theory of positive affect, and the effect of mere-exposure on cognitive fluency. First, the optimal arousal theory, (as discussed by Kahneman, 1973; Kardes, 1999; and Mehrabian and Russell, 1974), suggests that there is an optimal level of arousal, or neurological and physiological

activity, to achieve a certain goal. The optimal arousal concept is graphically represented following an inverted U-shaped curve function, where a state of moderate arousal will increase attention (and then affect, as explained below as part of the dopaminergic theory of positive affect) for other objects in an environment, including people. This represents the top of the inverted U-shape. The two lower tails of the U-shape represent the reduced level of attention that is present under very low and very high arousal conditions.

Optimal arousal theory plays a role in this study because the introduction of the pleasant ambient scent was intended to stimulate positive arousal in the study's participants. The expected consequence of this positive arousal was that the participants would exhibit more affiliation and social interaction behaviors.

The second theoretical basis for the study, the dopaminergic theory of positive affect proposed by Ashby, et al. (2002), suggests that an increased positive arousal state leads to neurotransmitters, particularly dopamine, being released to the frontal cortex. This area activates neurons that create a "happy" or "liking" feeling. The intent of the introduction of the pleasant ambient scent into the experimental environment in this study, then, was to increase the positive arousal levels which would stimulate the brain chemical reaction to create positive affect. Since feelings, such as affect, can be highly transient, or easily transferred to other objects in the environment (Kardes, 1999), then it was expected that the positive feelings would be transferred onto the other people in the waiting room and would prompt affiliation and social interaction among the participants.

Finally, the mere-exposure effect, proposed by Zajonc in 1968 (as cited in Winkielman, et al., 2002; Kardes, 1999) suggests that a prior exposure to some stimulus increases liking for the stimulus. Winkielman, et al. (2002) conducted research that

offers several possible explanations for this phenomenon. They believe that the brain secretes neurotransmitters such as dopamine, serotonin, and acetylcholine to provide a type of reward response to the cognitive processes when a person encounters a familiar stimulus. The familiarity leads to cognitive “fluency”, or ease of processing the information presented by the stimulus. It is thought that the reward response is a positive response to recognizing something familiar, resulting in the brain not having to process new information about a novel stimulus that might be potentially dangerous.

In this study, the intent was to provide a mere-exposure situation for the study’s participants. As the participants had time to occupy the same space together, they were exposed to each other and were able to become familiar with each other. This exposure was intended to serve two purposes: 1) to increase the liking and then affiliative interactions among the participants, and 2) to increase familiarity and liking with the participants, thus allowing them to focus on other types of tasks when in the actual focus group session that followed the waiting room period. If the addition of the scent to the experimental environment increased affect for the situation and others in the situation, then participants would produce more output in the focus group.

### *Dependent Variables*

The four dependent variables that were selected to examine group differences are affiliation behaviors, social interactions, affiliative interactions, and focus group output. The first two variables are described as two distinct types of behaviors by such researchers as Mehrabian and Russell (1974), Mehrabian and Diamond (1971), Bitner (1992), and Birdwhistel (1970). However, because affiliation and social interaction behaviors appear to be very closely related and are sometimes only placed in a particular

category based on some measure of distance between the subjects (Hall, 1976), the third dependent variable, “affiliative interactions”, was developed by combining the total observed incidences of affiliation behaviors and social interactions for each study participant.

The fourth variable, focus group output, was examined on a per-group basis. The total number of suggestions generated by each focus group were compared for differences between groups. While this results in a small sample size, reducing the statistical power of the experiment, it seemed prudent to explore the production aspect of the meeting to begin to understand the practical implications for the world of business management.

In closing, greater familiarity and liking (affect) for others in a situation would be beneficial to the hospitality industry that depends heavily the physical environment and its employees to generate goodwill, loyalty, and repeat business from customers, which should be the goals of all businesses (Shoemaker & Lewis, 1999; Bowen & Shoemaker, 1998). Chapter 3 discusses the methodology that was used to test the concepts discussed above.

## CHAPTER 3

### METHODOLOGY

#### Overview of Research Questions

Two primary questions were posed in this study.

Research Question 1: Does the physical environment, specifically, the ambient scent, impact the social interactions between strangers in a focus group waiting room environment?

Research Question 2: Does the physical environment affect the interactions and contributions of participants during a focus group session?

To answer these questions, four propositions were proposed in this study.

P1: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of Affiliation behaviors exhibited by focus group participants.

P2: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of Social Interactions that will be initiated by focus group participants.

P3: The presence of a pleasant ambient scent in the focus group waiting room will increase the combined number of affiliation behaviors and social interactions, or Affiliative Interactions, exhibited by focus group participants.

P4: The presence of a pleasant ambient scent in both the focus group waiting room and in the focus group room itself will increase the number of contributions that will be generated by focus group participants, i.e., Focus Group Output, during the actual focus group session.

### Research Design

A quasi-experimental design was used in this study. The study tested a methodology for examining behavior in an environment that has not been studied in the past. The study examined the effects of two levels of ambient scent manipulation – the presence of a pleasant ambient scent and the absence of the added ambient scent -- on two types of slot machine players.

Four dependent variables were under consideration in this study. The first was number and type of observed affiliation behaviors. The second was the number and type of social interactions that were observed. The third was the total quantity of affiliation behaviors and social interactions combined, which will be henceforth referred to as Affiliative Interactions. The fourth dependent variable was the number of contributions/opinions that focus group participants made during the focus group session that followed the observation period.

Several covariates were also under consideration as moderators or mediators of observable behaviors. These covariates included the emotions of pleasure, arousal, and dominance; the subjects' need for affiliation; the subjects' mood after exposure to the treated/untreated environment; and three demographic measures. The dimensions examined in this study are summarized below in Table 2.

Table 2. *Summary of Variables Included in Study*

| <u>Variable Type</u> | <u>Variable Name</u>         | <u>Measurement</u>                |
|----------------------|------------------------------|-----------------------------------|
| Dependent            | Affiliation Behaviors        | Video content analysis            |
|                      | Social Interaction Behaviors | Video content analysis            |
|                      | Affiliative Interactions     | Video content analysis            |
|                      | Focus Group Output           | Text content analysis; word count |
| Independent          | Scent Condition              | Scented/Unscented (dichotomous)   |
|                      | Participant Group Type       | Tryer-Acceptor/Tryer-Rejecter     |
| Covariate            | Emotion:                     |                                   |
|                      | Pleasure                     | 6-item Likert scale               |
|                      | Arousal                      | 6-item Likert scale               |
|                      | Dominance                    | 6-item semantic differential      |
|                      | Affiliative Tendency         | 26-item summed scale              |
| Demographic          | Mood                         | 4-item Likert scale               |
|                      | Sex                          | Male/Female                       |
|                      | Age                          | Continuous                        |
|                      | Smoke once or more daily?    | Yes/No                            |

Field studies have been used in environmental psychology since Barker developed methodologies for the study of ecological (or environmental) psychology in a “real world” setting in the late-1940’s (Bonnes & Secchiaroli, 1995; Barker, 1976). The new methodologies were developed because Barker was unhappy with the predominantly laboratory-based methodologies that existed at the time and the attending problems with validity from which laboratory research suffers.

The experiment is quasi-experimental because the subjects were part of a convenience sample and not chosen randomly from the general population. A strictly experimental design would require bringing experiment subjects into a laboratory environment, controlling all conditions, and then manipulating the variables under

consideration (Cooper & Schindler, 1998). A true experimental design provides greater reliability than a quasi-experimental design because the sample is a true random sample. However, experimental studies conducted under laboratory conditions generally have lower external validity, due to the artificiality of the laboratory environment. In addition, budgetary constraints made obtaining a truly random sample prohibitively expensive in this instance.

Each of the variables and covariates are discussed next.

### *Independent Variables*

Two independent variables, ambient scent condition and participant group membership, were under consideration in this study. The first variable was the ambient scent condition of the room, a dichotomous independent variable. The treated-condition groups met in a room with a pleasant scent added and the control groups met in an unscented room. The selection of this variable, ambient scent, answers the call for further research on ambient scent in the field of atmospherics research (Gulas & Bloch, 1995; Baron, 1990; Bitner, 1992; Spangenberg, Crowley, & Henderson, 1996). In addition, this variable is interesting because most of the research done in the past has examined ambient scent in a retail or consumer products environment or in a cognitive psychology context. No past research was located that shows the effect of ambient scent on a services environment or social interactions in meetings or focus group situations.

The selection of an ambient scent for the waiting room was affected by three factors – pleasantness of the scent, the novelty of the scent, and the intensity of the scent. Most of the literature reviewed indicated that floral scents are usually considered to be pleasant, rather than neutral or unpleasant (Gulas & Bloch, 1995; Morrin & Ratneshwar, 2000).

The novelty, or unfamiliarity or unexpectedness, of the scent assists in creating and increased state of arousal. The increased arousal condition occurs because the novel stimulus cues the individual that some environmental condition does not match expectations. Attention is increased attention in the situation, as is brain activity to process the novel data (Morrin & Ratneshwar, 2000; Ashby, et al., 2002, Winkielman, et al., 2002). A positive arousal state can lead to increased positive affect, as Morrin and Ratneshwar (2000) found in product evaluation in a pleasantly scented environment. The intensity of ambient scent is crucial to control (Gulas & Bloch, 1995) because too light a scent will not be noticed by the individuals in the environment, while too intense a scent has been found to be negatively arousing (Mehrabian & Russell, 1974; Gulas & Bloch, 1995, Morrin & Ratneshwar, 2000). The procedure used to control the intensity of the scent is discussed in the Procedures section of this chapter.

Morrin and Ratneshwar's (2000) study on the effect of ambient scent on memory and remembering familiar and unfamiliar brands found that a pleasant ambient scent might improve memory, in part through an encoding effect. The scent found by study participants to be the most pleasant was geranium, which was rated higher than lavender, rosemary, or eucalyptus. Essential oil of geranium was used in this study.

The second independent variable was specified by the sponsor of this study. The sample participants were casino patrons who have played a particular slot machine game in the past. This variable was also dichotomous, the levels of which were determined by frequency of use of the slot machine used as the topic of the focus groups. The first group consisted of people who have played the game, like it, and continue to play it

frequently. The second group consisted of those people who have played the slot machine but either do not like it, or have decreased their frequency of play.

### *Dependent Variables*

Four dependent variables were measured in this study: 1) the number of Affiliation Behaviors observed; 2) the number of Social Interactions observed; 3) the combined total affiliation behaviors and social interactions, i.e., Affiliative Interactions; and 4) the gross number of contributions that each focus group generated during the focus group sessions, referred to henceforth as Focus Group Output.

*Affiliation Behaviors.* Bitner's (1992) Servicescapes model has two outcomes listed for the Servicescape – approach/avoidance behaviors and social interactions among and between employees and customers. Affiliation behaviors fall into the approach/avoidance category as examples of approach behaviors (Mehrabian & Russell, 1974; Mehrabian, 1980; Bitner, 1992). Bitner and others call for further research into how the environmental atmosphere or Servicescape affects behavior and this model tests the effect of ambient scent on affiliation. The list of potential affiliation behaviors that will be counted are included in Appendix C, the training manual used to train the expert judges of the videotaped in this study.

*Social Interactions.* Social interactions are also an outcome of the Servicescapes model (Bitner, 1992). This study examines the number and type of social interactions that are visually observed during the focus group's time in a waiting room to ascertain if the ambient scent variable has a measurable effect on the propensity to initiate and engage in social interaction. The list of social interaction behaviors that were counted is

included in Appendix C, the training manual used to train the expert judges of the videotaped in this study.

*Affiliative Interactions.* While Mehrabian and Russell (1974), Bitner (1992), and Mehrabian and Diamond (1971) discuss affiliation behaviors and social interactions as two distinct types of behavior, other researchers, such as Festinger, Schachter, and Black (1963) and occasionally, Mehrabian (1970) himself, view both types as being the same. The Affiliative Interactions measure used in this study is the sum of each participant's affiliation behaviors and social interaction behaviors, as observed and reported by the expert judges used in this study.

*Focus Group Output.* This dependent variable study is the quantity of information that each focus group generated during the focus group session following the observation period in the waiting room. This examines whether the presence of the ambient scent had a statistically significant effect on focus group output.

#### *Covariates*

There were three potential covariates in this study – emotion, affiliative tendency, and mood. The purpose of covariate measurement is twofold: “to eliminate some systematic error that is outside the control of the researcher that can bias results and to account for differences in the responses due to unique characteristics of the respondents” (Hair, Anderson, Tatham, & Black, 1998, p. 346). These covariates were measured through a survey that was administered after the participants spent 15 minutes in the waiting room environment. Each covariate will be discussed in turn.

*Emotion.* The emotion dimension of internal responses in Bitner's (1992) Servicescapes framework is under consideration as a covariate in this study because it has

been used extensively in past research (Mehrabian, 1980; Mehrabian & Russell, 1974; Bitner, 1992; Morrin & Ratneshwar; 2000, Machleit & Eroglu, 2000; Sherman, Mathur, & Smith, 1997). The emotion dimension consists of three factors – pleasure, arousal, and dominance. It has been used in the past to measure the emotional response to a physical space. The three dimensions of emotion were used as covariates in this study because group differences were examined and past research indicates that the subjects' behaviors can be affected by their emotional reactions to the treatment space. Morrin and Ratneshwar (2000) examined their subjects' current feelings of pleasure, arousal, and dominance after the subjects entered the scented/unscented room but immediately before beginning the experimental treatment conducted in their study. This study examined these emotional responses to the waiting room for the participants in the focus group to control for emotion while examining the behavior in the environment.

*Affiliative Tendency.* The need to examine affiliation and social interaction behaviors led to the need to control for the subjects' affiliative tendency. It is possible that the people who agree to participate in the focus group have a greater tendency to engage in social situations than the normal population. This situation also provides the opportunity to determine if the presence of the pleasant ambient scent increased the actual affiliative behaviors displayed by the participants.

*Mood.* Bitner (1992) proposes mood as a moderating variable for individuals in forming emotional responses to the perceived Servicescape. Mood is a transient state and affects the individual's behavior within the environment. Mood is characterized by Wessman (1979) as "shifting yet pervasive emotional feeling states of varying duration – usually not as intense nor as clearly related to a specific provoking object or situation as

is the case with a fully developed emotion” (Wessman, 1979, p. 74). According to Ashby, et al.’s (2002) dopaminergic theory of positive affect, arousal conditions that induce positive affect (or mood) are likely to increase positive arousal. The addition of ambient scent in this study was intended to induce positive affect and arousal in the participants. Mood is a part of the spectrum of emotions, but was examined separately in this study. This study included questions about current mood to control for possible covariation with behavior, to control for differences between groups.

### *Demographics*

Three demographic variables are examined in this study. Sex is examined as a covariate in this study because of prior research indicating that there is a significant difference in odor identification between the sexes. The study also examines whether participants smoke tobacco products once a day or more often and the participants’ ages.

### *Control Variables/Conditions*

This study did not occur in a laboratory setting, but all care was taken to provide an identical environment for all groups. Environmental variables that were controlled include the layout of the semi-fixed objects (i.e., furniture) within the waiting room, lighting levels, temperature, ambient sound, and the focus group moderator who was blind to the treatment conditions.

### *Collection of Data*

The experiment was conducted in the Stan Fulton Building on the campus of the University of Nevada, Las Vegas. Two adjacent rooms were used, the first as a waiting area and the second for the actual focus group session. The focus group participants

entered the waiting room area that was either scented or not scented prior to the participants' arrival. The participants were then told that the focus group moderator was running a few minutes late and they would have to wait for a few minutes. Their behavior was observed via a camera that recorded visual information only.

When the fifteen-minute period ended, participants completed the preliminary survey and then moved to the focus group room, where the focus group session commenced. The fifteen-minute period was selected for this study because it was long enough for the formation of social interactions but not so long that the participants became irritated and then perform poorly in the actual focus group session. The participants completed a second survey at the conclusion of the focus group session to determine whether the ambient scent was detectable.

The topic of the focus group was the participants' attitudes, beliefs, awareness, and usage of a particular knowledge-based slot machine game. A local gaming machine manufacturing company, the sponsor of the study, provided the topic and the participants' incentives. The amount of data generated during the focus groups is the only information relevant to this study. The actual information about the slot machines is proprietary and confidential and, as such, will not be discussed in this study.

The survey data were entered into SPSS® 11.0, a computer application package for statistical analysis, and analyzed. The data obtained via videotape were analyzed using observational techniques from three judges, who tracked the participants' behaviors through the waiting period. The qualitative information was analyzed for interjudge agreement and then quantified for use in the statistical analysis. In addition, the videotaped focus group sessions were transcribed by a professional transcriptionist. The

transcripts were content analyzed and the number of contributions was quantified for each session. The data were analyzed using the analysis of variance (ANOVA) technique. Each component of the procedure will now be discussed in detail.

### *Ambient Scent Condition*

The waiting room was either scented or unscented. The scented condition was created by applying two-to-three drops of essential oil of geranium to pieces of blotter paper and fastened to the bottoms of the square tables in the waiting room. The same procedure was conducted in the focus group room. The scented rooms were aired out for a minimum of two days before the next unscented session took place.

In addition, the post-session survey completed by the focus group participants consisted of questions asking if the participants noticed anything special about the waiting room and the focus group room. Their answers were intended to determine if the intensity of the scent was perceptible, imperceptible, or too strong.

### *Survey #1*

A survey was used to gather demographic data and to measure the covariates in this study. The survey was completed after the 15-minute period spent in the waiting room. Informed Consent, as approved by the University of Nevada Las Vegas' Office for the Protection of Research Subjects, was provided during recruitment of the subjects. The study participants provided their signed informed consent forms at the beginning of each session. The participants then completed the preliminary survey.

The preliminary survey instrument was a fifty-one question, paper-and-pencil questionnaire. The survey was divided into four sections that measured emotion

(pleasure, arousal, and dominance), affiliative tendency, mood, and demographics. A copy of the survey is located in Appendix A at the end of this document.

The survey questions are scales that have been used in the past to measure emotion, affiliative tendency, mood, and demographics. The emotion covariates – pleasure, arousal, and dominance – were measured using scales developed by Mehrabian and Russell (1974) and Russell and Pratt (1980). The first two components, Pleasure and Arousal, were measured using modified versions of Mehrabian and Russell's (1974) scale. The first modifications were by Russell and Pratt (1980), still using a semantic differential scale but identifying more specific semantic pairs. Baker, Levy, and Grewal (1992) then converted the semantic differential scales to 6-point Likert-type scales. Their modification involved selecting the half of the semantic pairs that indicated the “unpleasant” and “sleepy” qualities of a place in a study that examined some of the unpleasant characteristics of a retail environment. Baker et al. (1992) tested the two scales and reported an  $\alpha = .84$  for the pleasure dimension and  $\alpha = .80$  for the arousal dimension. These indicate a reasonable level of internal reliability in measuring these factors.

Baker, et al. (1992) tested for internal validity of the two scales using confirmatory factor analysis and found the two scales to have higher intra-item correlation than correlation between the two scales. No further testing of validity was reported. This study used the same 6-point scale proposed by Baker, et al. (1992), but changed the unpleasant and sleepy terms into the pleasant and “awake” terms that were proposed by Russell and Pratt (1980).

The third component, dominance, was measured using the Dominance dimension scale proposed by Mehrabian and Russell (1974). They tested and refined this scale many times, and reported an  $\alpha = .88$ . This again indicates that the items in the scale are reasonably stable in their measurement. The scale is a semantic differential scale, with verb descriptor pairs at either end of a continuum. A series of seven blank spaces is provided where the respondent checked the point where he or she felt that he or she fell within the range.

The three factors of emotion -- pleasure, arousal, and dominance -- were developed by Mehrabian and Russell (1974), based on previous research in mood and perceptual psychology. Mehrabian and Russell's (1974) three factors were obtained through factor analysis. Divergent validity of each factor was verified by the low intercorrelations between each factor. For example, the factors pleasure and arousal were slightly negatively correlated (-0.07). Pleasure and dominance were slightly positively correlated (0.03). Dominance and arousal showed a low positive correlation (0.18). Construct validity was not reported, possibly because the initial work was based on past research by others.

The third section of the survey measured the participant's affiliative tendency. The scale used in this section was a 26-item scale developed by Mehrabian and Ksionzky (1974). The instrument uses a 9-point scale, ranging from -4 through +4 and includes 0. The respondent evaluates each statement presented and indicates his or her agreement with the statement on the 9-point scale that ranges from very strong disagreement to very strong agreement. The sum of the respondent's answers is calculated to obtain a measure of affiliative tendency. The population mean for the scale is reported, by Mehrabian and

Ksionzky (1974), to be 28. The scores of this study's participants were compared with the population mean and then compared between participant groups for group differences. This scale is reported to have internal reliability coefficient of .80.

Mehrabian and Ksionzky (1974) tested the construct validity of this scale by administering a separate scale relating to the "flexibility of interpersonal cognitions" (Mehrabian & Ksionzky, 1974, p. 29, quotations in text) where interpersonal cognitions are determined by affect. This was essentially a test to insure that the affiliative tendency scale did not simply report the same information as their sensitivity to rejection scale. Their goal was to develop a scale that truly measured an individual's affiliative tendency aside from his or her desire to avoid rejection. They report a moderately negative correlation between the affiliative tendency and flexibility of interpersonal cognition scale (-0.31), which indicates adequate construct validity.

The next dimension measured in the survey was current mood. This was measured using a four-item scale tested by Boles and Burton in 1992 (Bruner & Hensel, 1992, p. 437-439) that Boles and Burton found to have  $\alpha = .84$ . They administered the scale prior to exposing sample subjects to advertising stimuli to test if mood was a predictor of attitude towards the advertisements presented. It was found not be a significant predictor. However, for the purposes of this study it was considered prudent to test this dimension since the scent stimulus might stimulate the subject's current mood. Again, this decision was grounded in the dopaminergic theory of positive affect (Ashby, et al., 2002) where a positive stimulus (here, the ambient scent) increases arousal. Increased states of positive arousal are likely to stimulate positive affect and mood (Winkielman, et al., 2002). The instrument uses a 5-point Likert-type scale.

The demographic variables that were explored included gender, age, and whether the individual smoked tobacco products one time or more per day. The smoking question was included because smokers often have a decreased ability to perceive odors and this may moderate their reaction to the pleasantly scented environment.

The results of the data collected in Survey #1 will be discussed in Chapter 4 – Data Analysis and Results. However, it should be noted at this time that a flaw in the data collection procedure was discovered after the data had been collected. This inadvertent oversight in coding the surveys resulted in the inability to link the surveys completed by the participants with their individual affiliation and social interaction behaviors and focus group production. This inability to connect the covariate measures to the observed dependent variables resulted in discarding the survey data for use in an analysis of covariance. This changed the method of analysis of covariance to analysis of variance.

#### *Survey #2*

A second survey was administered at the conclusion of the actual focus group session. Survey #2 consisted of five statements with which the participant either agreed or disagreed. The statements are about various conditions of the rooms that the group occupied. Statements included 1) The lighting was good; 2) The furniture was comfortable; 3) The room temperature was comfortable; 4) I did not notice the presence of a scent in the room(s); and 5) I did not notice the presence of any background noise in the room(s). If the participant disagreed with a statement, they were asked to elaborate on why they disagreed. The request for elaboration from the “disagree” answers only was intended to provide brevity in the survey, since it was believed that the participants would, after two hours in the experimental environment, be fatigued and would also be

eager to collect the \$50 incentive and leave the focus group space. The intent of this series of questions was to determine if the scent intensity in the scented conditions was too strong.

### *Videotaped Data*

The participants were led into the waiting room as a group and videotaping commenced as soon as they entered. Participants were not made aware of the presence of the video camera while in the waiting room. The video camera was positioned at the ceiling level in a corner to maximize the viewing angle for full room coverage. This method was used to collect the data in lieu of a human observer in the room. This was intended to reduce the likelihood that the presence of an observer in the waiting room would lead to abnormal behaviors by the subjects.

The camera was a tiny “spy” camera, embedded in a computer chip, mounted at the ceiling of the room. Building conditions prevented running the camera’s cables through the ceiling to a remote location. The cables were run down the wall and connected to the VCR that recorded the visual data. The VCR was disguised as an array of audio-visual equipment that bore a sign indicating that it was to be reserved and used for a training session for a University group activity.

The participants were informed of the presence of the video camera in the Informed Consent letter, but the specific presence of a camera in the waiting room was not made. This was to reduce the likelihood of creating the Hawthorne Effect, identified by Roethlisberger and Dickson in 1939 (Bechtel & Zeisel, 1979). The Hawthorne Effect describes the improvement in production that was recorded by a control group that did not receive the improved lighting treatment in a study in a factory. The control group

knew that the experiment was being conducted and this knowledge, by itself, led to the increased production rate. This result led the effect that the improved lighting had on the treatment group to be called into question.

Another principle, the Heisenberg Uncertainty Principle, states that nothing in nature can be measured without interfering with it in some way (Bechtel & Zeisel, 1979).

Videotaping this study's subjects in as unobtrusive a manner as possible minimized the effect that the observation technique had on the focus group participants' behaviors.

#### *Human Subjects Protocols*

Human subjects protocols, as approved by the University of Nevada, Las Vegas' Office for Sponsored Programs on February 13, 2003 (OPRS# 600S0103-027), were carefully followed. The nature of the observation portion of this experiment led to the University's requirement that the subjects be notified in advance that they would be observed and videotaped. The subjects' agreement to be videotaped was obtained as a condition of participation when they were recruited to participate in the focus group session itself.

The Office for Sponsored Programs also required that the subjects be informed that they would be potentially subjected to an airborne chemical treatment. The Informed Consent letter includes a list of chemicals that are used to clean the building, such as floor wax, window cleaner, and hand soap. This list also includes a variety of air fresheners. The essential oil of geranium odorant used in this study is listed in this section.

The portion of the Informed Consent notification that the participant signed and turned in at the beginning of the experiment required that the participant explicitly agree

to be videotaped and that they had read the list of chemicals. The full Informed Consent package is included in Appendix B.

### Sample Information

The participants in this study were a convenience sample of adult individuals who were recruited at various commercial casinos in the Las Vegas, Nevada area. The recruitment process included obtaining permission to be videotaped and screening potential participants for sensitivity to chemicals. Participants who knew each other were not allowed to register for the same focus group session, to reduce the likelihood that individuals in each session would know each other. The intent was to have groups consisting of strangers, to avoid pre-existing relationships that could affect the interactions within the group. Finally, the people who agreed to participate in the focus group were told to not wear perfume, cologne, or other scents on the day of the focus group. The recruiter explained that the focus group moderator was allergic to perfume and cologne.

### *Sample Size Calculation*

The original intent of the researcher was to conduct a multivariate analysis of covariance (MANCOVA). When comparing groups in a cellular design, Hair, et al. (1998) recommend a minimum of 20 cases per cell. The four-cell design (treatment vs. non-treatment and participant group type) resulted in the need for at least 80 participants to obtain the proper sample size for MANCOVA. Tabachnick and Fidell (2001) also suggest that at least 20 cases per cell for MANOVA or MANCOVA are necessary. A

typical focus group consists of 10-12 participants. A minimum of eight focus groups was planned to obtain an adequate sample size.

The change in analysis technique from multivariate analysis of covariance to univariate analysis of covariance does not negatively affect the sample size issue. MANCOVA is, in fact, a more sensitive statistical method than ANCOVA. The 20 cases per cell required in MANCOVA provide adequate power for an ANCOVA analysis. The final analyses used in this study were a series of univariate ANOVA's, which also had sufficient statistical power with the 20 cases per cell.

*Response rate.* The response rate for the survey was 100%, since the participants completed the survey instrument upon arrival at the focus group location.

### Validity

Internal validity is a difficult issue to address when conducting qualitative research. Research conducted in the field can be highly variable and contain a high degree of uncertainty due to activities or factors that either are unforeseen or cannot be controlled by the researcher (Winkel, 1985). The techniques that were used during this experiment to address validity issues were the attempts to control the various environmental variables in the waiting room, controlling for moderator differences in the focus group sessions by using a single moderator for all eight sessions, holding focus group sessions on different days of the week, and attempting to control the subjects by requesting that they not sign up for the same focus group session in which a friend or friends will participate. Internal validity in the analysis phase of the study was addressed through a systematic, objective observation process and the use of three judges to evaluate the videotaped data.

These efforts did not provide complete validity for the study. The inherent problem of the artificiality of the laboratory setting, which affects external validity, the time of year for data collection and the use of casino patrons, which effect internal validity, cannot be overcome. However, the level of both internal and external validity should be satisfactory for an exploratory study that can be reproduced at a later date in other field settings and with subjects that fall into more diverse demographic categories.

### Treatment of Data

#### *Quantitative Data*

The data obtained from the survey instrument were coded and entered into the statistical analysis computer applications package, SPSS® 11.0. The data were screened for outliers, and tested to ensure that it did not violate the assumptions of ANOVA: observations must be independent, variance must be equal among groups, and distributions are normal (Hair, et al., 1998).

#### *Qualitative Data*

The raw data from the videotaped part of the data collection is qualitative. The treatment of the qualitative data converted it to quantitative data, through the observation and tracking techniques that are described below. Categories of behaviors were developed, following guidelines that are provided in Appendix C. The number of occurrences for affiliation, social interaction, and affiliative interactions behaviors was tabulated on an individual basis, and then entered into the SPSS® 11.0 database as dependent variables.

### *Analyzing the Videotape*

The technique that was used to analyze the videotape data in this study was a tracking technique called “behavioral mapping” (Bechtel & Zeisel, 1987). Behavioral mapping is an observational method derived from early research conducted in a hospital psychiatric ward (Rivlin & Wolfe, 1976). Winkel and Sasanoff (1976) recommend this “tracking” technique for determining overall traffic patterns, measuring distances, and determining differences between different time periods.

There are five essential elements in the behavioral mapping technique:

1. A graphic rendering of the space to be observed;
2. A clear definition of the human behaviors observed, counted, described, or diagrammed;
3. A schedule of repeated times during which the observation and recording take place;
4. A systematic procedure followed in observing;
5. A coding and counting system, which minimizes the effort required in recording observations. (Bechtel & Zeisel, 1987).

*Step One: Graphic Rendering.* The first step in behavioral mapping is to create a map that is drawn-to-scale of the space where the behavior will be observed (Bechtel & Zeisel, 1987). The observer watches behavior in the space and makes notations on the map of types and frequencies of behaviors, duration, and people involved in the behavior.

A scale drawing of the waiting room appears in Appendix C, the training guide for the observers. The drawing includes the location of the furniture and any other semi-

fixed features present in the room. The drawing was provided to the observers to assist in mapping the location of the behaviors and movement within the room.

*Step Two: Definitions of Behaviors.* A critical point in behavioral mapping is to generate, a priori, categories of behaviors that are to be specifically observed (Bechtel & Zeisel, 1987). Ittelson, Rivlin, and Proshansky (1976) suggest that the behavior categories “must be explicit, precise, and relatively narrow, and in addition, relevant to the particular problem under consideration (p. 341).” However, no matter how precisely the categories are defined, it is likely that they will change during the observation or will have behaviors added or deleted. Ittelson, et al. (1976) refer to a study of a family’s household bathroom where the normally expected behaviors occurred as well as unexpected behaviors, such as using the bathroom as a “private telephone booth and as a refuge from family quarrels”(p. 341). This extended the list of behaviors beyond what was established a priori. The behavioral maps are empirical data, where data are obtained through observation.

Three general categories of behaviors were set a priori for this study. The behaviors that were tracked in the Waiting Room Environment were affiliation (for positive affiliative behavior), avoidance (for negative affiliation behavior) and social interaction. The two affiliative behaviors -- affiliation and avoidance -- were suggested by Mehrabian and Ksionsky (1974). They indicate that affiliation includes initiation of conversation, but do not suggest that continuing conversation is affiliation. There is reference to continued conversation as a social interaction. The separate categories of affiliation and social interaction were suggested by Bitner (1992). The behavior in the Focus Group

Room did not require behavioral mapping and only involved counting contributions from focus group members, as listed in the typed transcripts of the sessions.

*Step Three: Schedule of Behaviors.* The observations were taped at approximately the same time of day or evening. The videotape observers set their VCR's to "0:00:00" at the beginning of each taped session and recorded the elapsed time shown when behaviors occurred. This provided a schedule to calculate the frequency and duration of the exhibited behaviors.

*Step Four: Systematic Procedure for Observing.* A training manual, which appears in Appendix C, was developed and used to train the videotape analysis judges. Each judge was trained by reviewing the manual, then practicing identifying behaviors that were shown on the videotapes. Eight judges were recruited and three different judges viewed each tape.

*Step Five: Coding System.* This requires identification of the categories of behaviors that are going to be observed. Two categories used in this study were derived from Bitner's (1992) Servicescapes framework – affiliation (positive and negative) and social interaction. Examples of behaviors that might be exhibited by the study's participants are provided in the Training Manual in Appendix C. Whereas Step Two involved defining categories of behaviors and examples of such behaviors, Step Five involves assigning specific codes to the behaviors. A coding system to categorize behaviors that were observed into the appropriate category was developed, using examples of behaviors suggested by Mehrabian and Russell (1974), Bitner (1992), and Birdwhistel (1970). The number of incidences of each behavior was counted, for use as dependent variables in the statistical analysis.

In addition, as a less subjective measure of focus group productivity, the focus group transcripts were used to obtain a word count from each of the focus group sessions. While this is not a measure of the quality of the focus group production or the actual quantity of suggestions, it does indicate the amount of discussion that occurred.

### *Judges/Observers*

The proposed study required a minimum of three judges (Malin, 2002; Personal Communication, LeAnn Putney, December 3, 2002) to observe the videotaped data and perform the behavioral mapping techniques. The judges were recruited among graduate students in the University of Nevada, Las Vegas' Educational Psychology and Sociology departments. Each judge had previous coursework in qualitative analysis and content analysis techniques. Although six judges were required, eight judges were recruited to provide a buffer against incomplete work or poor analysis. Each judge viewed four videotaped waiting room sessions, resulting in each session being analyzed by three independent judges. The data provided by one judge were discarded due to low quality. The data generated by three judges for each session were retained for analysis.

The judges were trained between April 5 and April 17, 2003. The training manual that is included in Appendix C of this document was used during training. A one-hour training session was conducted, during which anywhere from one to four judges were trained. The training included an overview of the training manual and procedures, followed by analysis exercises where the judges viewed portions of videotaped sessions and then practiced the content analysis to be performed. Question and answer periods helped to clarify actions that were exhibited on the tapes and the procedures for recording the actions.

The training manual was developed to assist the expert judges in observing the types of behaviors targeted in this study. Although each judge was recruited through two academic departments at the University of Nevada, Las Vegas and had taken at least one course in qualitative methodology that included experience in participant observation, guidelines were provided to insure that the judges focused on the right categories of behaviors. The procedures were developed using some of the guidelines recommended by Spradley (1980), who offers a detailed, step-by-step procedure for organizing, conducting, analyzing, and reporting ethnographic studies. Although Spradley emphasizes the spoken communication aspects of the subjects under observation, as well as the observer as a participant in the observation environment, there are numerous techniques that he either recommends specifically for behavior observation or that can be adopted from observations of speech.

While Spradley's (1980) method generally leads to the construction of generated categories or domains, this study is a focused observation, where the types of behaviors to be observed and recorded are established a priori, based on previous research and theory. The purpose of this study is not to examine all potential cultural aspects of a group, but is limited to examining behaviors of positive affiliation. This study used non-participating observers. The manual and training sessions prepared the observers to complete the videotape content analysis by providing guidance in four areas. First, the observers were trained in exercising explicit awareness of each of the study subjects and their actions. Second, the observers were offered guidance in introspection. In this situation, the observers exercised care in interpreting the subjects' behaviors without making assumptions or inferences regarding the causes of the behaviors. Third, a

detailed record-keeping system was provided and training was offered in how to comply with the recording requirements. This is related to the fourth and final area, field notes. The record-keeping system used in this study made use of a “condensed account” of behaviors observed in the videotapes (Spradley, 1980, p. 69).

The training manual for the session was also developed in accordance with the five-step guidelines suggested by Bechtel and Zeisel (1987), that were presented earlier. The activities that delineated the affiliation and social interaction behaviors were adapted from information provided by Mehrabian and Russell (1974), Bitner (1992), and Birdwhistel (1970).

The development of a manual to train observers was also influenced by the researcher’s own experience. The researcher has fifteen years of experience in facilities management, service operations management, technical project sales, and other sales. This past experience required training staff to observe the environment and its occupants in a systematic, detailed manner.

The judges noted their observations on the forms provided, as shown in Appendix C. The researcher reviewed the data provided by the judges and then coded each behavior into an appropriate category. The form provides a space to calculate the total number of incidences of each type of observed behavior for each focus group member.

The data obtained from the judges were analyzed for reliability. The formula for interjudge reliability used by Smith and Houston (1985) is:

$$R = \frac{A + (N - 1) * A}{1 + (N - 1) * A}$$

where A = average interjudge agreement and N = the number of judges. Three judges were used for each taped session. The interjudge agreement calculation is as follows:

$$A = \frac{\sum_{i < j} \frac{2M_{ij}}{n_i + n_j}}{1 / (N(N-1)/2)}$$

where  $M_{ij}$  = number of coding decisions upon which there is agreement between judges  $i$  and  $j$

$N$  = number of judges

$n_i$  = number of coding decisions by judge  $i$

$$\left( \frac{2M_{12}}{n_1 + n_2} + \frac{2M_{23}}{n_2 + n_3} + \frac{2M_{13}}{n_1 + n_3} \right) * [(3 * 2)/2]$$

Two types of disagreement can occur between judges. The first is a clerical-type error made by one of the judges when he or she coded the incident incorrectly. The second type of error is a disagreement between two or more judges. The treatment of low interjudge agreement in this study will be discussed in the next chapter, Data Analysis and Results.

### *Statistical Methods*

This study involved two, dichotomous independent variables and four continuous dependent variables. The study examined group differences between the treatment and control groups, but did not attempt to predict group membership. Each dependent variable was examined separately, due to an expected high correlation between three of the variables, Affiliation Behaviors, Social Interactions, and the combined dependent variable, Affiliative Interactions. The fourth dependent variable, Focus Group Output, was measured at the group level rather than at the individual level and therefore was tested separately.

In addition, several covariates had been included to control for extraneous factors when examining the dependent behavior variables. The use of two, dichotomous treatment independent variables lends a factorial design to the study. However, as stated earlier, it was necessary to discard the covariates from the analysis due to a data collection error. The final method for analysis was a 2 x 2 factorial analysis of variance (ANOVA).

According to Hinkle, Wiersma, and Jurs (1998), the general formula used to state analysis of variance is:

$$X_{ijk} = \mu + \alpha_j + \beta_k + (\alpha\beta)_{jk} + e_{ijk}$$

where:

$X_{ijk}$  = the number of behaviors exhibited by the  $i$ th subject in the  $j$ th row and the  $k$ th column

$\mu$  = the grand mean of the population

$\alpha_j$  =  $(\mu_{j\cdot} - \mu)$ , the effect of being in a particular level of the first independent variable

$\beta_k$  =  $(\mu_{\cdot k} - \mu)$ , the effect of being in a particular level of the second independent variable

$(\alpha\beta)_{jk}$  =  $\{(\mu_{jk} - \mu) - [(\mu_{j\cdot} - \mu) + (\mu_{\cdot k} - \mu)]\} = (\mu_{jk} - \mu_{j\cdot} - \mu_{\cdot k} + \mu)$ , the interaction effect of being in a particular  $j$  and  $k$  combination after the main effects have been considered

$e_{ijk}$  = random error associated with the number of behaviors exhibited

The data analysis first looked for interaction effects between the two control variables, followed by an examination of main effects, when warranted by the interaction

effects analysis. The results of these analyses will be discussed in the next chapter, Data Analysis and Results.

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## CHAPTER 4

### DATA ANALYSIS AND RESULTS

#### Introduction

This chapter will discuss the processes used to analyze the data and the results. It begins with an overview of the sample characteristics, then reviews the procedures used to determine suitability of the data for inclusion in the analysis. The discussion then turns to the analyses used to test the hypotheses proposed in this study. Before the discussion of the analysis and results, the following is a review of the research questions posed in this study:

Research Question 1: Does the physical environment, specifically, the ambient scent, impact the social interactions among strangers in a focus group waiting room environment?

Research Question 2: Does the physical environment affect the contributions of participants during a focus group session?

#### Sample Results

The intent for the study was to have an ultimate sample size of 80. However, to compensate for possible cancellations and no-shows at the sessions, the focus groups were over-recruited. The goal was to have a minimum of 13 people per session recruited,

which included a 30% excess sample size to account for drop-outs. However, it was not always possible to recruit 13 individuals for each group. In addition, the drop-out rate occasionally exceeded 30%. A total of 101 signed up for focus groups and 77 people actually participated, resulting in a 76.24% participation rate.

A summary of the three demographic variables that were measured appears below in Table 3. The table also includes demographic data obtained from the Las Vegas Perspective 2002, a survey of the population and business environment in the Las Vegas, Nevada area that is conducted on a biennial basis. Information on smoking incidences was also collected from the American Cancer Society (2003) for comparison reasons. This information is presented in Table 3 to provide a comparison between the study sample and the overall local population.

Table 3. *Sample Characteristics and Comparison with Local Population*

|   | Study Sample  |       | Population Comparison                                |
|---|---------------|-------|--|
| Sex ( <i>n</i> = 76)  |               |       |  |
| Male  | 34            | 44.7% | 47.3% <sup>(a)</sup>                                 |
| Female  | 42            | 55.3% | 52.7% <sup>(a)</sup>                                 |
| Age ( <i>n</i> = 74)  |               |       |  |
| Mean  | 53.8 years    |       | N/A  |
| Median  | 58.0 years    |       | 46.3 years <sup>(a)</sup>                            |
| Range   | 23 – 81 years |       | N/A  |
| Smoke tobacco products once or more daily? ( <i>n</i> = 76) |               |       |  |
| Yes   | 19            | 25.0% | Men: 26% <sup>(b)</sup><br>Women: 21% <sup>(b)</sup> |
| No  | 57            | 75.0% |  |

Notes: (a) *Las Vegas Perspective 2002*. (2002). Las Vegas, NV: Metropolitan Research Association.

(b) *Cancer facts and figures 2003*. (2003). Atlanta, GA: American Cancer Society, Inc. Retrieved June 3, 2003, from <http://www.cancer.org/downloads/STT/CAFF2003PWSecured.pdf>

Although this study had a higher percentage of women and fewer men than the overall Las Vegas population, the difference was not statistically significant ( $\chi^2 = .842$ ). The study's sample was also somewhat older than the local resident population. The percentage of participants who smoke once or more daily was similar to that of the general population.

Table 4 below summarizes the results of the part of the survey administered to the focus group participants at the conclusion of the actual focus group. The questions were intended to determine if the scent levels were too intense in the experimental and focus group environments.

| Table 4. <i>Post-Test Survey of Environment</i>                       |       |          |   |
|---|-------|----------|---|
| Question (n = 76)   | Agree | Disagree | If you disagree, why?   |
| The lighting was good.  | 76    | 0        |   |
| The furniture was comfortable.  | 76    | 0        | "Could be better" (1)   |
| The room temperature was comfortable.                                 | 74    | 2        | "A little warm" (2)   |
| I did not notice presence of a scent in the room(s).                  | 74    | 2        | "Not overpowering" (1)  |
| I did not notice the presence of any background noise in the room(s). | 64    | 12       | Noise from slot machines (7)<br>Outdoor noise (3)<br>Air handling fan (1) |

Two respondents reported noticing the presence of a scent in the environment. One respondent in one of the scented condition groups indicated that while he or she did

notice a scent, it was “not overpowering”. The other respondent who reported noticing a scent was in an unscented condition group.

### Interjudge Agreement

The reliability of the content analysis performed by the independent expert judges was assessed using the formula shown previously in Chapter 3. The formula is essentially a weighted-average type formula. The data used in the formulae were the number of incidences of affiliation behaviors, social interaction behaviors, and the combined variable, affiliative interactions, that were observed and recorded by each judge. Avoidance behaviors data were also collected and appear in the raw data located in Appendix D, but are not included in this analysis. An example of the calculation of the calculation of the interjudge reliability, using the formula discussed in Chapter 3, is shown below:

$$R = \frac{A + (N - 1) * A}{1 + (N - 1) * A}$$

where A, the average interjudge agreement is:

$$A = \frac{\sum_{i < j} \frac{2M_{ij}}{n_i + n_j}}{N(N - 1) / 2}$$

For example, if the three judges observed and recorded 3, 5, and 6 behaviors respectively for Participant 1, the interjudge agreement is calculated as follows:

$$\begin{aligned} \text{Step 1: } A_{1,2} &= (2*3)/(3 + 5) = .75 \\ A_{2,3} &= (2*5)/(5+6) = .91 \\ A_{1,3} &= (2*3)/(3+6) = .67 \end{aligned}$$

Step 2:

$$\begin{aligned}
 A &= (.75 + .91 + .67) / (3(3-1)/2) \\
 &= 2.33 * .333 \\
 &= .78
 \end{aligned}$$

After the average interjudge agreements are calculated, the interjudge reliability is calculated. Using the above example, the reliability is then calculated as:

$$\begin{aligned}
 R &= (.78 + (3-1))*(.78) / (1 + (3-1))*(.78) \\
 &= 2.17 / 2.34 \\
 &= .93
 \end{aligned}$$

Table 5 shows the interjudge reliabilities for each of the 77 participants.

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*Table 5. Interjudge Reliability for Affiliation Behaviors, Social Interaction Behaviors, and Affiliative Interactions*

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| <u>Case #</u><br><u>(n = 77)</u> | <u>Affiliation</u><br><u>Behaviors</u> | <u>Social Interaction</u><br><u>Behaviors</u> | <u>Affiliative</u><br><u>Interactions</u> |
|----------------------------------|--|---|---|
| 1                                | .00                                    | .80   | .77                                       |
| 2                                | .89                                    | .93   | .94                                       |
| 3                                | .76                                    | 1.00  | .95                                       |
| 4                                | .81                                    | .93   | .95                                       |
| 5                                | .77                                    | .87   | .96                                       |
| 6                                | .75                                    | .94   | .98                                       |
| 7                                | .88                                    | .95   | .91                                       |
| 8                                | .91                                    | .80   | .96                                       |
| 9                                | .75                                    | .94   | .89                                       |
| 10                               | .90                                    | .86   | .88                                       |
| 11                               | .89                                    | .88   | .90                                       |
| 12                               | .89                                    | .91   | .92                                       |
| 13                               | .85                                    | .81   | .81                                       |
| 14                               | .95                                    | .85   | .88                                       |
| 15                               | .83                                    | .78   | .83                                       |
| 16                               | .76                                    | .92   | .85                                       |
| 17                               | .74                                    | .00   | .73                                       |

Table 5. *Interjudge Reliability for Affiliation Behaviors, Social Interaction Behaviors, and Affiliative Interactions (cont.)*

| Case #<br>(n = 77) | Affiliation<br>Behaviors | Social Interaction<br>Behaviors | Affiliative<br>Interactions |
|--------------------|--------------------------|---------------------------------|-----------------------------|
| 18                 | .00                      | .00                             | .00                         |
| 19                 | .77                      | .92                             | .95                         |
| 20                 | .81                      | .90                             | .95                         |
| 21                 | .89                      | .91                             | .93                         |
| 22                 | .91                      | .90                             | .91                         |
| 23                 | .93                      | .89                             | .91                         |
| 24                 | .81                      | .92                             | .89                         |
| 25                 | .86                      | .90                             | .92                         |
| 26                 | .80                      | .89                             | .89                         |
| 27                 | .78                      | .93                             | .94                         |
| 28                 | .81                      | .86                             | .92                         |
| 29                 | .89                      | .92                             | .93                         |
| 30                 | .80                      | .96                             | .96                         |
| 31                 | .00                      | .84                             | .83                         |
| 32                 | .00                      | .00                             | .00                         |
| 33                 | .85                      | .94                             | .94                         |
| 34                 | .84                      | .90                             | .90                         |
| 35                 | .73                      | .91                             | .90                         |
| 36                 | .83                      | .89                             | .86                         |
| 37                 | .90                      | .86                             | 1.00                        |
| 38                 | .00                      | .00                             | .89                         |
| 39                 | .88                      | .98                             | .91                         |
| 40                 | .69                      | .94                             | .88                         |
| 41                 | .00                      | .78                             | .78                         |
| 42                 | .91                      | .00                             | .91                         |
| 43                 | 1.00                     | .96                             | .99                         |
| 44                 | .86                      | .93                             | .90                         |
| 45                 | .85                      | .98                             | .91                         |
| 46                 | .93                      | .85                             | .86                         |
| 47                 | .00                      | .91                             | .85                         |
| 48                 | .79                      | .96                             | .91                         |
| 49                 | .88                      | .94                             | .94                         |
| 50                 | .78                      | .70                             | .71                         |
| 51                 | .70                      | .00                             | .70                         |
| 52                 | .88                      | .74                             | .97                         |
| 53                 | .89                      | .80                             | .99                         |
| 54                 | .88                      | .95                             | .95                         |
| 55                 | .91                      | .89                             | .96                         |
| 56                 | .72                      | .98                             | .92                         |
| 57                 | .77                      | .00                             | .75                         |

Table 5. *Interjudge Reliability for Affiliation Behaviors, Social Interaction Behaviors, and Affiliative Interactions (cont.)*

| Case #<br>( <i>n</i> = 77) | Affiliation<br>Behaviors | Social Interaction<br>Behaviors | Affiliative<br>Interactions |
|----------------------------|--------------------------|---------------------------------|-----------------------------|
| 58                         | .93                      | .00                             | .92                         |
| 59                         | .78                      | .00                             | .74                         |
| 60                         | .83                      | 1.00                            | .90                         |
| 61                         | .90                      | .86                             | .90                         |
| 62                         | .00                      | .80                             | .85                         |
| 63                         | .00                      | .00                             | .00                         |
| 64                         | .74                      | .84                             | .88                         |
| 65                         | .89                      | .00                             | .86                         |
| 66                         | .79                      | .00                             | .79                         |
| 67                         | .82                      | .88                             | .91                         |
| 68                         | .79                      | .92                             | .93                         |
| 69                         | .82                      | .91                             | .92                         |
| 70                         | .84                      | .90                             | .89                         |
| 71                         | .87                      | .94                             | .94                         |
| 72                         | .80                      | .97                             | .89                         |
| 73                         | .97                      | .90                             | .93                         |
| 74                         | .82                      | .96                             | .91                         |
| 75                         | .80                      | .00                             | .80                         |
| 76                         | .84                      | .94                             | .96                         |
| 77                         | .81                      | .97                             | .88                         |

The total number of incidences for each behavior recorded by each of the three judges evaluating the videotapes was used in the interjudge reliability calculation. The rule of thumb used to determine if a proper level of interjudge reliability is a level of .90 or greater (Bechtel & Zeisel, 1987). Examining the raw data from the expert judges showed that the judges often disagreed on the difference between an affiliation behavior and a social interaction behavior. However, the combined variable, Affiliative Interactions, does not show significant improvement in reliability over the two separate variables. The interjudge reliabilities displayed in Table 5 that resulted in a value of 0.00 are the result

of one or more judges not recording any instance of the subject behavior. The calculation for average interjudge agreement will result in a 0 in either the numerator or the denominator of the equation, providing an answer of 0, which in turn results in a reliability value of 0 as well. However, when the cases were examined as agreement between only two judges at a time, an acceptable level of interjudge agreement was achieved. This level of agreement was deemed to be acceptable for retaining the cases in the analysis.

While the preferred level of .90 was not achieved in many cases, the interjudge reliability of these variables generally ranged from .80 to .95. While this is not ideal, it was deemed acceptable for retention in the analysis phase for this exploratory study.

#### Quantitative Data Screening Issues

##### *Unequal Sample Sizes and Missing Data*

The distribution of the sample appears below in Table 6.

*Table 6. Sample Distribution*

|                     | <u>Participant Group</u> |                       | <u>Total</u> |
|---------------------|--------------------------|-----------------------|--------------|
|                     | <u>Tryer-Acceptor</u>    | <u>Tryer-Rejecter</u> |              |
| Scented Condition   | 18                       | 22                    | 40           |
| Unscented Condition | <u>17</u>                | <u>20</u>             | 37           |
| Total               | 35                       | 42                    |              |

Ideally, the sample would have had a minimum of twenty cases per cell. The recruiters who enlisted participants for the focus groups over-recruited to proactively address potential no-shows for each session. However, the rate of participants who did not appear at the sessions was higher than expected, resulting in two of the cells in the Tryer-Acceptor participant condition with fewer than twenty cases. Although the low sample size is not ideal, the decision to stop data collection at this point was made due to the high cost in both money and time of pursuing an additional five cases to balance out the design. The distribution of the cases is still relatively balanced among the four cells and did not profoundly affect the results of this exploratory study.

Missing data were examined in the survey results. However, as will be discussed later in this chapter, the variables that had missing data were dropped from the analysis.

#### *Normality of Sampling Distributions*

The sample size of 77 does not meet the requirement for 20 cases per cell in the 2 x 2 between subjects design. However, there are more cases in each cell than there are variables under study in the final model. Normality was tested using histograms and box plots for the three individual behavioral dependent variables, Affiliation Behaviors, Social Interactions, and Affiliative Interactions. These three variables were found to have roughly normal distributions. The dependent variable Focus Group Output had few values, since each dependent variable was a summative number for each group, preventing a true test of normality of the sampling distribution.

### *Outliers*

All data were tested for the presence of outliers. Three outliers were found in the Affiliation Behaviors variable but were retained in the analysis for two reasons. First, the observed cases that were flagged as outliers by SPSS 11.0 each had a reasonable level of interjudge agreement ( $R = .635, .696$ , and  $.59$ , respectively) for the numbers observed behaviors. Second, the small sample size ( $n = 77$ ) led to the decision to preserve as much of the sample as possible. The remaining behavior variables were found to have no outliers.

The data in the Focus Group Output variable were also examined for outliers. No outliers were found with the exception of one focus group's number of contributions in the focus group. The focus group sessions were audio-taped and transcripts of each session were generated. The audiotape ran out of tape on the first side of the tape during each session and the tape had to be turned over to continue recording the remainder of the session. The tape did not get turned over during Focus Group 3, resulting in the loss of approximately 15 minutes of verbal information and a much lower incidence of focus group contributions. It was decided that the value for the number of contributions for this group would be replaced with the mean of the number of contributions from the remaining seven focus groups, since the loss of one of the focus groups' data would result in a loss of participants and half of the information from one of the experimental cells.

### *Normality and Homogeneity of Variance*

The normality and the homogeneity of the variance for the dependent variables Affiliation Behaviors, Social Interactions, and Affiliative Interactions were tested.

Normality was tested using frequency analysis and generation of histograms. The histograms for all three dependent variables showed that each variable was normally distributed. The homogeneity of variance for each dependent variable was tested using Levene's test of homogeneity of variance. Again, each variable's variance was homoscedastic.

The normality and homogeneity of variance were not tested for the Focus Group Output variable. This is due to the method of calculating the variable's values on a suggestions-per-group basis, rather than on an individual participant's contribution basis. This results in the variable having only eight values, one for each focus group session. Testing for normality and homogeneity of variance was not effective because of the small sample size. This was determined to be acceptable for this exploratory study.

### *Covariate Issues*

Analysis of the covariates was conducted to determine the appropriateness of retaining each one in the overall analysis. The results of these tests are discussed below. However, the covariates were removed from the analysis in this study because of the inability to pair the participant responses to the covariate scales to their behaviors in the dependent variables. In addition, some of the covariates discussed below were also unsuitable for use in an analysis of covariance due to the nature of the scales used.

### *Linearity*

A desirable covariate is one that is linearly related to the dependent variables. However, it was not possible to test the linearity of the covariates because of the inability

to link the individual's scale information with their observed behaviors, due to a data collection and coding error. The covariates were removed from the analysis.

### *Reliability of Covariates*

While all covariates were dropped from the analysis, it was still important to test their reliability to determine if they might be suitable in future experiments. There was also concern that the number of covariates was too high for a study that used a relatively small sample. Besides the problems associated with matching the covariates with observed behaviors, the covariates were not included to help achieve parsimony in the model.

The reliability of each of the covariates was tested using Cronbach's alpha. The value for each of the covariate scales is shown in Table 7 below.

Table 7. *Cronbach's Alpha Values for Covariates*

| <u>Covariate Dimension</u> | <u>Cronbach's Alpha</u> | <u>Number of Observations</u> |
|----------------------------|-------------------------|-------------------------------|
| Pleasure                   | .3554                   | 77                            |
| Arousal                    | .4499                   | 72                            |
| Dominance                  | .6968                   | 74                            |
| Affiliative Tendency       | .7471                   | 73                            |
| Mood                       | .4360                   | 75                            |

None of the scales used to measure the covariates meets the minimum required value of .80 (Tabachnick and Fidell, 1999). However, the sample sizes that range from 72 to 77 do not provide enough data to accurately determine reliability. The scales were also analyzed using bivariate correlation to determine if the covariates were redundant. The Pleasure, Arousal, Dominance, and Mood scales' items were found to have high

intercorrelations within each scale, which is not desirable for covariate measures. For example, the Dominance scale is a six-item semantic differential scale. Each of the items should, ideally, be measuring roughly the same dimension of emotion. The result of retaining the Dominance scale as a covariate would, in essence, measure the same thing six times, which would skew the results. The Pleasure, Arousal, and Dominance scales were developed for use as three separate factors in a factor analysis technique and are not suitable for use as covariates. Mood is a separate four-item scale but is not summative, meaning that the four scale items measure roughly the same thing (current mood) but are not combined at the end to create an overall mood score. If an overall score for Mood, Pleasure, Arousal, or Dominance were developed, it is possible that they might be suitable for use in as covariates.

Affiliative Tendency, however, is a summative scale that would be suitable for use as a covariate. To review, the scale consists of twenty-six items that are summed to create an Affiliative Tendency score. In an effort to explore if Affiliative Tendency might be suitable for use in future research, Cronbach's alpha test for reliability was performed on this covariate. The Cronbach's alpha for the Affiliative Tendency scale did not meet the traditionally acceptable cut-off point of .80 or greater in reliability. However, the value of .7471 is close enough to the .80 point to consider using it in a future analysis, particularly if the study utilizes a larger sample. One point of interest was the mean score for the study sample on the Affiliative Tendency score. The population mean reported by Mehrabian and Ksionzky (1974) was 28 ( $n = 916$ ), which is a summative score for the 26-item scale. The participants in this study had a mean score of 61.89 ( $n = 77$ ) on the Affiliative Tendency scale, indicating a high tendency to affiliate with others.

This high tendency to affiliate is consistent with the behaviors observed by the researcher while in the casinos where the focus group participants were recruited. An informant who is a representative of the company that sponsored this study and who has extensive contact with the gamblers who play the slot machine under study was discussing the progress of recruitment with the researcher. The researcher noted that the people who play the game were surprisingly willing to talk to the recruiters, considering how difficult it traditionally is to conduct intercept interviews and to recruit while slot machine players are gambling. The informant responded that the people who play this game “would affiliate with a rock if they could” (personal communication, Ruth Moderhak, March 5, 2003). No significant differences in the mean Affiliative Tendency scores were found in either the different scent conditions or between the participant group types.

#### Analysis of Variance (ANOVA)

A 2 x 2 factorial analysis of variance was performed for each of the four dependent variables. The General Linear Model univariate option in SPSS 11.0 was used. The independent variables used were Scent Condition (unscented or scented) and Participant Group Type (Tryer-Acceptor or Tryer-Rejecter). This method enters all variables simultaneously, therefore order of entry of the variable into the analysis does not affect the results. The total sample size of 77 was used in the analysis, with no deletions.

The analyses for each of the four dependent variables – affiliation behaviors, social interaction behaviors, affiliative interactions, and focus group output – will be presented. The interactions effects will be discussed first, followed by main effects.

### *Affiliation Behaviors*

An analysis of variance was performed on the dependent variable Affiliation Behaviors. The results of the analysis are shown below in Table 8.

Table 8. *Analysis of Variance for Affiliation Behaviors*

| Source                     | df | F        | $\eta^2$ | p    |
|----------------------------|----|----------|----------|------|
| Between subjects           |    |          |          |      |
| Scent Condition (S)        | 1  | .804     | .011     | .373 |
| Participant Group Type (T) | 1  | 1.121    | .015     | .293 |
| Scent x Type               | 1  | .579     | .008     | .449 |
| Error                      | 73 | (11.109) |          |      |

Note: Values enclosed in parentheses represent mean square errors.

\* $p < .10$ . \*\* $p < .05$ .

There was no statistically significant interaction effect between the scent condition and the participant group type,  $F_{(1, 73)} = .579$ ,  $p > .10$ . There was also no statistically significant main effect for either scent condition ( $F_{(1, 73)} = .804$ ,  $p > .10$ ) or participant group type ( $F_{(1, 73)} = 1.121$ ,  $p > .10$ ). The interjudge reliabilities for this dependent variable were generally somewhat lower (ranging from 0 to .99, with a mean of .74) than the reliabilities for the other two continuous dependent variables. This may explain, in part, the lack of significance.

### *Social Interaction Behaviors*

An analysis of variance was performed on the dependent variable Social Interaction Behaviors. The results of the analysis are shown in Table 9. There was no statistically

significant interaction effect between the scent condition of the waiting room and the participant group type  $F_{(1, 73)} = .316, p > .10$ . However, there was a statistically significant difference in main effect in scent condition,  $F_{(1, 73)} = 3.911, p < .05, \eta^2 = .051$ . The scented condition (mean = 11.65,  $\sigma = 8.12$ ) resulted in more social interaction behaviors exhibited by the study participants than did the unscented condition (mean = 8.60,  $\sigma = 7.10$ ). The  $\eta^2$  value of .051, however, indicates that the strength of association between the scent condition and the exhibition of social interaction behaviors is weak.

Table 9. *Analysis of Variance for Social Interaction Behaviors*

| Source                     | df | F        | $\eta^2$ | p      |
|----------------------------|----|----------|----------|--------|
| Between subjects           |    |          |          |        |
| Scent Condition (S)        | 1  | 3.911    | .051     | .052*  |
| Participant Group Type (T) | 1  | 27.539   | .274     | .000** |
| Scent x Type               | 1  | 1.019    | .014     | .316   |
| Error                      | 73 | (43.388) |          |        |

Note: Values enclosed in parentheses represent mean square errors.

\* $p < .10$ . \*\* $p < .05$ .

In other words, only 5.1% of the variance in the number of social interactions is attributable to the scent condition present in the room.

There was also a statistically significant main effect from the participant group type,  $F_{(1, 73)} = 27.539, p < .05, \eta^2 = .274$ . The participant groups consisting of Tryer-Acceptors exhibited significantly more social interaction behaviors (mean = 14.46,  $\sigma = 7.66$ ) than did the groups consisting of Tryer-Rejecters (mean = 6.63,  $\sigma = 5.85$ ). The  $\eta^2$  value of .274 indicates a moderate level of strength of association between the participant group type and the number of social interactions that the group exhibited. In other words,

approximately 27.4% of the variation in the number of social interactions can be explained by the type of participant group.

### *Affiliative Interactions*

An analysis of variance was performed on the dependent variable Affiliative Interactions. The results of the analysis are shown below in Table 10.

Table 10. *Analysis of Variance for Affiliative Interaction Behaviors*

| Source                     | df | F        | $\eta^2$ | p      |
|----------------------------|----|----------|----------|--------|
| Between subjects           |    |          |          |        |
| Scent Condition (S)        | 1  | 1.505    | .020     | .224   |
| Participant Group Type (T) | 1  | 14.354   | .164     | .000** |
| Scent x Type               | 1  | .253     | .003     | .617   |
| Error                      | 73 | (67.078) |          |        |

Note: Values enclosed in parentheses represent mean square errors.

\* $p < .10$ . \*\* $p < .05$ .

There was no statistically significant interaction effect between the scent condition of the waiting room and the participant group type on the combined dependent variable, Affiliative Interactions,  $F_{(1, 73)} = .253$ ,  $p > .10$ . There was also no statistically significant difference in main effect in scent condition,  $F_{(1, 73)} = 1.505$ ,  $p > .10$ .

There was, however, a statistically significant main effect from the participant group type,  $F_{(1, 73)} = 14.354$ ,  $p < .0001$ ,  $\eta^2 = .164$ . The participant groups consisting of Tryer-Acceptors exhibited significantly more affiliative interaction behaviors (mean = 18.91,  $\sigma = 8.26$ ) than did the groups consisting of Tryer-Rejecters (mean = 11.87,  $\sigma = 8.12$ ). Although the participant group type has a statistically significant main effect, the  $\eta^2$  value of .164 indicates a weak level of strength of association between the participant

group type and the number of affiliative interactions that the group exhibited. In other words, approximately 16.4% of the variation in the number of affiliative interactions can be explained by the type of participant group.

### *Focus Group Output*

The analysis of variance was performed and the results of the analysis are shown below in Table 11. The initial analysis used the number of suggestions generated in the focus group sessions as the dependent variable. The dependent variables were calculated on a per-group, rather than a per-individual, basis. This resulted in a total sample size of eight.

Table 11. *Analysis of Variance for Focus Group Output*

| Source                     | df | F        | $\eta^2$ | p      |
|----------------------------|----|----------|----------|--------|
| Between subjects           |    |          |          |        |
| Scent Condition (S)        | 1  | 3.613    | .475     | .130   |
| Participant Group Type (T) | 1  | 4.861    | .549     | .092*  |
| Scent x Type               | 1  | 10.688   | .728     | .031** |
| Error                      | 4  | (21.625) |          |        |

Note: Values enclosed in parentheses represent mean square errors.

\* $p < .10$ . \*\* $p < .05$ .

There was a statistically significant interaction effect between the scent condition and the participant group type on the number of suggestions generated by the focus groups,  $F_{(1,4)} = 10.688$ ,  $p < .05$ ,  $\eta^2 = .728$ . While the interaction effect is statistically significant, the relatively high  $\eta^2$  value indicates that the strength of association between

the independent variables' interaction effect and the number of focus group suggestions is relatively strong.

There was no statistically significant main effect from the scent condition,  $F_{(1,4)} = 3.613$ ,  $p < .130$ . There was, however, a statistically significant main effect in the participant group type,  $F_{(1,4)} = 4.861$ ,  $p < .10$ ,  $\eta^2 = .092$ . The focus groups consisting of Tryer-Acceptors generated significantly more suggestions during the focus group session (mean = 79.75,  $\sigma = 2.99$ ) than did the groups consisting of Tryer-Rejecters (mean = 72.50,  $\sigma = 11.09$ ). The  $\eta^2$  value of .092 indicates a relatively weak strength of association between the participant group type and the number of suggestions generated by the focus groups.

The significant interaction and participant group type main effects should be viewed with caution. The sample consists of only eight observations, which diminish the statistical power of the analysis. An additional analysis of variance was conducted in an effort to use a less subjective evaluation of the focus group output measure. The transcripts were analyzed for quantity of content by examining the total word count for each session. This again resulted in only eight cases for the dependent variable (one word count value per session), which reduced the statistical power of the analysis. However, it provided insight into the effect of ambient scent, as well as participant group type, on the focus group output. The results of this analysis are shown in Table 12.

There was no statistically significant interaction effect between the scent condition of the waiting room and the participant group type on the word count for the focus group sessions,  $F_{(1,4)} = .3340$ ,  $p > .10$ .

Table 12. *Analysis of Variance for Focus Group Session Word Count*

| Source                     | df | F             | $\eta^2$ | p    |
|----------------------------|----|---------------|----------|------|
| Between subjects           |    |               |          |      |
| Scent Condition (S)        | 1  | .539          | .119     | .504 |
| Participant Group Type (T) | 1  | 1.872         | .319     | .243 |
| Scent x Type               | 1  | 3.340         | .455     | .142 |
| Error                      | 4  | (571,204.125) |          |      |

Note: Values enclosed in parentheses represent mean square errors.

\* $p < .10$ . \*\* $p < .05$ .

There was also no statistically significant difference in main effect in either the scent condition,  $F_{(1,4)} = .539$ ,  $p > .10$  or in the participant group type,  $F_{(1,4)} = 1.872$ ,  $p > .10$ .

#### *Post Hoc Tests*

Post hoc tests, such as the Tukey or Scheffé tests, were not performed. These tests are usually performed if any independent variable in a factorial design has three or more levels of treatment. This study's independent variables had two levels of treatment each. Thus, post hoc testing was not required.

#### *Proposition Testing*

The four propositions investigated in this study are discussed next. All propositions were tested at the .10 significance level, which was deemed to be appropriate for an exploratory study.

*P1: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of affiliation behaviors exhibited by focus group participants.*

There was no statistically significant interaction or main effects in the scent condition on the number of affiliation behaviors exhibited by the study participants. Thus, Proposition 1 was not supported.

*P2: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of social interactions that will be initiated by focus group participants.*

Scent had a statistically significant main effect on the number of social interaction behaviors exhibited by the study participants. However, the participant group type had an even more significant effect on the number of social interactions. Proposition 2 was supported in this study.

*P3: The presence of a pleasant ambient scent in the focus group waiting room will increase the combined number of affiliation behaviors and social interactions, or Affiliative Interactions, exhibited by focus group participants.*

The ambient scent condition in the study did not have a statistically significant main effect on the number of affiliative interactions exhibited by the study participants, while the participant group type had a significant effect. However, the lack of significance on the part of the scent condition results in Proposition 3 not being supported.

*P4: The presence of a pleasant ambient scent in both the focus group waiting room and in the focus group room itself will increase the number of contributions that will be generated by focus group participants, i.e., focus group output, during the actual focus group session.*

The ambient scent did not have a statistically significant main effect on the number of suggestions contributed by the focus groups. However, the scent condition and the

participant group type did have a significant interaction effect on the focus group output. The participant group type did have a significant main effect. Since the main effect of scent was not significant, Proposition 4 was not supported. However, the low power of this analysis should be noted.

A detailed discussion of the study's findings is presented in the next chapter. It will be followed by a discussion of the limitations to the study and suggestions for future research.

## CHAPTER 5

### DISCUSSION AND CONCLUSION

#### Introduction

This chapter begins with a summary of the study, followed by a discussion of the results that were reported in Chapter 4. The chapter concludes with a discussion of the generalizability of results, limitations of the study, and suggestions for future research.

#### Summary of the Study

This study sought to test whether the presence of a pleasant ambient scent would have a positive influence on focus group participants' behaviors. The intent of the study was to explore if the focus group and the meetings industries can provide meeting environments that would be more conducive to communication and more productive. The concepts tested in this study are based in environmental psychology, or the study of how the physical environment affects individual and group behavior within the environment.

*Design.* The study was quasi-experimental, using a 2 x 2 factorial design. The two independent variables under study were the presence or absence of a pleasant ambient scent and the type of participant group, defined as either Tryer-Acceptors or Tryer-Rejecters of a particular slot machine game. The participant group categories were

defined by the sponsor of the study, a gaming machine manufacturer. The experiment involved focus group participants spending fifteen minutes in the experimental environment, completing a survey, participating in the actual focus group session, then completing a post-focus group survey. The time spent in the experimental environment was videotaped for content analysis of behaviors exhibited while in the treated/untreated room.

### *Covariates*

Several potential covariates were measured using a test administered to the participants immediately following the fifteen minutes in the waiting room. These covariates included Pleasure, Arousal, Dominance, Affiliative Tendency, and Mood. Pleasure, Arousal, Dominance, and Mood were ultimately discarded as covariates for two primary reasons. First, an error in the data collection procedure prevented matching the participants' responses to the surveys to the observed behaviors that were used as the dependent variables. This made it impossible to conduct an analysis of covariance.

In addition, these measures were discarded because they exhibited low reliability and they could not be verified to have a linear relationship with the dependent variable. The low reliability was possibly due to the small sample size ( $n = 77$ ). The inability to verify a linear relationship with the dependent variables was due to the data collection procedure error.

These Pleasure, Arousal, Dominance, and Mood variables were also unsuitable for use as covariates because they are intended as scale items used in factor analysis. A covariate should be a single item measure that controls noise in the analysis from influences that are not controlled in the experiment. For these variables to be effective

covariates, the analysis would require that they be single indicant variables, rather than several scale items that are part of a factor analysis.

The Affiliative Tendency measure was more suitable for use as a covariate. This is because the measure is a summative scale, where the responses to the twenty-six scale items are summed at the end of the survey to produce an Affiliative Tendency score for each respondent. However, the data collection procedural error made it impossible to test the linear relation with the dependent variables. Thus, it was also discarded in this study.

### *Dependent Variables*

The study initially proposed four dependent variables: Affiliation Behaviors, Social Interactions, Affiliative Interactions, and Focus Group Output. The Affiliation Behavior, Social Interaction, and Affiliative Interactions variables were developed through videotape content analysis conducted by expert judges. The content analysis had less than optimal interjudge reliability, possibly due to the highly subjective process of content analysis of movement viewed on videotape. However, this was an exploratory study and the interjudge reliability values that generally fell into the .80 - .95 range suggest that the technique used may be effective for use in the future with some refinement of the types of behaviors and improved training of the expert judges.

The dependent variable Focus Group Suggestions was calculated by counting suggestions made during the focus group sessions that occurred after the 15-minute waiting room period. The counts were generated off the focus group transcripts. The transcripts were also analyzed using the Word Count function in Microsoft Word to

provide additional focus group production data for comparison purposes. This was done to provide a less subjective basis for analysis.

The data were analyzed using a 2 x 2 factorial univariate analysis of variance (ANOVA). The results of the analysis show that scent had no statistically significant increase in the numbers of Affiliation Behaviors or Affiliative Interactions exhibited by the participants in the study. However, scent had a statistically significant effect on the social interaction behaviors exhibited by the participants. Specifically, the addition of the scent to the waiting room resulted in more social interaction behaviors than were exhibited in the unscented room.

In contrast, the participant group type had a statistically significant effect on the Social Interaction and Affiliative Interactions behaviors exhibited and on the focus group output. The Tryer-Acceptor participants exhibited more of these behaviors and made more suggestions in the focus group sessions than did the Tryer-Rejecters.

### Discussion of Results

The results of the study indicate that a pleasant ambient scent, in this case, essential oil of geranium, has a positive effect on increasing social interaction behaviors of participants in a meeting environment. The initial study design consisted of four propositions that each tested one dependent variable. The original model proposed several covariates in an analysis of covariance. The covariate measures were found to be unsuitable for inclusion in the analysis and were dropped. The final analysis was a 2 x 2 factorial analysis of variance (ANOVA). Each proposition and its implications are discussed next.

*P1: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of affiliation behaviors exhibited by focus group participants.*

This proposition was not supported. The ambient scent condition did not appear to have any effect on the affiliation behaviors exhibited by the study's participants. It was expected that the addition of the pleasant scent to the environment would induce the participants' levels of arousal to the correct levels that would lead to the formation of feelings of positive affect/liking for the environment and other people in the environment.

The interjudge reliabilities for the Affiliation Behaviors were somewhat lower than those for the Social Interactions and Affiliative Interactions dependent variables. The lack of support for this proposition may be due, in part, to the reduced reliability of the data. The lowered reliabilities seem to arise from a general lack of agreement among the judges on what constituted an Affiliation Behavior. These behaviors include subtle body movements and changes in eye contact duration. The lack of agreement may be the result of inadequate training of the judges to identify these behaviors, less than optimal videotape quality for the videotapes used to analyze the data, or differences in quality of the judges' personal VCR's that were used to playback the tapes during the analysis.

*P2: The presence of a pleasant ambient scent in the focus group waiting room will increase the number of social interactions that will be initiated by focus group participants.*

Proposition 2 was supported in this study. Scent had a statistically significant main effect on the number of social interaction behaviors exhibited by the study participants. However, the participant group type had an even more significant effect on the number of social interactions.

The scent condition performed as expected in the exhibition of Social Interaction behaviors by the participants in the waiting room area. However, the strength of association between the scent condition and social interactions is relatively weak, where approximately 5% of the variation in the number of social interactions can be attributed to scent condition.

One interesting aspect of the analysis is that the discarded covariate measure Affiliative Tendency, which was intended to measure the general tendency of the participants to affiliate with others, was analyzed using descriptive measures and the study's sample, as a whole, had a relatively high mean value for Affiliative Tendency. When Mehrabian and Ksionzky (1974) developed the scale, they had a sample size of 916 that had a mean Affiliative Tendency score of 28. The sample in this study ( $n = 77$ ) had a mean score of 61.89, which is significantly higher. There were no statistically significant differences in the Affiliative Tendency scores between the scented and unscented groups or the Tryer-Acceptors and Tryer-Rejecters. This infers that the effect of scent in this study may have been obscured by the fact that the participants in the study all had a fairly high tendency to affiliate from the outset. The fact that scent had a statistically significant effect indicates that the methodology proposed in this study may be used again in the future on a more diverse group of people, possibly pre-screened for high affiliative tendency. This might enable a researcher to obtain more precise information about the real contribution of the scent condition to the exhibition of social interaction behaviors.

The Social Interactions dependent variable was also significantly influenced by the type of Participant Group. The Tryer-Acceptors of the slot machine under study

exhibited significantly more social interaction behaviors than did the Tryer-Rejecters, where approximately 27.4% of the variation in Social Interactions can be associated with the type of participant group.

Again, the high mean score for Affiliative Tendency for the entire sample is interesting. The subjects in both participant groups were 1) willing to speak to a stranger (recruiter) while playing games in a casino, 2) were willing to sign up for a focus group, and 3) actually showed up for the focus group at a later date and in a building located in a different part of town from the casino's location. These may indicate that this type of person has a higher interest in interacting with other people. While this may have skewed the number of social interaction behaviors exhibited upwards over what would be exhibited by the general population, there was still a significantly higher number of interactions displayed by the Tryer-Acceptors. While this was not tested in this study, it is possible that the personality type of the Tryer-Acceptors may be skewed towards a high level of agreeableness, if analyzed using the Big 5 personality inventory proposed by McClelland (1985). One of the issues that concerned the sponsor of the study was uncovering the behavior and attitudes of the frequent players of the game, particularly what the players especially liked about the game. The social interaction component of the game came up frequently as a highly desirable feature of the game for devoted players.

*P3: The presence of a pleasant ambient scent in the focus group waiting room will increase the combined number of affiliation behaviors and social interactions, or Affiliative Interactions, exhibited by focus group participants.*

Once again, scent had no statistically significant main effect on the dependent variable. The Affiliative Interactions dependent variable was generated with the combined number of affiliation and social interaction behaviors. As discussed earlier in Proposition 1, the Affiliation Behaviors dependent variable was not significantly influenced by the scent condition. However, the discussion of the relatively high value for the sample's mean Affiliative Tendency score may have obscured the results that scent would have had on less affiliative subjects. Unfortunately, the data collected for Affiliative Tendency, which could not be used in this analysis as a covariate, would have controlled the influence that affiliative tendency had on the participants' behaviors.

Participant Group Type once again had a statistically significant effect on the exhibition of Affiliative Interactions. The Tryer-Acceptors displayed more combined affiliation and social interaction behaviors than did the Tryer-Rejecters.

*P4: The presence of a pleasant ambient scent in both the focus group waiting room and in the focus group room itself will increase the number of contributions that will be generated by focus group participants, i.e., Focus Group Output, during the actual focus group session.*

Scent condition did not appear to have a statistically significant main effect on the number of focus group suggestions generated that were used for Focus Group Output. Participant group type did have a main effect, and there was a statistically significant interaction effect between the scent condition and participant group type. However, the results of this portion of the analysis appear to be somewhat perverse, as the values for the measure of the strength of association between the independent variables and the dependent variables,  $\eta^2$ , are quite high. The  $\eta^2$  value for the main effect for the

participant group type is .549 ( $p = .092$ ) and the  $\eta^2$  value for the interaction effect is .728 ( $p = .031$ ). These are very high, especially considering the  $p$ -values. The perverseness of this analysis is most likely due to the low power of the analysis. There are only eight cases analyzed, one case for each focus group session. This suggests that future research should consider the number of suggestions generated during the focus group on a per-individual basis, rather than examining it on an aggregated per-group basis, to improve the statistical power of the study. Output on a per-group basis could be considered as well, but would require a sample size of at least 40 focus groups (2 treatment conditions x 20 cases per cell), which would be both time-consuming and very expensive to conduct and analyze.

### General Implications of the Study

Past studies have examined various ambient conditions and other aspects of the physical environment and their effects on retail environments. However, the characteristics that set services businesses apart from product marketing and retail businesses require new techniques to evaluate the effect of the physical environment on the people within the environment. This study proposed a new methodology for examining the effect of one of the ambient conditions, scent, in a services environment. While the methodology and the results of this study have many limitations that will be discussed in the next section of this chapter, the study offers evidence that a pleasant ambient scent can have a positive effect on the effectiveness of a meeting environment.

### *Theoretical Implications*

#### *The Servicescapes Model*

There are several theoretical implications arising from this study. First, Bitner (1992) proposed the Servicescapes model, shown earlier in Figure 1 on page 10 of this study. Her model provides a framework for examining the effect of the physical environment on the people, both customers and employees, within the service environment. Bitner proposed that the model be tested. Some of the components that are easily manipulated, such as music, have been tested in a retail environment. However, Bitner recommends examining the approach and avoidance and social interaction behaviors. The retail tests have examined approach-type behaviors, such as time spent in the environment, gross revenue, and sales per square foot. No study found to date has specifically examined the affiliation or social interaction behaviors that Bitner recommended for study. This study proposed a methodology for examining these behaviors that are so important for a non-retail services business.

#### *Aubert-Gamet and Cova's (1999) Post-Modern World*

Aubert-Gamet and Cova (1999) discuss Bitner's (1992) Servicescapes model. They discuss it in the context that in today's "post-modern" society, humans are becoming more isolated through the increase in technology. The isolation arises from individuals commuting in automobiles instead of on mass transportation, telecommuting for work rather than going to an office and having face-to-face interactions with customers and co-workers, and through entertaining at home through televisions, computers, internet, and video rentals, rather than out in the public arena. Aubert-Gamet and Cova (1999) suggest that some, although not all, people crave the social interaction that this isolation is slowly

decreasing. They point to examples such as “mall-walkers”, people who go to a shopping mall to walk for exercise and to socialize. Aubert-Gamet and Cova suggest that the mall-walkers use this as a way to connect with other people. Another example provided is the typical traveler holed up in his or her “cocoon-prison”, or hotel room. They suggest that some travelers who are very isolated from face-to-face contact while traveling on business crave human social interaction and propose that hotel companies create public spaces that provide opportunities for social interactions to occur. This is proposed as a type of amenity or competitive advantage for the future.

This study was intended to test the effect of ambient scent on the social interaction behaviors. If the presence of the scent was found to encourage more social interactions among the participants, it might be possible to make use of ambient scent in a business servicescape to facilitate the formation of the social interactions that are desired by the type of people that Aubert-Gamet and Cova (1999) describe in a post-modern world. The addition of a facilitating scent would be an amenity that could be offered to create a competitive advantage for the business.

This study attempted to examine one of the ambient variables of the physical environment, ambient scent, to determine if the introduction of a pleasant scent into the physical surroundings would help facilitate affiliation and social interactions. The results of this study are mixed, particularly because the results are probably confounded by the high baseline level of Affiliative Tendency of the study’s subjects. However, the methodology presented in this study is intended as an initial foray into studying the human interaction component of Bitner’s (1992) Servicescapes model.

### *Ambient Scent and Affect*

The Mere-Exposure Theory suggests that the more exposure to a stimulus that a person receives, the more that person is likely to feel positive affect, or liking, for that stimulus (Winkielman, et al., 2002). The stimulus may include the overall environment, objects within the environment, or other people in the environment. This study did not measure the participants' levels of affect for the environment or others in the environment, per se. However, the study was based on the concepts of the Mere-Exposure theory, where the exposure to the other focus group members before beginning the focus group should have had a significant positive effect on the amount of interaction and participation that occurred later in the focus group session itself.

Brain research and psychological studies have indicated that there is a positive relationship between arousal and affect. The scent component of the study was intended to stimulate arousal in the participants, which is closely associated with positive affect. The results of this study were, again, confounded by the high Affiliative Tendency scores of the study's participants. Future research could focus specifically on the feelings of liking for others that occur with or without a pleasant scent added to the environment. Arousal could also be tested.

### *Ambient Scent and Behavior*

The major concept tested in this study was the effect of the ambient variable "odor", specifically whether the introduction of a pleasant scent had an effect on the affiliation and social interaction behaviors exhibited by the study's participants. Past studies have suggested that a pleasant scent might facilitate decision-making, cooperation, negotiation, and purchasing behaviors (Baron, 1990; Spangenburg, et al., 1996). This study is a direct

test of how ambient scent affects behavior in group interactions. The underlying physiological theory is that an increase in positive arousal is closely associated with increased motor activity. Increased motor activity means that an individual will engage in more physical activity. The increased positive arousal state is also closely associated with an increase in positive affect. Overall, the increase arousal and affect was expected to prompt the study's participants into more affiliation and social interactions with the other people in the group.

The increased interaction within the group was also expected to result in more production during the focus group session. Some researchers have found that an increase in affect leads to increased skill in problem-solving and creative thinking (Ashby, et al., 2002). The increase is attributed to different levels of neurotransmitters being released to the parts of the brain that facilitate this function. In addition, the prior exposure during the waiting room session should have allowed the subjects to become familiar with each other, lending "fluency" in the cognitive processing of information when encountering new people for the first time. This period of familiarization allowed the participants to be more productive later in the focus group itself because they had already become familiar, through mere-exposure, with the other participants. The brain had already processed information about the novel stimulus (new people) and was able to move on to other functions, such as discussing the slot machine under study.

The effect of scent on behavior was found to be significant only on social interactions in this study. However, the effects of scent on the other behaviors studied may have been confounded by the high Affiliative Tendency scores for the study's participants. Future

tests should control for Affiliative Tendency's covariation to understand ambient scent's true effect on group interactions.

### *Retail Marketing vs. Services Marketing*

The Servicescapes model (Bitner, 1992) has not been tested extensively. However, limited tests of the model have been conducted primarily in the area of retail marketing. While retail marketing shares many characteristics with services marketing, the world of services has some characteristics that make the understanding and managing of the physical environment all the more important. First, the products purchased in a retail environment are usually (although not always) tangible, removed from the store after the purchase is completed, and consumed at a later time by the customer. The product can be evaluated at a later time, separate from the evaluation of the environment in which it was purchased.

Services, on the other hand, are purchased and consumed simultaneously. The customer becomes part of the service-creation environment and the physical surroundings become part of the product itself. The product is evaluated while the customer is still in the service environment, rather than at a later time as is often possible with a tangible product. The employees and other customers at a restaurant or hotel also become part of the product, as the customer interacts or is affected by them. Understanding the overt and subtle effects of the environment and managing them properly is important to provide the best product possible for the right customers.

The Servicescapes model has been tested most often in retail environments. However, very little research has been conducted in a pure services environment. This study offered a methodology to test the effect that one component of the physical

environment had on the people in the study. This is closer to the type of situation present in a services environment, such as a hotel meeting room or a restaurant, than the typical retail study represents.

#### *New Methodology for Testing the Servicescape*

Most previous studies testing the Servicescapes model have used a laboratory setting with college students as subjects. While this lends internal validity to the study, as control over most variables is possible, external validity is reduced in these circumstances because the setting is artificial and the subjects are not representative of the population as a whole.

This study examined how scent affected individual and group behavior in a field setting. Although the setting (meeting rooms in a classroom building on a university campus) was not a typical environment that the participants would normally find themselves in, it was an environment that more closely resembled a meeting room environment that would be found in a business' offices or a hotel or conference center. Although the subjects were a convenience sample that had some very unique characteristics – they had a high affiliative tendency, were casino gamblers who had played a certain game, and were somewhat older than the local population – they were more representative of the general population in many ways than would be a sample consisting of college juniors and seniors. These factors did not provide perfect external validity, but did move in the direction of improving the ability to generalize findings of an atmospheric study across the population.

### *Managerial Implications*

This study also has managerial implications for the focus group and hotel meetings industry, as well as for businesses in general.

#### *Focus Group Industry*

This study was conducted using eight focus groups on a single topic. The intent was to determine if the addition of a pleasant scent would increase the amount of interaction and then the amount of production that the focus groups would generate, represented by the number of suggestions made by the group. The study had mixed results. While the scent did not have a main effect on the number of suggestions generated, it did have an interaction effect along with the participant group type on the number of suggestions generated. The high tendency to affiliate among the study's subjects should be of interest to focus group companies, because people who are likely to agree to participate in a focus group may be likely to have a high affiliative tendency. Care should be taken to control for this tendency to ensure that the likes/dislikes, attitude, awareness, and usage of products or services that are the topic of a focus group are not different from those individuals with a lower affiliative tendency.

On the surface, the lack of effect on the focus group production attributable to scent would suggest that scent would not have an important role to play. However, only one scent, essential oil of geranium, was used in this study. The arousal- and affect- inducing qualities of scent may still be useful to the focus group industry. One area that could be particularly fruitful is using a scent that is congruent, or relevant, to the product or topic being studied in the focus group. Scent congruence has been found to have a significant effect on product evaluation and purchase intent (Mitchell, Kahn, & Knasko, 1995).

### *Hotel Meetings Industry*

This study was conducted in an environment that was similar to that of a meeting room in a hotel or conference center. These businesses rely on providing a total experience for their customers, who are the purchasers of the meeting space and the accompanying services. The scent used in this study had a significant positive main effect on the number of social interactions that occurred among the strangers in the study's sample. The introduction of a pleasant, novel scent into a hotel or conference center meeting room environment could facilitate positive affiliation behaviors and social interactions among meeting participants. This would be most useful if the meeting attendees were not familiar with each other or needed to conduct networking, where meeting new people and interacting is important. The results of the study suggest that a hospitality company, be it a restaurant, a hotel with meeting rooms, or a conference center, may be able to create a sustainable competitive advantage by offering a pleasant scent to their meeting customers as a way to improve the effectiveness of meetings, thereby increasing the return on the customer's investment in the meeting.

### *General Business Implications*

There are two primary business implications arising from this study. First, services businesses may be able to choose and use a distinctive "signature" scent for their service locations. Many products are associated with a distinctive scent, such as food, detergents, and personal hygiene products. However, most services are not associated with a specific scent. Scent is the most evocative of the five senses because it is believed to serve as a cue for memory-retrieval. If services companies could carefully choose and use a specific scent that did not evoke recall of other products or competitors' offerings, it

would be an additional way to “tangibilize” the service. If a customer were to smell the signature scent at a location away from the businesses premises, the scent might trigger a recall function where the customer then would recall the business’ name and services. For example, the researcher for this study worked for a large, American hotel company for four years. This particular company uses a type of air freshener that has a scent unique to the company. Although the researcher left this company 15 years prior to this study, every location for this company still smells exactly the same and evokes memories of working for the company and for the accommodations it offers.

The use of a signature scent in a services business could also lead to increased liking for the business. The repetition of the scent should lend fluency to the cognitive processes behind identifying and associating the scent with a specific source. The more a customer smells the scent and identifies it as the company’s odor, the greater the likelihood that the neurotransmitters that chemically “reward” the brain for recognizing a familiar scent as a non-risk will lead to feelings of positive affect toward the company/source of the scent.

According to Shoemaker and Lewis (1999), the goal of hotel firms should be to retain loyal customers. Hotels are a prime example of a services business in which the physical environment plays a uniquely important role, since a hotel’s customers remain in the service environment for a relatively long period of time compared to many other service businesses. Loyal customers in the hospitality industry are customers who have a higher likelihood of returning to property and who are likely to behave as partners to the organization (Bowen & Shoemaker, 1998; Shoemaker & Lewis, 1999). Increasing liking for a company increases the degree of attachment to the company that a customer feels.

Increased attachment and liking should lead to an increased proportion of business that is given to the company by the customer, thereby increasing profits. If the introduction of a pleasant, signature scent can facilitate recall, and if recall facilitates liking through the mere-exposure effect, then the scent should increase the loyalty of a service company's customers.

### Limitations of the Study

Although there were statistically significant results, supported by practical significance measures, there are several limitations to the study's design that prevent the results from being generalizable across the whole population.

### *Convenience Sample*

The study's sample was a convenience sample of people who have played a particular slot machine game, as specified by the sponsor of this study. These study subjects were recruited inside various "locals" casinos in the Las Vegas, Nevada area. As such, the characteristics of these subjects may not be typical of other gamblers who play different types of machine games, gamblers who do not play machines but prefer table games, tourist gamblers instead of local resident gamblers, or ultimate comparisons with non-gamblers.

In addition, these participants were willing to talk to the recruiters in the casino, while gambling. This characteristic may set them apart in their willingness or need to affiliate with other people. The Affiliative Tendency scale administered to the study participants after the 15-minute waiting room period showed that the study group, as a whole, scored

higher than the population groups reported in previous studies. The relatively high affiliative tendency for this study's participants could have skewed the amount of interaction they exhibited and their willingness to cooperate in the focus group session.

### *Age*

This study's participants also had a higher mean age than the rest of the Las Vegas population. There are anecdotal reports that older people, particularly retirees, are more likely to affiliate with and initiate social interactions with new people. This tendency may have skewed the results of this study.

### *Seasonal Effects*

Another factor that may have influenced the participants' behavior is a seasonal issue in the Las Vegas area. The focus group sessions were held during the first two weeks of March, 2003. This coincided with the beginning of an annual period with high pollen counts in the air. Several participants reported suffering from allergies during the experiment. It is possible that the results would have turned out differently if the experiment were conducted during a season with fewer allergens in the environment.

### *Prior Exposure*

Another factor that limits the generalizability of this study's results is that some of the participants may have had prior exposure to each other in the parking lot area of the building in which the experiment was conducted. That small, accidental amount of

exposure may result in prior affect for others before the participants ever reached the experimental environment.

#### *Deodorant Use*

Another issue that may have affected participant response involves the use of deodorant. While the participants were asked and reminded to not wear perfume or cologne to the focus group session, most participants wore some type of underarm deodorant. Many brands of deodorant have a wide variety of perfume-like scents added to them. This scent may have confounded effects of the ambient scent in the waiting room.

#### *Disabled Olfaction*

One final limitation to the study is the issue of screening for a participant's ability to smell. The participants were not screened for their ability to smell and a percentage of the population has an inability to smell or a degraded ability to smell. The participants, particularly those who suffer from allergies, may have had limited ability to smell the scent present in the scented condition. Although there are significant positive results for the participants in the scented condition, the results may have been affected by people who could not detect the scent.

#### *Suggestions for Future Research*

The participants in this study were a convenience sample from a narrowly defined group of people. They were generally older than the rest of the population and were

gamblers who play a specific type of slot machine that has special characteristics and a special target market (details on this machine and its market are proprietary and were therefore not discussed in this study). Future study using the general methodology suggested in this study should examine a more diverse group of subjects to determine if the effects of ambient scent are generalizable across a wider array of people.

The dependent variable Focus Group Output in this study was calculated as a group total instead of total contributions on an individual participant basis. Future research using this methodology should include tracking the focus group output more closely on an individual contribution basis, then linking it with the earlier behaviors exhibited in the waiting room and the survey data in such a way that the subject's privacy is protected. This would increase the statistical power of the analysis, providing more meaningful information.

The values for the behavioral dependent variables were calculated using content analysis. While content analysis is considered to be a quantitative method, the interpretation of the videotaped data was still highly subjective and depended on the viewpoint of the observer. This resulted in lower than desired interjudge reliability measures. This study was intended as an exploratory foray into a new methodology for studying ambient scent's effect on interactions in an environment. Future research might use the techniques proposed in this study with a refined list of the expected behaviors to improve the reliability of the content analysis and thus the reliability of the overall study. Improved training of the judges to provide more consistent, reliable observations should also be explored.

The four measures used in this study as covariates – Pleasure, Arousal, Dominance, and Mood – were not suitable for use as covariates and were thus dropped from the analysis. However, the Affiliative Tendency is suitable for use as a covariate if the individual scores can be linked to the behaviors exhibited by each study subject. This measure offered some important information and should be included in future research. If this were to happen, the researcher should insure the ability to match the subjects' behaviors with their Affiliative Tendency scores, to screen out any prior tendency to affiliate with others that might skew the data.

Future study could also examine whether a different scent would have the same effect. This study used essential oil of geranium in the scented condition. This particular scent was chosen because it is considered pleasant but non-evocative, meaning it did not immediately remind anyone of a particular scent, product, or environment. For example, other floral scents such as rose or jasmine might remind people of common perfumes and perhaps of people they know who wear the perfume. Citrus scents such as lemon (detergent) or orange (cleaners, deodorizers) may remind people of specific products or situations where these products were used. Pleasant scents other than essential oil of geranium may have an even more pronounced effect on people's behaviors in a meeting or focus group environment. Perhaps a scent that is more congruent with the goals of a particular meeting situation could be examined, such as using a "new car scent" while training a group of new car sales representatives.

The study of ambient scent and its effect on human behavior by creating arousal and generating affect for places and other people in the place is a field that is still in its infancy. The implications of gaining a better understanding of how to manipulate this

variable in the physical environment could be far-reaching for any services industry, but particularly for the hospitality industry. Hotels and restaurants could, in effect, develop a “signature scent” that, when experienced outside the company’s environment, evokes memories of pleasant experiences in that environment and causes the consumer to think about the company. As the old saying goes, “any publicity is good publicity”. The free “publicity” offered when a special scent evokes pleasant memories could be part of the next frontier in hospitality marketing.

## APPENDIX A

### SURVEYS

Preliminary Survey – administered after 15 minutes in the waiting room.

Below is a list of words that can be used to describe places. We would like you to rate how accurately each word below describes this room. Use the following rating scale for your answer, where a 1 means that the description is extremely inaccurate and a 6 means that the description is extremely accurate. You may use any number on this 1 to 6 scale.

| Extremely Inaccurate |   |   |   | Extremely Accurate |   |   |
|----------------------|---|---|---|--------------------|---|---|
| This room is:        |   |   |   |                    |   |   |
| Nice                 | 1 | 2 | 3 | 4                  | 5 | 6 |
| Satisfying           | 1 | 2 | 3 | 4                  | 5 | 6 |
| Alive                | 1 | 2 | 3 | 4                  | 5 | 6 |
| Displeasing          | 1 | 2 | 3 | 4                  | 5 | 6 |
| Active               | 1 | 2 | 3 | 4                  | 5 | 6 |
| Repulsive            | 1 | 2 | 3 | 4                  | 5 | 6 |
| Drowsy               | 1 | 2 | 3 | 4                  | 5 | 6 |
| Pleasant             | 1 | 2 | 3 | 4                  | 5 | 6 |
| Idle                 | 1 | 2 | 3 | 4                  | 5 | 6 |
| Comfortable          | 1 | 2 | 3 | 4                  | 5 | 6 |
| Lazy                 | 1 | 2 | 3 | 4                  | 5 | 6 |
| Fast                 | 1 | 2 | 3 | 4                  | 5 | 6 |

The following six adjective pairs describe feelings in a particular situation. Some of the pairs might seem unusual, but you probably feel more one way than the other. So, for each pair, put a check mark (Example:     :     : ✓:     ) close to the adjective which you believe to describe your feelings better at this time. The more appropriate that adjective seems, the closer you put your check mark to it.

---

|             |               |               |               |               |               |               |               |            |
|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|------------|
| Controlling | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | Controlled |
| Influential | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | Influenced |
| In control  | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | Cared for  |
| Important   | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | Awed       |
| Dominant    | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | Submissive |
| Autonomous  | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | <u>    </u> : | Guided     |

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Please use the following scale to indicate the degree of your agreement or disagreement with each of the statements. Record your answers in the spaces provided below.

- +4 = Very strong agreement
- +3 = Strong agreement
- +2 = Moderate agreement
- +1 = Slight agreement
- 0 = Neither agreement nor disagreement
- 1 = Slight disagreement
- 2 = Moderate disagreement
- 3 = Strong disagreement
- 4 = Very strong disagreement

- \_\_\_\_\_ When I'm introduced to someone new, I don't make much effort to be liked.
- \_\_\_\_\_ I prefer a leader who is friendly and easy to talk to over one who is more aloof and respected by his followers.
- \_\_\_\_\_ When I'm not feeling well, I would rather be with others than alone.
- \_\_\_\_\_ If I had to choose between the two, I would rather be considered intelligent than sociable.
- \_\_\_\_\_ Having friends is very important to me.
- \_\_\_\_\_ I would rather express open appreciation to others most of the time than reserve such feelings for special occasions.
- \_\_\_\_\_ I enjoy a good movie more than a big party.
- \_\_\_\_\_ I like to make as many friends as I can.
- \_\_\_\_\_ I would rather travel abroad starting my trip alone than with one or two friends.
- \_\_\_\_\_ After I meet someone I did not get along with, I spend time thinking about arranging another, more pleasant meeting.
- \_\_\_\_\_ I think that fame is more rewarding than friendship.
- \_\_\_\_\_ I prefer independent work to cooperative effort.
- \_\_\_\_\_ I think that any experience is more significant when shared with a friend.
- \_\_\_\_\_ When I see someone I know walking down the street, I am usually the first one to say hello.
- \_\_\_\_\_ I prefer the independence which comes from lack of attachments to the good and warm feelings associated with close ties.
- \_\_\_\_\_ I join clubs because it is such a good way of making friends.
- \_\_\_\_\_ I would rather serve in a position to which my friends nominated me than be appointed to an office by a distant national headquarters.
- \_\_\_\_\_ I don't believe in showing overt affection toward friends.

- +4 = Very strong agreement  
 +3 = Strong agreement  
 +2 = Moderate agreement  
 +1 = Slight agreement  
 0 = Neither agreement nor disagreement  
 -1 = Slight disagreement  
 -2 = Moderate disagreement  
 -3 = Strong disagreement  
 -4 = Very strong disagreement

- \_\_\_\_\_ I would rather go right to sleep at night than talk to someone else about the day's activities.  
 \_\_\_\_\_ I have very few close friends.  
 \_\_\_\_\_ When I'm with people I don't know, it doesn't matter much to me if they like me or not.  
 \_\_\_\_\_ If I had to choose, I would rather have strong attachments to my friends than have them regard me as witty and clever.  
 \_\_\_\_\_ I prefer individual activities such as crossword puzzles to group ones such as bridge or canasta.  
 \_\_\_\_\_ I am much more attracted to warm, open people than I am to standoffish ones.  
 \_\_\_\_\_ I would rather read an interesting book or go to the movies than spend time with friends.  
 \_\_\_\_\_ When traveling, I prefer meeting people to simply enjoying the scenery or going places alone.

The following four statements ask about your current mood. Please indicate your answer using the 10-point scale, where a 1 means that you Strongly Disagree with the statement and a 5 means that you Strongly Agree with the statement.

|  | <b>Strongly Disagree</b> |   |   |   | <b>Strongly Agree</b> |
|--|--------------------------|---|---|---|-----------------------|
| Currently, I am in a good mood.                          | 1                        | 2 | 3 | 4 | 5                     |
| As I answer these questions I feel very cheerful         | 1                        | 2 | 3 | 4 | 5                     |
| For some reason I am not very comfortable right now. (r) | 1                        | 2 | 3 | 4 | 5                     |
| At this moment I feel "edgy" or irritable. (r)           | 1                        | 2 | 3 | 4 | 5                     |

The last few questions will be used to group your answers with those of others who complete this survey.

Gender (please circle one):

Male

Female

What is your current age (in years):

\_\_\_\_\_

Do you smoke tobacco products once or more per day?

Yes

No

Post-Focus Group Survey – administered after the conclusion of the focus group session.

Please indicate your agreement or disagreement with the following statements. Use the scale provided below, where a 1 means that you Strongly Agree with the statement and a 7 means that you Strongly Disagree with the statement. You may use any number on the 1 to 7 scale.

|                                      | Strongly Agree |   |   |   |   |   | Strongly Disagree |  |
|--------------------------------------|----------------|---|---|---|---|---|-------------------|--|
| I felt:                              |                |   |   |   |   |   |                   |  |
| In harmony with others               | 1              | 2 | 3 | 4 | 5 | 6 | 7                 |  |
| I interacted well with others        | 1              | 2 | 3 | 4 | 5 | 6 | 7                 |  |
| I made new friends                   | 1              | 2 | 3 | 4 | 5 | 6 | 7                 |  |
| My skills were appreciated by others | 1              | 2 | 3 | 4 | 5 | 6 | 7                 |  |
| Needed by the group                  | 1              | 2 | 3 | 4 | 5 | 6 | 7                 |  |
| I pulled my weight                   | 1              | 2 | 3 | 4 | 5 | 6 | 7                 |  |

Please indicate your agreement or disagreement with the following statements. You may elaborate in the space below each question if you wish.

The lighting was good.

Agree    Disagree

If you disagree, why? \_\_\_\_\_

The furniture was comfortable.

Agree    Disagree

If you disagree, why? \_\_\_\_\_

The room temperature was comfortable.

Agree    Disagree

If you disagree, why? \_\_\_\_\_

I did not notice present of a scent in the room(s).

Agree    Disagree

If you disagree, why? \_\_\_\_\_

I did not notice the presence of any background noise in the room(s).

Agree    Disagree

If you disagree, why? \_\_\_\_\_

Thank you very much for your time. Please return this survey to the focus group moderator.

## APPENDIX B

### INFORMED CONSENT NOTIFICATION

**University of Nevada, Las Vegas  
Department of Hotel Administration**

**INFORMED CONSENT**

**General Information:**

I am Dina Zemke, a Doctoral Student from the UNLV Department of Hotel Administration. I am the researcher on this project. You are invited to participate in a research study. The study is intended to help casino game machine manufacturers improve their knowledge-based casino games and to develop new games that consumers are interested in playing.

**Procedure:**

If you volunteer to participate in this study, you will be asked to do the following:

1. Participate in a focus group session that will be held at the Stan Fulton Building on the University of Nevada Las Vegas campus.
2. The focus group session will last for around 2 hours.
3. You will be asked to complete two surveys, one before the focus group begins and one following completion of the focus group. If you need to use reading glasses, please bring them with you to the session.
4. Allow yourself to be video taped and audio taped during the entire time that you are in the Stan Fulton Building.
5. Some of the rooms that you will be in may have been exposed to cleaning chemicals or air fresheners. You will be exposed to these chemicals in the air if they are present. A list of the potential chemicals is attached – please examine this list and do not sign up for the focus group if you think you may have a negative reaction to them.

**Benefits of Participation:**

By participating you will help in the development of knowledge-based casino games. You will also help me to complete my doctoral dissertation. I know that you have a busy schedule, so I would like to offer you \$50 for your participation in the focus group. You will receive the \$50 after the focus group session is finished.

**Risks of Participation in this Study:**

- You will need to provide your own transportation to and from the focus group.
- The focus group will require approximately two (2) hours of your time.
- You will be videotaped while you are in the focus group facility. If you are uncomfortable being videotaped, please do not volunteer to participate in this study.
- In addition, there may be some airborne allergens present, such as cigarette smoke or air freshener. If you have allergies or a respiratory condition such as asthma or reactive airway disease, please do not volunteer to participate in this study.
- You may also be uncomfortable answering some of the questions asked. You are encouraged to discuss this with me either now or when you are at the Stan Fulton Building. I will explain the questions to you in more detail and if you are uncomfortable answering them, you may decline to answer them.

Knowledge-Based Casino Games  
**INFORMED CONSENT**

**Contact Information:**

If you have any questions about the study or if you believe you may have experienced harmful effects as a result of participation in this study, you please contact Stowe Shoemaker, my faculty advisor, at (702) 895-1794.

For questions regarding the rights of research subjects, you may contact **the UNLV Office for the Protection of Research Subjects at 895-2794.**

**Voluntary Participation:**

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

**Confidentiality:**

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for at least 3 years after completion of the study. After the storage time the information gathered will be destroyed.

**Participant Consent:**

**Step 1:** Please check one of the boxes below indicating your agreement to be videotaped.

- ☐ I agree to be videotaped during this session.
- ☐ I do not agree to be videotaped during this session.

**Step 2:** Please check one of the boxes below indicating that you have read the attachment regarding chemicals that may be present in the building.

- ☐ I have read the attached list of chemicals and realize that I may encounter these chemicals while in the Stan Fulton Building.

**Step 3:** Please read the statement below and sign your name in the space provided.

I have read the above information and agree to participate in this study. I am at least 18 years of age. A copy of this form has been given to me.

\_\_\_\_\_  
Signature of Participant

\_\_\_\_\_  
Date

\_\_\_\_\_  
Participant Name (Please Print)

Your focus group session is scheduled for:

\_\_\_\_\_, \_\_\_\_\_, at \_\_\_\_\_ in the Stan Fulton Building, Room 234.  
Day                      Date                      Time

**NOTE:** Please do not wear perfume or cologne or other scents to the session -- the moderator is allergic to them!

The session should last approximately 2 hours. Please arrive 5 minutes early. If you will not be able to attend, please contact Dina Zemke via email at [dmzemke@hotmail.com](mailto:dmzemke@hotmail.com) or at 858-6194.

Thanks again for your participation!

## Chemical List

The following is a list of chemicals that are used to clean the Stan Fulton Building, as well as information on the furniture and carpeting used in the building. Please review this list and let me know if you have an allergy or sensitivity any of these items.

### Cleaning Chemicals:

| <b><u>Brand</u></b>      | <b><u>Product</u></b> | <b><u>Purpose</u></b>               |
|--------------------------|-----------------------|-------------------------------------|
| Allstar                  | Aqua-satin            | Water-based stainless steel cleaner |
| Allstar                  | Gum-Off               | Chewing gum remover                 |
| Cross Link II            | Spray buff reactant   | Floor polishing solution            |
| Gilman Products          | A-Ben-A-Qui           | Universal cleaner                   |
| Hilltone                 | Super Shine-All       | Window/glass cleaner                |
| Johnson Wax Professional | Extraction Cleaner    | Carpet cleaning solution            |
| Johnson Wax Professional | Pro-Strip             | Floor stripping solution            |
| Johnson Wax Professional | Protein Spotter       | Carpet stain remover                |
| Johnson Wax Professional | Shine-Up              | Furniture polish                    |
| Misty                    | Painless Stainless    | Aerosol stainless steel cleaner     |
| Pink Pearl               | Lotion Hand Soap      | Soap in lavatories                  |

### Air Fresheners:

| <b><u>Brand</u></b> | <b><u>Product</u></b>           |
|---------------------|---------------------------------|
| Crabtree & Evelyn   | Essential oil of geranium       |
| Crabtree & Evelyn   | Essential oil of lavender       |
| Glade               | Neutral air freshener           |
| Glade               | Plug-ins Tropical Breeze        |
| Lysol               | Country Linen deodorizing spray |
| Renzit              | Lemon air freshener             |

### Furniture & Carpet:

|        |                                 |
|--------|---------------------------------|
| Carpet | Synthetic blend                 |
| Chairs | Upholstery is a polyester blend |
|        | Padding is polyurethane         |

## APPENDIX C

### EXPERT JUDGE TRAINING MANUAL

## **Waiting Room Environment – Interactions between Strangers**

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### **General Information:**

**Contact:** Dina Zemke, Ph.D. Candidate, Hotel College  
555-5555 (8:00 a.m. to 9:00 p.m. daily)  
dmzemke@hotmail.com

**Completion Date:** No later than April 30 (April 20 if possible)  
Work shall be performed at your convenience

### **Compensation:**

As a thank-you for your help with this project, I will pay you \$15/hour of your time, including today's training session. Please record the time you put into the project on the attached timesheet. Your participation in this project does not imply employment by me.

I do not anticipate that you will need to purchase materials or supplies for this project. However, if you need to make photocopies or need to purchase other supplies, please either get them from me or provide a receipt and I will reimburse you for your expenses.

### **Equipment you need to provide:**

You will need to have access to a television and VCR (VHS format). You will also need to provide your own pens, pencils, etc. I will provide copies of all forms that you will need to complete this project.

---

### **Project Overview**

This study is my dissertation. In this section of the project, I am looking at the effects that ambient scent has on affiliation behaviors and social interactions among a group of strangers in a waiting room setting. There are two conditions that the people in the waiting room might have experienced – either the room was left unscented or it was scented with essential oil of geranium. You will not be notified which group had which condition.

The people you will observe in the videotapes are waiting to participate in a focus group that discussed a certain slot machine game. They did not know each other before they entered the waiting room.

The videotape you will analyze has the results for 4 different sessions. Each session lasted approximately 15 minutes, so you will analyze approximately 1 hour of data. Sound is not included in the video, so you will only analyze movements in the space.

The data you will observe will have been collected at two different times during the day – at 4:00 p.m. and at 6:00 p.m. You will notice a difference in the appearance of the room because the late afternoon sun affects the appearance of the windows in the room. At the beginning of each session, I appear and provide the number of the session that you are about to observe. If it is not clear which session you are viewing while you are watching the tape, please contact me and I will help figure it out.

## Behavior Observation

We are looking at 3 basic types of behaviors in this study – affiliation, social interaction, and avoidance.

The people you will observe generally entered the room, sat in a chair, and remained in that spot for the duration of the time in the waiting room. Each chair is numbered on the diagram I have provided.

### Affiliation

In this situation, we are looking for behavior that indicates that the person desires to affiliate with others in the room. This is not the same as actually interacting with the other people.

#### Examples of Affiliation behavior:

- Eye contact                      Increasing attempts at eye contact; increased looking in the direction of other people
- Body Orientation              Increasingly facing other people
- Gestures                         Mirroring or parallel behaviors  
**Mirroring:** mirror image behaviors between people. For example, if one person scratches their chin with their left hand, the other person scratches their chin with their right hand.  
**Parallel:** two or more people move in parallel with each other.
- Facial Expressions            Smiling; “questioning” expressions
- Body Distance                 Closing distance between themselves and others  
Leaning toward other(s)  
Moving chair closer to other(s)

### **Social Interaction**

Social interaction is actual interaction between two or more people. This may include talking to others, closing distance between themselves and others, and physical contact.

#### **Examples of Social Interaction behavior:**

- Eye contact                      Prolonged and focused
- Body orientation              People are facing each other at increasingly parallel angles
- Gestures                          Hand gestures, pointing. Head nodding; tilting toward other person; moving head inward toward other person.
- Physical contact              Handshake; hand on the shoulder or the back of other person.
- Proximity                        Moving closer to the other person, lean towards the other person.
- Conversation                  With one or more people

### **Avoidance**

Avoidance behavior is displayed when the person is uncomfortable in the environment or does not want to interact with others in the environment. A few people exhibited these behaviors, some for the duration of the time in the waiting room.

#### **Examples of Avoidance behavior:**

- Leaving the room
- Reading a magazine or newspaper
- Looking out the window
- Staring up at the ceiling
- Staring at a fixed point (not at another person)

**How to Record the Observed Data**

1. Fill out the cover sheet information for the group that you are about to observe.
2. Fill out one Tracking Form for each person in the waiting room. Identify the person by the seat number that they occupy (i.e., 1, 2, 5, or 12).
3. Watch the videotape and record the activities of each person in the room on their own sheet. Record who the person interacts with and approximately what time into the session it occurs (get the time off your VCR counter).

One way to approach recording the activities of each person is to group the people into clusters. A quick way to identify where clusters will occur is to watch the first few minutes of the session in Fast-Forward mode. This may help you to see larger grouping patterns emerge. Then Rewind the tape and begin watching the tape, focusing on one of the clusters at a time. If you spread out the tracking sheets in front of you, grouped by cluster participants, it will save time (and boredom).

Please try to write clearly (print, if possible). You may use more than one sheet for a participant if you run out of space on the first sheet. Make sure you record the participant number on each sheet.

**IF YOU HAVE ANY QUESTIONS AT ALL, PLEASE CALL ME!!!** My schedule is very flexible and I can meet you to provide more supplies or to go over the tapes or your data.

**Waiting Room Mapping Form**

**Judge:**

\_\_\_\_\_

**Focus Group #** \_\_\_\_\_

**Day:**

**Date:**

**Time:**

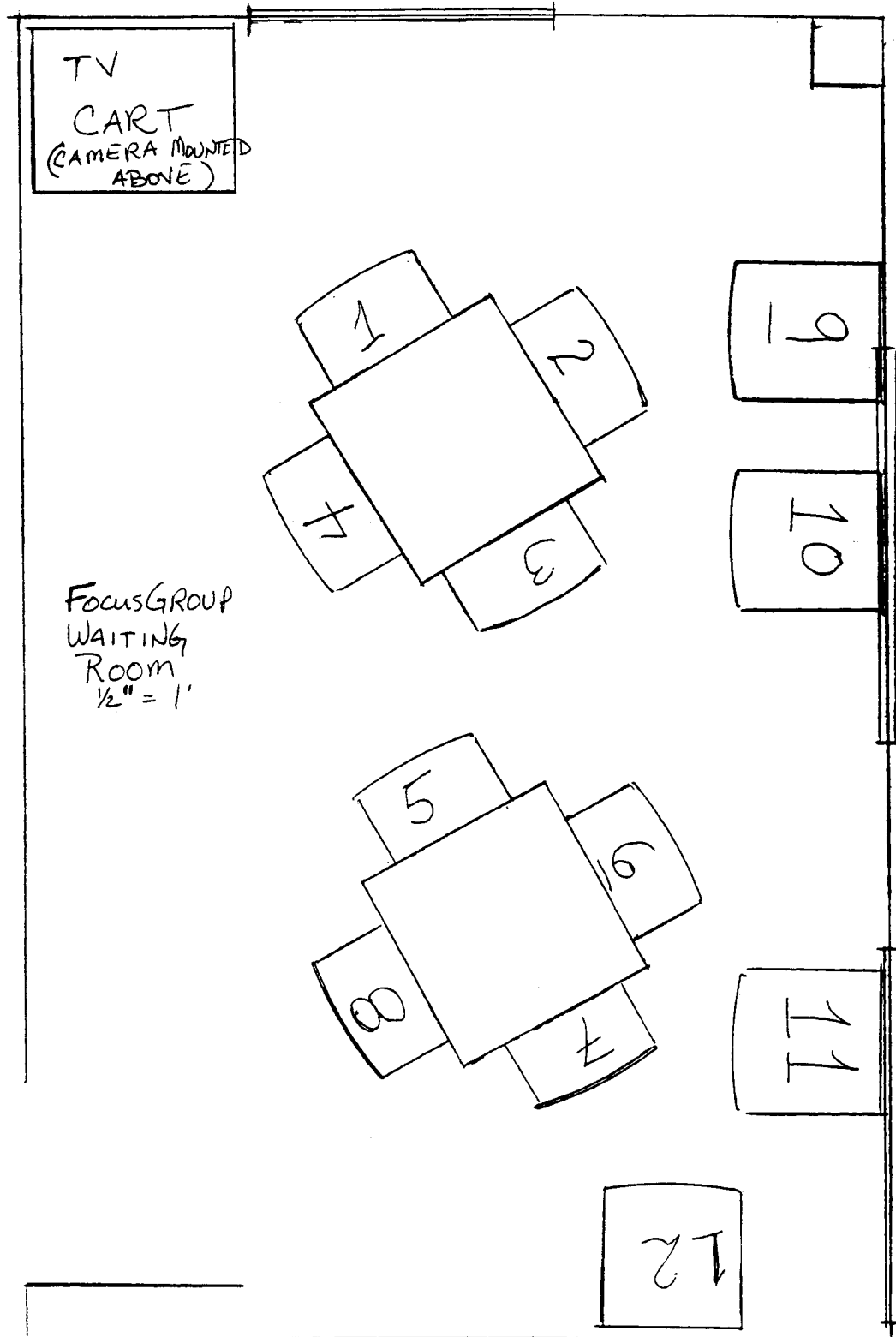
**# of Participants in Group:**

**# Males:**

**# Females:**

**Position (please record gender):**

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_
- 6 \_\_\_\_\_
- 7 \_\_\_\_\_
- 8 \_\_\_\_\_
- 9 \_\_\_\_\_
- 10 \_\_\_\_\_
- 11 \_\_\_\_\_
- 12 \_\_\_\_\_



Tracking Form

| Affiliation | Time | Social Interaction | Time | Avoidance | Time |
|-------------|------|--------------------|------|-----------|------|
|             |      |                    |      |           |      |
|             |      |                    |      |           |      |
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|             |      |                    |      |           |      |

## APPENDIX D

### RAW DATA FOR INTERJUDGE AGREEMENT

Group 1

|             | JUDGE 1 |            |       | JUDGE 2     |            |       | JUDGE 3     |            |       |
|-------------|---------|------------|-------|-------------|------------|-------|-------------|------------|-------|
|             | Aff     | Social Int | Avoid | Aff         | Social Int | Avoid | Aff         | Social Int | Avoid |
| 1           | 8       | 9          | 4     | 0           | 1          | 8     | 0           | 3          | 1     |
| 2           | 2       | 23         | 3     | 6           | 12         | 9     | 2           | 12         | 4     |
| 3           |         |            |       |             |            |       |             |            |       |
| 4           | 6       | 8          | 0     | 7           | 8          | 4     | 1           | 3          | 2     |
| 5           | 5       | 8          | 0     | 8           | 12         | 3     | 1           | 15         | 0     |
| 6           |         |            |       |             |            |       |             |            |       |
| 7           | 9       | 7          | 0     | 11          | 3          | 0     | 0           | 11         | 1     |
| 8           | 4       | 18         | 0     | 7           | 14         | 0     | 0           | 24         | 0     |
| 9           |         |            |       |             |            |       |             |            |       |
| 10          | 2       | 29         | 1     | 1           | 12         | 1     | 3           | 20         | 0     |
| 11          | 9       | 1          | 1     | 7           | 2          | 1     | 4           | 9          | 1     |
| 12          | 14      | 11         | 2     | 8           | 16         | 0     | 0           | 9          | 4     |
|             | 59      | 114        | 11    | 55          | 80         | 26    | 11          | 106        | 13    |
| Aff+Soc Int | 173     |            | 11    | Aff+Soc Int | 135        | 26    | Aff+Soc Int | 117        | 13    |
| Total       | 184     |            |       | Total       | 161        |       | Total       | 130        |       |
| Ratio       | 94.0%   |            | 6.0%  | Ratio       | 83.9%      | 16.1% | Ratio       | 90.0%      | 10.0% |

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| Group 2     |        |     |       |             |        |     |       |             |        |     |       |
|-------------|--------|-----|-------|-------------|--------|-----|-------|-------------|--------|-----|-------|
| JUDGE 1     |        |     |       | JUDGE 2     |        |     |       | JUDGE 3     |        |     |       |
| Aff         | Social | Int | Avoid | Aff         | Social | Int | Avoid | Aff         | Social | Int | Avoid |
| 2           | 14     |     | 0     | 3           | 5      |     | 0     | 5           | 20     |     | 0     |
| 15          | 19     |     | 0     | 7           | 16     |     | 0     | 5           | 51     |     | 1     |
| 11          | 14     |     | 0     | 4           | 10     |     | 0     | 6           | 23     |     | 1     |
| 15          | 5      |     | 0     | 3           | 4      |     | 4     | 13          | 37     |     | 1     |
| 8           | 16     |     | 0     | 5           | 8      |     | 1     | 5           | 36     |     | 0     |
| 6           | 5      |     | 0     | 2           | 0      |     | 4     | 1           | 5      |     | 1     |
| 9           | 6      |     | 0     | 0           | 3      |     | 1     | 6           | 5      |     | 2     |
| 6           | 1      |     | 9     | 0           | 0      |     | 7     | 3           | 0      |     | 1     |
| 8           | 1      |     | 5     | 0           | 0      |     | 11    | 0           | 0      |     | 2     |
| 80          | 81     |     | 14    | 24          | 46     |     | 28    | 44          | 177    |     | 9     |
| Aff+Soc Int | 161    |     | 14    | Aff+Soc Int | 70     |     | 28    | Aff+Soc Int | 221    |     | 9     |
| Total       | 175    |     |       | Total       | 98     |     |       | Total       | 230    |     |       |
| Ratio       | 92.0%  |     | 8.0%  | Ratio       | 71.4%  |     | 28.6% | Ratio       | 96.1%  |     | 3.9%  |

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| Group 3     |         |            |       |             |            |       |             |            |       |  |  |
|-------------|---------|------------|-------|-------------|------------|-------|-------------|------------|-------|--|--|
|             | JUDGE 1 |            |       | JUDGE 2     |            |       | JUDGE 3     |            |       |  |  |
|             | Aff     | Social Int | Avoid | Aff         | Social Int | Avoid | Aff         | Social Int | Avoid |  |  |
| 1           | 7       | 20         | 1     | 6           | 17         | 1     | 0           | 36         | 1     |  |  |
| 2           | 9       | 21         | 0     | 7           | 12         | 2     | 1           | 30         | 1     |  |  |
| 3           | 9       | 15         | 8     | 3           | 9          | 2     | 3           | 21         | 7     |  |  |
| 4           |         |            |       |             |            |       |             |            |       |  |  |
| 5           |         |            |       |             |            |       |             |            |       |  |  |
| 6           | 9       | 10         | 1     | 4           | 8          | 0     | 7           | 21         | 1     |  |  |
| 7           | 4       | 17         | 0     | 2           | 8          | 2     | 2           | 22         | 0     |  |  |
| 8           | 9       | 8          | 0     | 1           | 6          | 5     | 7           | 13         | 2     |  |  |
| 9           |         |            |       |             |            |       |             |            |       |  |  |
| 10          |         |            |       |             |            |       |             |            |       |  |  |
| 11          | 4       | 16         | 1     | 2           | 9          | 0     | 1           | 22         | 0     |  |  |
| 12          | 4       | 17         | 1     | 1           | 11         | 0     | 3           | 30         | 1     |  |  |
|             | 55      | 124        | 12    | 26          | 80         | 12    | 24          | 195        | 13    |  |  |
| Aff+Soc Int | 179     |            | 12    | Aff+Soc Int | 106        | 12    | Aff+Soc Int | 219        | 13    |  |  |
| Total       | 191     |            |       | Total       | 118        |       | Total       | 232        |       |  |  |
| Ratio       | 93.7%   |            | 6.3%  | Ratio       | 89.8%      | 10.2% | Ratio       | 94.4%      | 5.6%  |  |  |

| Group 4     |         |        |     |         |             |        |         |       |             |        |      |
|-------------|---------|--------|-----|---------|-------------|--------|---------|-------|-------------|--------|------|
|             | JUDGE 1 |        |     | JUDGE 2 |             |        | JUDGE 3 |       |             |        |      |
|             | Aff     | Social | Int | Avoid   | Aff         | Social | Int     | Avoid | Aff         | Social | Int  |
| 1           | 1       | 18     |     | 0       | 1           | 12     |         | 0     | 0           | 23     |      |
| 2           | 4       | 24     |     | 0       | 8           | 9      |         | 0     | 1           | 35     |      |
| 3           | 3       | 26     |     | 6       | 3           | 14     |         | 5     | 1           | 30     |      |
| 4           | 10      | 21     |     | 0       | 6           | 16     |         | 0     | 1           | 22     |      |
| 5           | 11      | 17     |     | 2       | 0           | 4      |         | 8     | 0           | 22     |      |
| 6           |         |        |     |         |             |        |         |       |             |        |      |
| 7           |         |        |     |         |             |        |         |       |             |        |      |
| 8           | 1       | 16     |     | 0       |             |        |         |       | 0           | 10     |      |
| 9           |         |        |     |         |             |        |         |       |             |        |      |
| 10          | 9       | 17     |     | 1       | 3           | 12     |         | 4     | 2           | 21     |      |
| 11          | 10      | 34     |     | 0       | 5           | 13     |         | 1     | 2           | 32     |      |
| 12          | 7       | 34     |     | 0       | 1           | 15     |         | 3     | 0           | 28     |      |
|             | 56      | 207    |     | 9       | 27          | 95     |         | 21    | 7           | 223    |      |
| Aff+Soc Int | 263     |        |     | 9       | Aff+Soc Int | 122    |         | 21    | Aff+Soc Int | 230    |      |
| Total       | 272     |        |     |         | Total       | 143    |         |       | Total       | 240    |      |
| Ratio       | 96.7%   |        |     | 3.3%    | Ratio       | 85.3%  |         | 14.7% | Ratio       | 95.8%  |      |
|             |         |        |     |         |             |        |         |       |             |        | 4.2% |

| Group 5     |            |       |  |             |            |       |  |             |            |       |  |
|-------------|------------|-------|--|-------------|------------|-------|--|-------------|------------|-------|--|
| JUDGE 4     |            |       |  | JUDGE 5     |            |       |  | JUDGE 6     |            |       |  |
| Aff         | Social Int | Avoid |  | Aff         | Social Int | Avoid |  | Aff         | Social Int | Avoid |  |
| 2           | 5          | 3     |  | 2           | 7          | 6     |  | 16          | 14         | 17    |  |
| 8           | 2          | 4     |  | 2           | 8          | 7     |  | 28          | 6          | 8     |  |
|             |            |       |  |             |            |       |  |             |            |       |  |
| 0           | 1          | 1     |  | 0           | 0          | 0     |  | 0           | 0          | 0     |  |
| 11          | 7          | 7     |  | 14          | 7          | 12    |  | 36          | 8          | 27    |  |
| 0           | 12         | 1     |  | 3           | 7          | 3     |  | 21          | 10         | 13    |  |
| 1           | 3          | 1     |  | 0           | 1          | 1     |  | 0           | 14         | 5     |  |
| 5           | 0          | 8     |  | 4           | 0          | 8     |  | 9           | 0          | 11    |  |
| 7           | 2          | 1     |  | 7           | 3          | 5     |  | 7           | 2          | 6     |  |
| 8           | 13         | 6     |  | 9           | 24         | 9     |  | 32          | 19         | 13    |  |
| 4           | 6          | 5     |  | 7           | 6          | 7     |  | 18          | 5          | 13    |  |
| 46          | 51         | 37    |  | 48          | 63         | 58    |  | 167         | 78         | 113   |  |
| Aff+Soc Int | 97         | 37    |  | Aff+Soc Int | 111        | 58    |  | Aff+Soc Int | 245        | 113   |  |
| Total       | 134        |       |  | Total       | 169        |       |  | Total       | 358        |       |  |
| Ratio       | 72.4%      | 27.6% |  | Ratio       | 65.7%      | 34.3% |  | Ratio       | 68.4%      | 31.6% |  |

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Group 6

|             | JUDGE 4   |            |           | JUDGE 5     |            |           | JUDGE 6     |            |           |
|-------------|-----------|------------|-----------|-------------|------------|-----------|-------------|------------|-----------|
|             | Aff       | Social Int | Avoid     | Aff         | Social Int | Avoid     | Aff         | Social Int | Avoid     |
| 1           | 2         | 6          | 6         | 4           | 28         | 10        | 4           | 13         | 1         |
| 2           | 0         | 15         | 13        | 0           | 7          | 1         | 15          | 17         | 17        |
| 3           |           |            |           |             |            |           |             |            |           |
| 4           | 1         | 10         | 6         | 3           | 13         | 6         | 10          | 9          | 13        |
| 5           | 3         | 6          | 1         | 3           | 10         | 4         | 10          | 6          | 1         |
| 6           | 2         | 5          | 6         | 2           | 24         | 1         |             |            |           |
| 7           | 10        | 0          | 14        | 2           | 0          | 8         | 0           | 0          | 8         |
| 8           | 2         | 2          | 3         | 1           | 4          | 1         | 3           | 0          | 5         |
| 9           | 4         | 5          | 4         | 6           | 42         | 2         | 11          | 14         | 4         |
| 10          | 12        | 8          | 7         | 4           | 11         | 8         | 6           | 7          | 8         |
| 11          | 7         | 5          | 4         | 3           | 6          | 5         | 6           | 2          | 1         |
| 12          | 1         | 4          | 5         | 3           | 5          | 4         | 0           | 4          | 4         |
|             | <b>44</b> | <b>66</b>  | <b>69</b> | <b>31</b>   | <b>150</b> | <b>50</b> | <b>65</b>   | <b>72</b>  | <b>62</b> |
| Aff+Soc Int | 110       |            | 69        | Aff+Soc Int | 181        | 50        | Aff+Soc Int | 137        | 62        |
| Total       | 179       |            |           | Total       | 231        |           | Total       | 199        |           |
| Ratio       | 61.5%     | 38.5%      |           | Ratio       | 78.4%      | 21.6%     | Ratio       | 68.8%      | 31.2%     |

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Group 7

|             | JUDGE 4   |            |           | JUDGE 5     |            |           | JUDGE 6     |            |           |
|-------------|-----------|------------|-----------|-------------|------------|-----------|-------------|------------|-----------|
|             | Aff       | Social Int | Avoid     | Aff         | Social Int | Avoid     | Aff         | Social Int | Avoid     |
| 1           | 6         | 2          | 11        | 5           | 0          | 6         | 0           | 0          | 4         |
| 2           |           |            |           |             |            |           |             |            |           |
| 3           |           |            |           |             |            |           |             |            |           |
| 4           | 11        | 1          | 10        | 7           | 0          | 7         | 6           | 0          | 6         |
| 5           | 1         | 1          | 3         | 0           | 0          | 5         | 1           | 0          | 5         |
| 6           | 6         | 7          | 2         | 1           | 7          | 0         | 3           | 2          | 4         |
| 7           | 8         | 8          | 8         | 3           | 3          | 3         | 6           | 2          | 6         |
| 8           | 0         | 9          | 2         | 2           | 3          | 2         | 0           | 2          | 3         |
| 9           | 0         | 0          | 1         | 0           | 0          | 1         | 0           | 0          | 1         |
| 10          | 0         | 4          | 5         | 2           | 10         | 1         | 4           | 2          | 1         |
| 11          | 3         | 0          | 3         | 1           | 0          | 0         | 3           | 1          | 2         |
| 12          | 10        | 0          | 10        | 1           | 0          | 1         | 3           | 0          | 6         |
|             | <b>45</b> | <b>32</b>  | <b>55</b> | <b>22</b>   | <b>23</b>  | <b>26</b> | <b>26</b>   | <b>9</b>   | <b>38</b> |
| Aff+Soc Int | 77        |            | 55        | Aff+Soc Int | 45         | 26        | Aff+Soc Int | 35         | 38        |
| Total       | 132       |            |           | Total       | 71         |           | Total       | 73         |           |
| Ratio       | 58.3%     |            | 41.7%     | Ratio       | 63.4%      | 36.6%     | Ratio       | 47.9%      | 52.1%     |

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Group 8

|             | JUDGE 4   |            |           | JUDGE 5     |            |           | JUDGE 6     |            |           |
|-------------|-----------|------------|-----------|-------------|------------|-----------|-------------|------------|-----------|
|             | Aff       | Social Int | Avoid     | Aff         | Social Int | Avoid     | Aff         | Social Int | Avoid     |
| 1           | 1         | 14         | 4         | 4           | 30         | 2         | 7           | 9          | 1         |
| 2           | 1         | 10         | 3         | 4           | 16         | 4         | 10          | 8          | 4         |
| 3           | 2         | 15         | 3         | 7           | 28         | 4         | 13          | 12         | 5         |
| 4           | 2         | 12         | 4         | 10          | 29         | 7         | 7           | 11         | 4         |
| 5           | 3         | 5          | 1         | 2           | 4          | 5         | 7           | 3          | 7         |
| 6           | 1         | 4          | 2         | 2           | 3          | 4         | 10          | 4          | 6         |
| 7           | 3         | 4          | 1         | 3           | 10         | 3         | 4           | 8          | 7         |
| 8           | 2         | 6          | 2         | 3           | 6          | 3         | 14          | 4          | 10        |
| 9           | 9         | 0          | 3         | 1           | 0          | 2         | 4           | 0          | 3         |
| 10          |           |            |           |             |            |           |             | 6          |           |
| 11          | 2         | 9          | 1         | 6           | 10         | 3         | 10          | 6          | 1         |
| 12          | 1         | 3          | 2         | 3           | 4          | 1         | 8           | 4          | 3         |
|             | <b>27</b> | <b>82</b>  | <b>26</b> | <b>45</b>   | <b>140</b> | <b>38</b> | <b>94</b>   | <b>75</b>  | <b>51</b> |
| Aff+Soc Int | 109       |            | 26        | Aff+Soc Int | 185        | 38        | Aff+Soc Int | 169        | 51        |
| Total       | 135       |            |           | Total       | 223        |           | Total       | 220        |           |
| Ratio       | 80.7%     |            | 19.3%     | Ratio       | 83.0%      | 17.0%     | Ratio       | 76.8%      | 23.2%     |

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VITA

Graduate College  
University of Nevada, Las Vegas

Dina Marie V. Zemke

Local Address:

4515 S. Durango Drive, #2052  
Las Vegas, NV 89147

Degrees:

Bachelor of Science, Hotel Administration, 1985  
Cornell University

Master of Business Administration, Operations Management, 1990  
University of Minnesota

Dissertation Title: The Effect of Ambient Scent on Affiliation Behaviors and Social Interactions

Dissertation Examination Committee:

Chairperson, Stowe Shoemaker, Ph.D.  
Committee Member, John Bowen, Ph.D.  
Committee Member, Cheri Young, Ph.D.  
Graduate Faculty Representative, Le Ann Putney, Ph.D.