NOTE TO USERS

The Sweet Sound and Smell of Success: Consumer Perceptions as Mediators of the Interactive Effects of Music and Scent on Purchasing Behavior in a Shopping Mall

Mélanie Morier

A Thesis
in
The John Molson School of Business

Presented in Partial Fulfillment of the Requirements
for the Degree of Master of Science in Administration at
Concordia University
Montreal, Quebec, Canada

August 2005

Your file Votre référence
ISBN: 0-494-10331-0
Our file Notre référence
ISBN: 0-494-10331-0

Abstract

The Sweet Sound and Smell of Success: Consumer Perceptions as Mediators of the Interactive Effects of Music and Scent on Purchasing Behavior in a Shopping Mall

Mélanie Morier

A growing number of malls draw on atmospheric cues such as ambient music and scents to enhance shopper experiences. However, the effects of these variables have yet to be clearly defined in the literature and are often used intuitively by retailers. Thus, exploratory research is still needed to increase the knowledge base of both academics and marketing practitioners if ambient stimuli are to be employed efficiently in retail settings.

This study tested the interactive effects of music tempo and citrus scent on merchandise quality and global perceptions of the environment, as well as on the amount of money spent by consumers surveyed in a Canadian neighborhood mall. The mediating role of evaluations on shoppers' purchasing behavior and the moderating role of gender were also investigated in the proposed model.

Analyses revealed that if the interaction of the selected environmental factors negatively impacted sales, citrus scent also had an independent, adverse affect on the latter; yet, tests failed to establish similar direct links to shopper perceptions. Furthermore, evidence was obtained of the mediating influence of merchandise quality and overall assessments of the setting on expenditures.

Finally, gender was found to quasi-moderate the relationship between the atmospheric variables and consumer evaluations, women exhibiting higher responses to the stimuli than their male counterparts. In general, men responded more favorably to single cue conditions, whereas women's reactions were enhanced in the combined presence or absence of ambient cues. Findings are discussed and provide insight into the theoretical and managerial implications of the study.

Acknowledgments

As my journey into higher education comes to a halt - whether temporary or final, only life can tell - I realize that I did not undertake it alone. I would therefore like to thank those who have helped, begged, nudged, yelled, cried, sulked, and applauded me along the way... as well as those who didn't. I owe the most gratitude to the following people:

My parents Marthe and Jacques, for teaching me the true meaning of unconditional love, selflessness, and faith, and for being the most ultimate, greatest Mom and Dad ever.

My spiritual mother Jocelyne, for her courage through great adversity, her wisdom and acceptance, and her infinite ability to marvel.

My "sister" Marie-France and her husband Yannick, for loving me through good and hard times, as well as entrusting me with the most precious gift of all... Justin.

My close friends Marie-France, Ninie, Annye, Stéphanie, Isabelle, Nadia, and their spouses, for staging interventions when needed, putting up with my disappearances, but most of all, for letting me grow and loving me all the way.

My close friends Lucy, Karine, Marilyn, Zaza, and Rémy, for protecting me against myself, for their sound advice, and their friendship.

The Morier and Millette families, for their constant encouragement, love, and support.

My thesis supervisor Dr. Michel Laroche, for his great knowledge, his sense of humor, as well as his understanding and confidence in my abilities.

My thesis committee member Dr. Jean-Charles Chebat, for his ongoing contribution to this project, his availability and patience, as well as for giving me the opportunity to work on the database.

My thesis committee member Dr. Onur Bodur, for his availability and collaboration, as well as Isabelle Miodek, for her patience, truly essential help, and constant graciousness.

The Ivanhoe Group, more particularly the "Faubourg de l'Ile" management team, for their collaboration and interest.

And last, but not least, Malek, whose rage and passion led me to the other end of strange universes... this truly was an incredible and unforgettable adventure.

As a final note, this thesis is in memoriam of Pietro, whose tragic loss marked the end of my journey. You will forever live in my heart, and I shall miss you every step of the way. Rest in peace, my friend.

"Une heure n'est pas qu'une heure,
c'est un vase rempli de parfums,
de sons, de projets et de climats."

Marcel Proust, *Le Temps retrouvé*, 1927

"Perseverance: A lowly virtue whereby mediocrity
achieves an inglorious success."

Ambrose Bierce, *The Devil's Dictionary*, 1911

"Qui maîtrisait les odeurs, maîtrisait le cœur de l'humanité."

Patrick Süskind, *Le Parfum*, 1988

"I don't know much about
music, you don't have to
in my line of work."

Elvis Aron Presley, 1935-1977

"Más hermoso parece el soldado muerto en la batalla que sano en la huida."

Miguel de Cervantès de Saavedra y Fajardo, *Don Quijote de la Mancha*, 1605

Table of Contents

List of Tables

List of Figures

List of Appendices

I. Introduction

Music is one of the most ancient forms of art and may probably claim to have touched every human being, as it has often been known to influence moods and thoughts. Similarly, scents have always had the power to evoke memories, and to generate immediate enticement, repulsiveness, or attraction. Although most individuals are content with simply appreciating both, others have become more interested in learning about their effects on human behavior. Retailers have caught on early to the potential benefits of these powerful stimuli, and have recently turned them into an essential component of the concept of stores as "environments", taking social trends such as egonomics (Popcorn, 1991) and the customization of the shopping experience to a whole new level. Therefore, it is not surprising that the ever expanding use of music and scent as elements of store atmospherics has increasingly attracted the attention of researchers in consumer marketing, and that understanding and controlling their impacts on retail locations has taken on a new importance.

Among the diverse settings explored by environmental psychologists, retail environments have certainly become one of the main domains of interest. As a result, typologies of experimental variables and theoretical models of consumer responses to ambient cues have become an integrant part of services marketing literature (Kotler, 1973; Mehrabian and Russell, 1974; Baker, 1986; Bitner, 1992; Herrington and Capella, 1994; Gulas and Bloch, 1995; Turley and Milliman, 2000). Based on such emerging concepts, store managers and mall owners have started to customize their environments with the help of

various atmospheric elements. Companies now specialize in providing music that is tailored to target audiences tastes and demographics (Chain Store Age, 1996; Bainbridge, 1998; Sweeney and Wyber, 2002), and olfaction consultants develop personalized fragrances for service providers and retailers whose businesses do not possess a distinctive scent (Miller, 1993; Bainbridge, 1998; Chebat and Michon, 2003). But are these efforts and resources really allocated where they should be?

While numerous researchers have started to study the effects of music (Smith and Curnow, 1966; Areni and Kim, 1993; Milliman, 1982, 1986; Yalch and Spangenberg, 1988, 1990, 1993; Baker, Levy, and Grewal, 1992; Baker, Grewal, and Parasuraman, 1994; Grewal and Baker, 1994; North, Hargreaves, and McKendrick, 1999; Dubé and Morin, 2001; Mattila and Wirtz, 2001; Babin, Chebat, and Michon, 2004) and scent (Hirsch and Gay, 1991; Mitchell, Kahn, and Knasko, 1995; Spangenberg, Crowley, and Henderson, 1996; Bone and Ellen, 1999; Mattila and Wirtz, 2001; Chebat and Michon, 2003) on shoppers' cognitive and behavioral responses in retail settings, these atmospheric elements have traditionally been investigated independently.

However, recent studies have suggested that consumers are not only affected by isolated ambient cues, but by stimuli interactivity as well (Baker, Levy, and Grewal, 1992; Gulas and Bloch, 1995; Wakefield and Baker, 1998; Mattila and Wirtz, 2001; Chebat, Michon, and Turley, 2003; Babin, Chebat, and Michon, 2004). Thus, a new field of research is emerging as the necessity of studying environmental variables' combined influence becomes clearer.

Hence, the main objective of this study is to explore the interactive effects of ambient music and scent on consumer perceptions and purchasing behavior. In addition, the mediating role played by merchandise quality and global environment assessments, as well as the moderating role of gender are also investigated. The first chapter presents available research findings on relevant issues. Based on this literature review, the subsequent section proposes the conceptual background and developed hypotheses. Methodological aspects of the current experiment are then summarized. The following chapters respectively detail results and outline data analyses. Finally, the last part of this report discusses the theoretical and practical implications of the findings, and explores potential limitations of the study, as well as future research directions.

II. Literature Review

As previously stated, the current experiment's main objective is to study the impact of the simultaneous use of music and scent on consumer perceptions and purchasing behavior, as well as the moderating role played by gender in these relationships. In order to undertake this research, it is necessary to develop a framework with which to analyze such influences. Thus, this section will explore the various theories and available literature findings in the following, relevant fields of interest: atmospherics and the service environment; music and scent as environmental cues; their effects on perceptions and behaviors; as well as those of potentially applicable moderating variables.

Readers should note that the terms atmospherics, ambient/environmental cues, variables, or stimuli will be used indiscriminately in the text. It is deemed unnecessary to provide extensive definitions of all terms and related concepts, the terms atmospherics, shelf space studies, environmental psychology, and servicescapes having appeared in a recurring manner in the literature in the last thirty years of exploration and conceptual development (Turley and Milliman, 2000).

A. Atmospherics and the Service Environment

Atmospherics remain one of the newest research interests in the field of marketing, although Kotler first defined the term in 1973. Its main contribution has been the

recognition that at the point-of-purchase, individuals not only preoccupy themselves with the tangible product or service being offered, but also respond to its environment, or more specifically, to the atmosphere of the service setting (Kotler, 1973). To the author, the tangible product is only a portion of a total consumption package that includes the services, warranties, packaging, advertising, financing, pleasantries, images, and other features accompanying the product. The atmosphere of the service environment is an essential part of this total product and can even, in certain situations, be more significant than the product itself. In other cases, atmosphere may even constitute the primary product (Kotler, 1973).

The concept of atmospherics is defined by Kotler (1973) as the effort invested to create a desirable buying environment in order to induce specific emotional responses in consumers and ultimately, increase their purchase probability. This causal chain of effects is outlined in Figure 1.

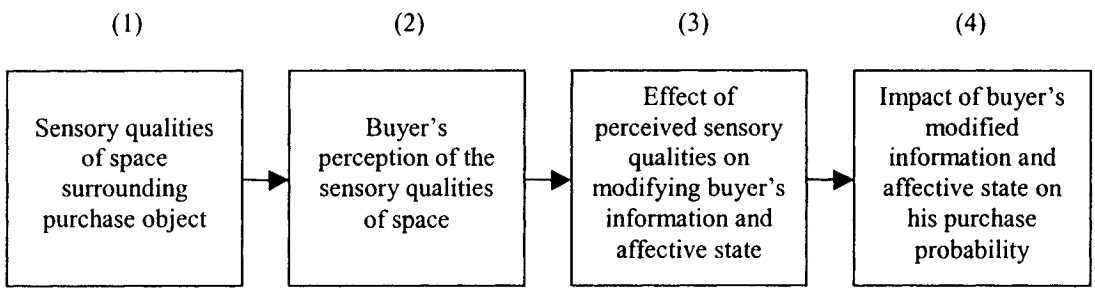

Figure 1 - Causal chain connecting atmosphere and purchase probability (Kotler, 1973, p. 54)

Kotler (1973) states that elements of store atmospherics can be processed through sight, sound, touch, and smell, the atmosphere itself being created through artifacts such as lighting, design, music, scents, and temperature; therefore, the purchase object rests

within a space characterized by sensory qualities that are either intrinsic to or designed into the space by the service provider. Consumers individually perceive different qualities of the environment, their perceptions being altered by selective attention, distortion, and retention (Kotler, 1973). These perceived elements influence the buyers' information and affective state, which in turn, may increase or decrease the latter's purchase probability or satisfaction with the service (Kotler, 1973; Bitner, 1990, 1992). In addition, atmosphere can help differentiate a service environment from its competitors, and/or communicate information about the establishment to potential and actual consumers (Kotler, 1973; Bitner, 1990, 1992; Baker, Grewal, and Parasuraman, 1994).

Other authors further define the definition offered by Kotler (1973) by advancing that a service, due to its intangible nature, requires that buyers entirely experience the service within the firm's physical environment, as it is "produced and consumed simultaneously" (Bitner, 1990; Bitner, 1992). Because of the level of abstraction entailed, users need to rely on tangible peripheral cues to shape mental representations of the service (Shostack, 1977). Hence, these ambient factors can directly affect decision making at the point-of-purchase, perhaps more so than other marketing variables such as advertising (Baker, Grewal, and Parasuraman, 1994). In fact, numerous studies have demonstrated that the service environment or its atmosphere have a significant influence on consumers' emotions and affect, perceptions, as well as behaviors (see "Summary Table of Key Atmosphere Studies" in Appendix A).

Thus, atmosphere constitutes an undeniable competitive advantage. Nevertheless, it should be controlled for and manipulated adequately, its effects also being related to the type of environment and to the nature of the experience sought by target audiences (Kotler, 1973; Mehrabian and Russell, 1974; Baker, 1986; Bitner, 1992; Baker, Grewal, and Parasuraman, 1994). But in order to do so, it is essential for researchers to define and understand the various atmospheric components at play in a particular space.

1. Typologies of Environmental Cues

Diverse authors have offered typologies of atmospheric variables. Having described atmosphere in sensory terms, Kotler (1973) proposed a classification dividing ambient cues among the four following distinct sensory dimensions:

Dimension	Environmental Cues
Visual	- Color - Brightness - Size - Shape
Aural	- Volume - Pitch
Olfactory	- Scent - Freshness
Tactile	- Softness - Smoothness - Temperature

Table 1 - Dimensions of atmosphere (Kotler, 1973, p. 51)

Baker (1986) also developed a framework of environmental factors, constituted of three critical facets of the service environment: ambient, design, and social factors (shown in Table 2, on the following page).

Ambient factors are background conditions that consumers are only aware of if they are missing from the environment, or surpass a certain threshold (temperature, noise, scent, etc.) and become unpleasant, whereas design factors include functional and aesthetic components that act as visual cues, such as architecture, style, and layout (Baker, 1986). Social factors symbolize the individuals in the environment and encompass both patrons and employees, whose number, appearance, and behavior are also anticipated to affect consumer perceptions (Baker, 1986).

Category	Definition	Environmental Cues
Ambient factors	Background conditions that exist below the level of our immediate awareness.	- Air Quality - Temperature - Humidity - Circulation/Ventilation - Noise (Level, Pitch) - Scent - Cleanliness
Design factors (Interior/Exterior)	Stimuli that exist at the forefront of our awareness.	**Aesthetic** - Architecture - Color - Scale - Materials - Texture, Pattern - Shape - Accessories **Functional** - Layout - Comfort - Signage
Social factors	People in the environment.	**Audience (Other Customers)** - Number - Appearance - Behavior **Service Personnel** - Number - Appearance - Behavior

Table 2 - Components of the physical environment (Adapted from Baker, 1986)

This particular classification of physical environment components was used in various experiments (Baker, Levy, and Grewal, 1992; Baker, Grewal, and Parasuraman, 1994;

Grewal and Baker, 1994). But while all factors may be manipulated to influence consumer perceptions of the service quality and satisfaction levels, Baker, Grewal, and Parasuraman (1994) maintain that ambient and social factors are most significant.

Later, Bitner (1992) offered another classification regrouping environmental cues in three main categories, two of which are identical to Baker's (1986) typology:

Category	Definition
Ambient Conditions	Ambient conditions include characteristics of the surroundings such as temperature, lighting, noise, music, and scent. They often imperceptibly affect the five senses, their presence usually being limited to a "background" condition. However, the effects of ambient cues become particularly perceptible when they are extreme or in conflict with expectations, and when long periods of time are spent in the environment.
Spatial Layout and Functionality	Spatial layout is described as the disposition, size, shape, and spatial relationship between the machinery, equipment, and servicescape furnishings. Functionality refers to the latter's ability to facilitate performance and the accomplishment of goals. The effects of spatial layout and functionality are most prominent in self-service settings, in situations where complex tasks are to be executed, and in time pressure situations.
Signs, Symbols and Artifacts	Signs, symbols, and artifacts are cues designed to communicate information to users of the location. They can be of a direct (signs) or indirect nature (symbols and artifacts) and can be used as labels, indicators of directional purposes, rules and expectations of behavior. They can also communicate symbolic meaning and create an overall aesthetic impression. Signs, symbols, and artifacts are especially important in determining first impressions, in communicating new service concepts, in repositioning a service, or in differentiating the organizations from others.

Table 3 - Classification of environmental cues (Adapted from Bitner, 1992)

The servicescape is a complex mix of elements present in the physical surroundings that managers can control and manipulate to affect both employee and consumer actions; these factors are perceived by the latter as a holistic pattern of interdependent stimuli (Bitner, 1992).

Finally, Turley and Milliman (2000) have proposed a more precise typology of environmental factors based on Berman and Evans' (1992) work. According to the latter,

atmospheric stimuli can be grouped into four categories: the exterior of the store, the general interior, the layout and design variables, and the point-of-purchase and decoration variables (Berman and Evans, 1992). The significance of social factors having been recognized in different studies (Baker, Levy, and Grewal, 1992), Turley and Milliman (2000) revised Berman and Evans' (1992) classification, adding a fifth category, called "Human Variables", in order to complete the typology (see the revised version of the categorization in Table 4).

Category	Variables	
1. External variables	a) Exterior signs	h) Lawns and gardens
	b) Entrances	i) Address and location
	c) Exterior display windows	j) Architectural style
	d) Height of building	k) Surrounding area
	e) Size of building	l) Parking availability
	f) Color of building	m) Congestion and traffic
	g) Surrounding stores	n) Exterior walls
2. General interior variables	a) Flooring and carpeting	h) Width of aisles
	b) Color schemes	i) Wall composition
	c) Lighting	j) Paint and wall paper
	d) Music	k) Ceiling composition
	e) P.A. usage	l) Merchandise
	f) Scents	m) Temperature
	g) Tobacco smoke	n) Cleanliness
3. Layout and design variables	a) Space design and allocation	h) Waiting rooms
	b) Placement of merchandise	i) Department locations
	c) Grouping of merchandise	j) Traffic flow
	d) Work station placement	k) Racks and cases
	e) Placement of equipment	l) Waiting queues
	f) Placement of cash registers	m) Furniture
	g) Waiting areas	n) Dead areas
4. Point-of-purchase and decoration variables	a) Point-of-purchase displays	f) Artwork
	b) Signs and cards	g) Product displays
	c) Wall decorations	h) Usage instructions
	d) Degrees and certificates	i) Price displays
	e) Pictures	j) Teletext
Human variables	a) Employee characteristics	d) Customer characteristics
	b) Employee uniforms	e) Privacy
	c) Crowding	

Table 4 - Atmospheric variables (Turley and Milliman, 2000, p. 194)

Hence, the environmental cues that will be the subject of the present study, music and scent, are respectively part of the aural and olfactory dimensions of Kotler's (1973)

categorization. They also figure into the first dimension of both Baker (1986) and Bitner's (1992) typology of ambient cues, and in the second category (general interior variable) of Berman and Evans' (1992), as well as Turley and Milliman's (2000) classification (see Appendix B for a table of comparison of the various typologies). In order to understand how these factors may affect consumer perceptions and purchasing behavior, it is necessary to introduce the theories that belie environmental psychology.

2. Theoretical Models of Consumer Responses to Atmospherics

Various theories explain the influence of atmospherics on consumer responses (Bitner, 1992). A vast majority of these theories are founded on the Mehrabian and Russell (1974) environmental psychology model. Environmental psychology (also known as human-environment theory) is based on the Stimulus-Organism-Response (SOR) paradigm. Within this framework, atmosphere is the stimulus (S) that prompts a consumer's evaluation or organism (O), and some behavioral response (R) (Donovan and Rossiter, 1982; Spangenberg, Crowley, and Henderson, 1996).

Mehrabian and Russell (1974) were the first to introduce a theoretical model on the effects of environmental factors on consumer emotions and behaviors. Combined with subsequent literature, the latter served as the foundation for Bitner's Servicescape Model (1992), an extended framework which highlights the impact of the service setting on both patrons and employees. In addition, two structural conceptualizations respectively illustrate the relationships linking the selected atmospheric cues (ambient odor and music) to consumer responses (Herrington and Capella, 1994; Gulas and

Bloch, 1995). The next sub-sections therefore offer an overview of the said models and of relevant findings engendered by their application.

2.1 PAD Model (1974)

Mehrabian and Russell (1974) proposed a theoretical model in which emotional states are induced by environmental stimuli and act as mediators, the obtained affective responses then generating approach-avoidance behaviors (see "Mehrabian and Russell PAD Model" in Appendix C). Cues emerging from the physical surroundings can provoke voluntary or involuntary emotional reactions of pleasure, arousal, and dominance (PAD). The authors defined pleasure as the degree to which an individual can feel good, joyful, happy or satisfied, while the arousal is the degree to which an individual feels alert, excited, stimulated, or active. Dominance refers to the level to which an individual feels autonomous and in control to act freely, given the situation (Mehrabian and Russell, 1974).

The PAD model borrows from information theory and takes stimulus factors into consideration in that the "degree of arousal evoked by an environment is considered to be a direct function of the information load of the situation" (Donovan and Rossiter, 1982, p. 42). The information load is defined by Mehrabian and Russell (1974) as the setting's degree of novelty (unexpected, surprising, new, and/or unfamiliar elements) and complexity (number of elements or features, as well as the extent of motion or change within them).

According to the model, shoppers' responses to the atmosphere can either be considered as approach or avoidance behaviors (Mehrabian and Russell, 1974). All positive reactions to a particular environment, such as the desire to stay, explore, affiliate, and work (towards performance and satisfaction), can be classified as approach behaviors. In contrast, avoidance behaviors lead individuals to leave, to refuse interacting with the environment or others, and to be uncooperative (Mehrabian and Russell, 1974). These aspects of approach-avoidance behaviors are further defined in Appendix D.

The PAD dimensions are orthogonal, that is, independent factors (Donovan and Rossiter, 1982). Nonetheless, Mehrabian and Russell (1974) state that a conditional interaction exists between pleasure and arousal in the determination of approach-avoidance behaviors, arousal amplifying approach behaviors in pleasant environments, and avoidance behaviors in their counterparts. The existence of such a relationship between positive emotions and approach, as well as between negative emotions and avoidance, has been well sustained by research (Russell and Mehrabian, 1978; Donovan and Rossiter, 1982).

The pleasure and arousal dimensions of Mehrabian and Russell's model (1974) have also been empirically proven to help predict certain consumer behaviors in retail settings. For instance, Donovan and Rossiter (1982) have found that behavioral intentions of approach, including shopping time and enjoyment, attitudes toward the environment itself and toward returning to the location, attraction and friendliness toward others, purchasing behavior, and store exploration were affected by consumers' emotional states in the surroundings.

More recently, Wakefield and Baker (1998) have conducted a field study of shopping malls on the relationship linking tenant variety, mall environment, and shopping involvement to customers' excitement and desire to stay at the mall. Results revealed that ambient cues such as design, music, mall layout, and decor were positively related to these emotional responses; in addition, the latter were also found to influence long-term patronage intentions and outshopping (Wakefield and Baker, 1998).

Nevertheless, various researchers have suggested the deletion of dominance dimension from the PAD model in the retail context (Russell and Pratt, 1980; Donovan and Rossiter, 1982; Yalch and Spangenberg, 1990). The authors argued that dominance involves cognitive interpretation by the person and, hence, is not entirely relevant in circumstances demanding affective responses. It would seem that dominance is indeed not an essential dimension in the context of shopping environments, for findings have demonstrated that it is not significantly related to different measures of approach and avoidance behaviors (Donovan and Rossiter, 1982; Yalch and Spangenberg, 1988, 1990).

2.2 Servicescape Model (1992)

Traditionally, research on the influence of physical surroundings on employee satisfaction, productivity, and motivation had not included customers (Bitner, 1992), just as employees had typically been ignored in the field of atmospherics research (Kotler, 1973; Donovan and Rossiter, 1982; Milliman, 1982). Inspired by Mehrabian and Russell's PAD model, Bitner (1992) designed a new framework integrating the effects of

the built commercial setting - called the servicescape - on consumers and employees, as well as their interactions (as depicted in Figure 2).

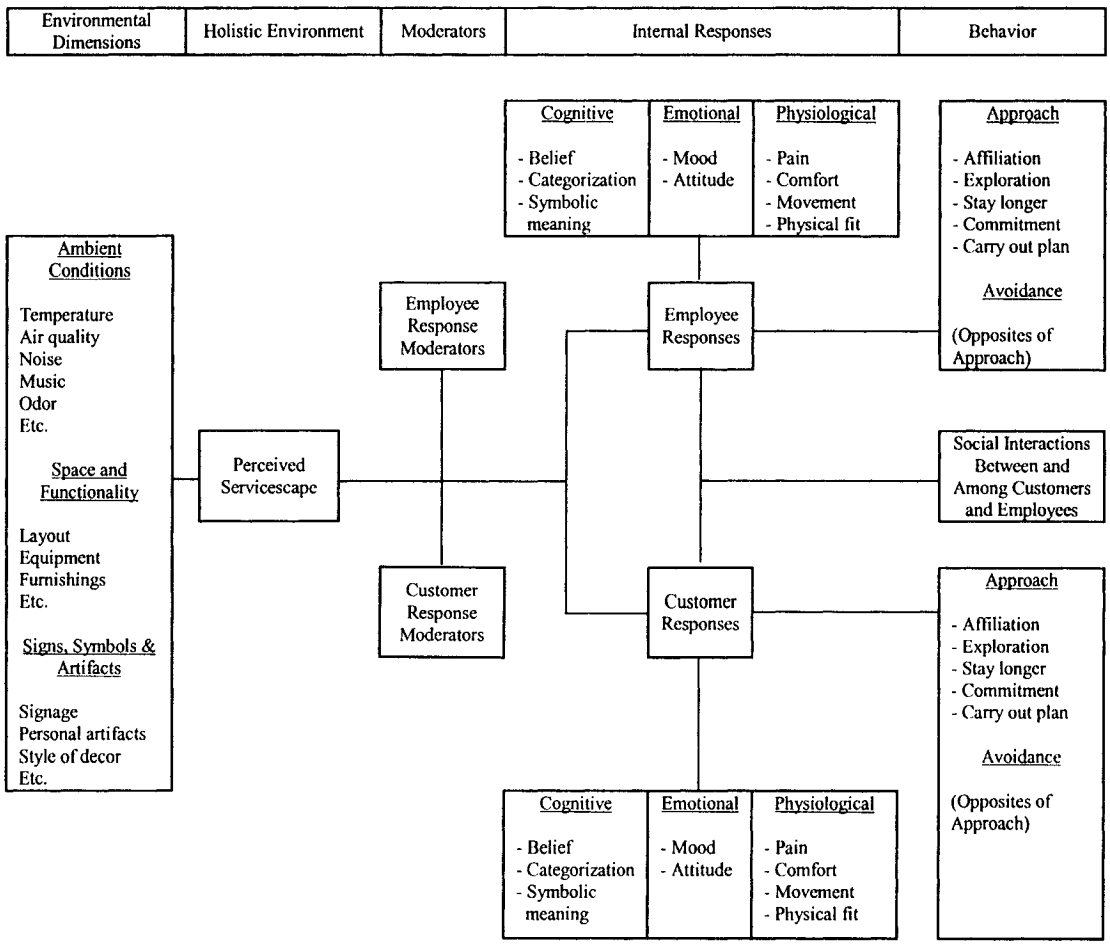

Figure 2 - Framework for understanding environment-user relationships in service organizations (Bitner, 1992, p. 60)

In this framework, the clientele and service personnel both perceive a range of objective environmental cues, to which they may respond cognitively, emotionally, and physiologically. As suggested by Mehrabian and Russell (1974), these individuals' reactions to their surroundings can be qualified either as an approach, or as an avoidance behavior. Bitner's Servicescape Model (1992) is, however, unique in that it not only adds

service personnel to the equation, but also includes the effects of the servicescape on the interactions between and among consumers and employees as well.

Perceptions of the environmental cues lead to certain emotions, beliefs, and physiological sensations that, in turn, affect behaviors; the relationship between the latter and atmospherics is therefore mediated by individual internal responses to the location (Bitner, 1992). The type of cognitive responses elicited by the service setting may influence people's beliefs about the organization, its employees or products, and thus, serve as a differentiating tool between firms (Bitner, 1992). This conceptualization is similar to the notion of non-verbal communication, or that of "silent language" mentioned by Kotler (1973).

The servicescape can also exert its power by eliciting physiological reactions to ambient stimuli, affecting employee performance and determining whether people remain or leave the environment; for instance, loud noises, extreme temperatures, air quality or inadequate lighting are all factors that can cause physical discomfort and thus, prompt avoidance decisions (Bitner, 1992). These physiological responses may even affect seemingly unrelated beliefs and emotions about people in the service setting or the setting itself as well (Bitner, 1992).

Finally, and similarly to Mehrabian and Russell's PAD model, pleasure and arousal levels of emotion generated by consumer and employee perceptions of the location can engender moods and attitudes that will determine whether approach or avoidance behaviors are adopted (Bitner, 1992).

2.3 Structural Framework for Relationship of Music to a Retail Environment (1994)

To further detail and illustrate the relationship linking music to consumer responses, Herrington and Capella (1994) have also provided a structural framework relating music to retail environments (see framework in Appendix E). According to this framework, early experiences with a retailer and/or knowledge of a retailer from other sources are key elements, as they contribute to the selection of a particular merchant by serving as a basis for the decision-making process.

In the second part of the framework, music influences shoppers at the point-of-purchase through store atmosphere, shopper mood, employee performance, and psychological costs of shopping to the consumer, which in turn determine the duration of time spent in the retail environment, the extent of purchasing, as well as the shopper's new evaluation of the shopping experience. The latter then serves as additional input for subsequent store selection decisions and for the development of long-term patronage (Herrington and Capella, 1994).

Consequently, music components are expected to either increase the information load of the setting - therefore, generating arousal - or contribute to its pleasant or unpleasant nature. Based on the same environmental theory principles as the PAD Model (Mehrabian and Russell, 1974), approach and avoidance behaviors will then be engendered by these affective responses (Herrington and Capella, 1994).

2.4 Model of the Influence of Ambient Scent on Consumer Responses (1995)

Gulas and Bloch (1995) developed a model specifically aimed at illustrating the effects of ambient scent on emotions and behaviors. The model is based on both Mehrabian and Russell's PAD model (1974) and Bitner's (1992) conceptual framework (see "Proposed Model of the Influence of Ambient Scent on Consumer Responses" in Appendix F). The perception of ambient scents, as opposed to product-related odors, is posited to occur as a "function of the objective scent levels in the physical environment and the smell acuity of the consumer", the latter being dependent on various individual characteristics (Gulas and Bloch, 1995, p. 90). The perceived odors are then combined with scent preferences, which are determined not only by the same personal attributes as olfactory acuity, but by physiological predispositions and past experiences as well.

Once amalgamated, scents and preferences influence consumers' affective responses, and ultimately produce approach-avoidance reactions. Potential moderators of the relationship between odor awareness and emotions include other atmospheric factors, as well as scent congruity (Gulas and Bloch, 1995). It is interesting to note that the authors consider merchandise evaluations and assessments of the overall setting as a "non-behavioral category of approach responses" that may also be affected by ambient scents (Gulas and Bloch, 1995).

Thus, environmental psychology models are helpful in determining the pertinent methods and measures needed to observe and analyze the influence of atmospheric cues on consumer responses to a retail setting (Spangenberg, Crowley, and Henderson, 1996). Furthermore, available frameworks clearly outline the manner in which the selected

factors, that is, music and scent, can induce emotional, cognitive, physiological, and behavioral reactions in a shopping context.

B. Music and Scent as Environmental Cues

Based on the literature, it is possible to presume that in a retail location such as a mall, consumers will be affected by the addition of various stimuli to the setting. Hence, this section will provide adequate descriptions of the environmental factors that will be used as independent variables in this study, music tempo and ambient scent. It also explores recent research on their use as store atmospheric elements, or general interior variables according to the Turley and Milliman (2000) typology.

1. Music

In "Music, Mood, and Marketing", Bruner II (1990, p. 94) describes music not as "a generic sonic mass, but rather a complex chemistry of controllable elements." Although academic definitions tend to differ on the nature of music's primary components, a consensus appears to have been reached on three basic structural factors, which have gained empirical confirmation: time, pitch, and texture (Dowling and Harwood, 1986; Bruner II, 1990). Definitions of these factors and related subcomponents, as well as a list of affective meanings drawn from music's main characteristics by musicians and conductors, are respectively provided in Appendix G and Appendix H. For a complete summary of research having tested these beliefs, see Bruner II (1990).

Within service environments, music if often used to generate desired consumer and employee responses. These effects are usually produced by manipulating the presence or absence of music in the setting, and/or various music dimensions (Milliman, 1982, 1986; Yalch and Spangenberg, 1990, 1993; Kellaris and Kent, 1991, 1992; Baker, Levy, and Grewal, 1992; Areni and Kim, 1993; Mattila and Wirtz, 2001). For instance, several studies cited in Bruner II (1990) report findings on the following physical characteristics of music: tempo, rhythm, phrasing, pitch, mode, harmony, melody, range, orchestration, and volume. In particular, music tempo follows an "inverted-U" function, the preferred range generally falling between 70 and 110 beats per minute, although preferences may vary depending on the context (Dowling and Harwood, 1986, Bruner II, 1990).

Along with Herrington and Capella's framework (1994), three main theories have been advanced to account for music's influence on consumer responses: classical conditioning, involvement, and the notion of "fit" (North and Hargreaves, 1997). Classical conditioning "implies that pairing a product (conditioned stimulus) with a liked piece of music (unconditioned stimulus) should produce an association between the two, and therefore liking for the product (a conditioned response)" (North and Hargreaves, 1997, p. 269), a concept illustrated by Gorn's study (1982), which revealed that the likableness of music being played in the setting was transferred onto a chosen object.

The concept of involvement, in turn, refers to the Elaboration Likelihood Model (ELM), which proposes that attitudes can be formed through two distinct routes to persuasion, defined by the level of involvement required to process information that is related to the issue at hand (Cacioppo and Petty, 1989). Due to its potency as a directive factor,

involvement is considered to have a "primary motivating influence" on decision-making processes (Engel, Blackwell, and Miniard, 1990). For instance, background music has been found to improve attention and brand attitudes for respondents with low involvement, but act as a distraction for those with high involvement (Park and Young, 1986; MacInnis and Park, 1991).

The third aspect, that is, the idea that accessing pertinent knowledge structures can improve processing ability, is inherently related to the concept of "fit" (North and Hargreaves, 1997). It has been suggested that individual attitudes can be positively affected by music in cases where the environmental cue is perceived to be congruent with the core message of the advertisement (Park and Young, 1986; MacInnis and Park, 1991). Support for the latter notion can be found in experiments having found evidence of low- and high-involvement consumer responses, as well as of purchasing behavior being improved by musical fit (Alpert and Alpert, 1990; MacInnis and Park, 1991; Areni and Kim, 1993; Chebat, Gélinas-Chebat, and Vaillant, 2001).

Mehrabian and Russell's PAD model (1974) may also provide an explanation for the effects of music on consumer behavior. Music's volume and tempo are presumed to contribute to the retail setting by raising its complexity and/or the number of environmental stimuli. In turn, this augmentation causes the environment to provide an increased amount of information, which leads individuals to experience higher levels of arousal (Herrington and Capella, 1994). The alternative is that the same physical characteristics of music either contribute to or detract from the pleasantness of the location, and lead to approach or avoidance behaviors (Herrington and Capella, 1994).

Another hypothesis advanced is that consumers voluntarily or involuntarily match their walking pace to the music's tempo, and/or increase their pace when faced with loud music (Smith and Curnow, 1966; Milliman, 1982). On the other hand, music may have an evocative power similar to the one exerted by ambient odors, that is, the capacity to bring up memories associated to the stimulus (Chebat, Gélinas-Chebat, and Vaillant, 2001). As a result, the retrieved information may color the assessment of the service encounter, from non verbal cues, to sales arguments, and atmospheric cues (Herrington and Capella, 1994; Chebat, Gélinas-Chebat, and Vaillant, 2001).

Thus, recent psychology and marketing experiments have demonstrated that music tempo has psychological stimulation properties and can affect key variables in consumer behavior (Milliman, 1982, 1986; Alpert and Alpert, 1990; Kellaris and Kent, 1991, 1992; Dubé, Chebat, and Morin, 1995; Wakefield and Baker, 1998; Chebat, Gélinas-Chebat, and Vaillant, 2001). Confirmation of the arousing quality of music tempo has been provided by Kellaris and Kent's study (1991). The authors found that increasing music tempo had a direct and positive impact on the arousal felt by the respondents. In addition, their results suggested that music in minor or atonal modes was perceived as less unappealing for fast-tempo music than slow or moderate-tempo music (Kellaris and Kent, 1991). Similarly, up-tempo music was deemed less irritating, sad, and depressing by participants in another study (Kellaris and Rice, 1993).

Other results also support the existence of a positive interactive influence of musical mode and tempo, music-induced pleasure having the strongest effect on subjects' desire to affiliate in low or high arousal conditions (Dubé, Chebat, and Morin, 1995). Pleasing

music, however, has been rather consistently related to background, soft-tempo music in earlier research (Baker, Levy, and Grewal, 1992; Dubé, Chebat, and Morin, 1995; Chebat, Gélinas-Chebat, and Vaillant, 2001; Dubé and Morin, 2001; Sweeney and Wyber, 2002). Consequently, although findings on this issue remain inconsistent and mixed (Milliman, 1982, 1986; Herrington and Capella, 1994; Mattila and Wirtz, 2001), tempo is one of the core factors of the influence wielded by music on shopper responses.

In general, the existing literature highlights the direct effects of music on emotions and behaviors (Milliman, 1982). It also underlines the indirect effects of music (through emotions) on perceived wait duration (Hui, Dubé, and Chebat, 1997), merchandise quality and global perceptions of the retail environment (Dubé and Morin, 2001; Mattila and Wirtz, 2001; Sweeney and Wyber, 2002), as well as on consumer responses such as approach/avoidance, expenditures, and undertaken activities, among others (Baker, Levy, and Grewal, 1992). Nevertheless, researchers state that music tempo effects still remain ambiguous and deserve further study (Baker, Levy, and Grewal, 1992; Kellaris and Rice, 1993; Herrington and Capella, 1994).

2. Scent

Scents are differentiated "along three different, albeit not necessarily independent dimensions": the affective quality of the scent (degree of pleasantness), its arousing nature (capacity to evoke physiological response), and its intensity (strength), the affective dimension being dominant for scent perception (Spangenberg, Crowley, and Henderson, 1996, p. 69). They are more arduous to distinguish than visual or aural

stimuli, in that they may be harder to label (Levine and McBurney, 1986), and can potentially generate false alarms and placebo effects (Richardson and Zucco, 1989; Ellen and Bone, 1998).

The arousing quality of scents can be established by examining the effects of odors on both EEG (electroencephalograph) and respiratory patterns, the latter demonstrating that scents do affect arousal levels (Lorig and Schwartz, 1988), and require little cognitive effort to be experienced (Ehrlichman and Halpern, 1988). It is important to note, however, that even if the arousing nature of scent and its affective dimension are not known to have been observed entirely independently from one another, findings seem to indicate that odors can contribute to the arousal felt by consumers in an environment (Spangenberg, Crowley, and Henderson, 1996).

Although they are primarily a physiological response, olfaction effects are more than "purely autonomic", as they also influence consumers' emotional and cognitive state, (Ellen and Bone, 1998; Bone and Ellen, 1999). They are processed through the limbic system, the section of the brain that generates emotions (Gulas and Bloch, 1995; Ellen and Bone, 1998). Findings on the affective quality of odors reveal that as scent intensity increases, its pleasantness decreases and tends to elicit more negative reactions (Richardson and Zucco, 1989; Ehrlichman and Bastone, 1992; Spangenberg, Crowley, and Henderson, 1996), even creating aversion in high concentrations (Bone and Ellen, 1999).

In addition, the olfactory system is intrinsically linked to human memory and cognition, as scents tend to be remembered as part of a significant biographical event (Cann and Ross, 1989; Richardson and Zucco, 1989; Hirsch, 1992; Mitchell, Kahn, and Knasko, 1995). Typically, pleasing scents are posited to generate favorable associations, either based on their hedonic nature or their capacity to be tied to previous positive experiences; in parallel, their offensive counterparts may lead to negative effects (Bone and Jantrania, 1992; Ehrlichman and Bastone, 1992; Hirsch, 1992; Gulas and Bloch, 1995; Hirsch, 1995; Ellen and Bone, 1998; Bone and Ellen, 1999). Similarly, past experiences evoked by music are also reported to affect consumer responses (Herrington and Capella, 1994; Chebat, Gélinas-Chebat, and Vaillant, 2001).

Nonetheless, Spangenberg, Crowley, and Henderson's (1996) results suggest that it is not the nature, but the presence of the scent itself that causes these effects. Even so, researchers sustain that presence alone cannot affect a retail customer's behavior and that the odor must be as congruent with the retail outlet as possible, while remaining pleasant in order to spur favorable responses (Bone and Jantrania, 1992; Hirsch, 1995; Knasko, 1995; Mitchell, Kahn, and Knasko, 1995; Bone and Ellen, 1999). However, additional findings specify that "no-odor control groups are essential" when conducting experiments, so that the influence of cue congruity and scent presence can be differentiated (Ellen and Bone, 1998, p. 38).

Thus, scents are, in general, hypothesized to influence consumers by influencing their emotional and evaluative, as well as their behavioral responses (Levine and McBurney, 1986; Ehrlichman and Bastone, 1992; Bone and Ellen, 1999). Yet, there

remains a definite gap in the literature concerning the impact of ambient scents, as opposed to scents attached to a particular object or person, especially so in marketing environments (Spangenberg, Crowley, and Henderson, 1996; Bone and Ellen, 1999). It is also noteworthy that earlier research has more often generated null effects (63.2%) than significant ones, and that studies have focused even less on the affective quality of odors than their presence (Bone and Ellen, 1999). (See Bone and Ellen (1999) for a complete review of scent effects in the marketplace.)

Hence, past research has shown that pleasant atmospheric cues can enhance the shopping experience, although few experiments have observed their interactive impact (Baker, Levy, and Grewal, 1992; Grewal and Baker, 1994; Gulas and Bloch, 1995; Mattila and Wirtz, 2001; Babin, Chebat, and Michon, 2004; Spangenberg, Grohmann, and Sprott, 2004; Morrin and Chebat, 2005). Findings not only support the capacity of music tempo to affect consumer emotions, perceptions, and behaviors, but support the potential for ambient scent to achieve similar effects as well, despite the absence of agreement and the contrasting evidence provided by various olfaction studies. The diverging results simply signal that findings in this area of research appear to be specific to the context from which they were obtained (Turley and Milliman, 2000).

C. Effects of Environmental Cues on Consumer Responses

As previously discussed, environmental stimuli can affect the service encounter by influencing consumer responses. The following section offers recent research on the

nature of music tempo and ambient scent's main and interactive effects on shopper perceptions and behaviors, as well as the mediating role of evaluations in the established relationships. For a complete review of available findings on the influence of emotions, perceptions, and behaviors on consumer responses, see Turley and Milliman's (2000) summary table of key atmospheric studies in Appendix A.

1. Effects on Perceptions

In recent years, considerable attention has been given by environmental psychologists to measures of attitudes, their main interest residing in studying perceived environmental quality (Holahan, 1982). Various measures quantitatively assess the aesthetic quality of physical settings, or of its contents; these measures therefore constitute subjective, preferential judgments made by individuals and based on their experience of a particular surroundings (Bell, Fisher, and Loomis, 1978; Holahan, 1982). In contrast, perceptions are defined as evaluations of the objective characteristics of an environment (Engel, Blackwell, and Miniard, 1990).

Originally developed to assess advertisements, the Elaboration Likelihood Model (ELM) provides further insight into the formation of attitudes (Cacioppo and Petty, 1989). Persuasion can either result from the careful examination of the value and relevance of whatever information is presented in favor of the issue (central route), or from the association of the issue and its attributes with contextual cues, whether positive or negative (peripheral route). The central route is used in situations where an individual has the motivation, opportunity, and ability to process information (and is therefore highly

involved), whereas the peripheral route takes precedence in cases when involvement is limited and a person is unwilling or unable to evaluate overt messages (Cacioppo and Petty, 1989); This conceptualization provides support for the idea that "similar general and enduring evaluations of stimuli (attitudes) can be based on and activate different psychological operations and that attitudes and affect can be differentiated" (Cacioppo and Petty, 1989, p. 74).

Unlike most manufactured goods, services offer few intrinsic cues on which to form beliefs because of their intangibility, and the fact that they are, by nature, high in experience and credence attributes (Shostack, 1977; Zeithaml, 1988). Thus, peripheral cues such as atmospherics serve as a basis for assessments of service quality (Shostack, 1977; Zeithaml, 1988; Olshavsky, 1985; Hui, Dubé, and Chebat, 1997), and the setting itself (Shostack, 1977). The environment therefore exerts a strong influence on consumers' perceptions of the service experience (Bitner, 1992), in a process that appears to require lower involvement (Cacioppo and Petty, 1989; MacInnis and Park, 1991) and resembles the formation of attitudes (Zeithaml, 1988). For instance, both consumers and employees may use the overall perception of the environment as a cue to mentally categorize and distinguish among various types and/or quality of similar settings (Bitner, 1992)

Furthermore, shoppers can use store aesthetics or environmental components to make inferences on the quality of products or brands sold in the establishment; as the attractiveness of the stimuli increases, so does the perceived quality (Olshavsky, 1985; Zeithaml, 1988; Baker, Grewal, and Parasuraman, 1994; Richardson, Jain, and

Dick, 1996). These inferences are posited to affect store environment evaluations that, in turn, influence store image (Baker, Grewal, and Parasuraman, 1994). Although the degree to which atmospheric elements exercise their influence is in large part determined by the type of product and/or service provided by the retailer (Kotler, 1973), for image-based environments such as restaurants and night-clubs, atmosphere may take an utmost importance; in contrast, hardware stores will unlikely be judged by consumers on such criteria (Herrington and Capella, 1994).

In a study pertaining to store images, Gardner and Siomkos (1986) found that consumers rated perfumes more favorably when given prestigious descriptions of the store environment than when given portraits of discount stores. In a similar fashion, Bellizzi, Crowley, and Hasty (1983) demonstrated the capacity of colors to influence evaluations of a store design and of its assortment of products. Experimental results revealed that cold colors positively influenced evaluations of a retail setting, whereas warm colors improved assessments of the merchandise, respondents believing it to be more up to date; price perceptions, however, were not affected by the visual stimuli (Bellizzi, Crowley, and Hasty, 1983).

1.1 Music

The available research reveals that few studies have focused on the influence of music on shopper evaluations. Nonetheless, the presence of background music has been found to ease the formation of brand attitudes for subjects in a low involvement condition, but to divert the attention of those in a high cognitive involvement condition, causing

interference in message encoding (Park and Young, 1986; MacInnis and Park, 1991). It has also been proposed that familiar, pleasant music can incite listeners to devote more attention to the stimulus, thereby positively affecting time perceptions (Kellaris and Kent, 1992).

Equally, slow-tempo music has been observed to affect salespersons' arguments in a retail situation by enhancing responses in the low-arousal condition (Chebat, Gélinas-Chebat, and Vaillant, 2001). Moreover, findings of a field experiment have demonstrated that pleasing background music increased attitudes toward the servicescape, which, in turn, had a direct positive effect on store assessments, as well as an indirect impact through attitudes toward the sales personnel (Dubé and Morin, 2001). Additional results also suggest that music can influence the direction of evaluations by facilitating the retrieval of mood-congruent thoughts (Gorn, 1982; Gardner, 1985; Dowling and Harwood, 1986; Alpert and Alpert, 1990; Bruner II, 1990; MacInnis and Park, 1991; Hui, Dubé, and Chebat, 1997; Chebat, Gélinas-Chebat, and Vaillant, 2001; Sweeney and Wyber, 2002).

In a study of music effects on shopping time perceptions, consumers under 25 believed they had remained in the department store longer than intended when listening to instrumental music, whereas the opposite was observed for older shoppers, their perception being similar for Top 40 hits; thus, the authors suggested that atypical environmental factors such as unfamiliar music might have altered consumers' perception of time (Yalch and Spangenberg, 1990). This experiment replicated the findings of an

earlier investigation on background and foreground music as atmospheric cues, in which time estimates equally interacted with age (Yalch and Spangenberg, 1988).

Similar results were obtained by Kellaris and Mantel (1996), who observed that playing stimulating music could reduce subjects' assessment of the duration of radio ads. Conversely, soothing background music had to be congruent with other surrounding elements to have a positive effect on subjective time. Arousal was also found to act as a moderator of the relationship between stimulus congruity and time perception, a result consistent with the premise that arousal could reduce processing capacity by acting as a "distraction mechanism" and hindering the processing and ensuing recall of stimuli (Kellaris and Mantel, 1996). Additional support for these findings was provided by Chebat, Gélinas-Chebat, and Vaillant (2001), who determined that background music being played in a store could stimulate or cancel cognitive processing, based on its level of arousal.

Furthermore, Baker, Grewal, and Parasuraman (1994) conducted an experiment in which the use of classical background music and subtle lighting (high-end image) generated more favorable assessments of gift merchandise quality, service, and overall evaluations of the environment than Top 20 music and harsher lighting (discount store image). Gardner and Siomkos (1986) achieved similar results when presenting subjects with verbal descriptions of a prestigious store containing elements such as "mood music", carpeting, wide aisles, etc., as opposed to a lower end setting (dirty floors, sloppily dressed salespeople, etc.).

Moreover, it is noteworthy to underline that in a study manipulating music to create zones in a department store, respondents perceived the merchandise to be less expensive in the foreground music experimental condition than in its background equivalent (Yalch and Spangenberg, 1993). In parallel, Grewal and Baker (1994) discovered a positive interaction effect of design (color, layout, organization of merchandise, and trimming of displays) and ambient factors (music and lighting) on consumer perceptions of price acceptability. Thus, despite the variability of its degree of impact, music as an atmospheric component can potentially play a defining role in determining a retailer's image (Baker, Levy, and Grewal, 1992; Herrington and Capella, 1994).

Finally, music-related findings also support the assumption that tempo alone may affect evaluative or behavioral responses. For instance, Baker, Levy, and Grewal (1992) established that pleasure and arousal could not be identified as perfect mediators of the relationship between ambient stimuli (music and lighting) and respondent's willingness to buy, suggesting that perceptions could play a more defining role than emotions in the process. Furthermore, the level of pleasure experienced by consumers was unaffected by exposure to background and foreground music in various retailing experiments (Yalch and Spangenberg, 1988, 1990, 1993; Kellaris and Kent, 1992).

1.2 Scent

Most research in this area has focused on scents associated with individuals (Baron, 1983; Cann and Ross, 1989), advertisement (Ellen and Bone, 1998), or products (Laird, 1932; Bone and Jantrania, 1992), both persons and products being perceived more

favorably when scented (Spangenberg, Crowley, and Henderson, 1996; Bone and Ellen, 1999). Yet, some authors suggest that there is little evidence of the influence of odor pleasantness on evaluative responses of objects or settings (Bone and Jantrania, 1992; Bone and Ellen, 1999).

Furthermore, research findings sustain a more cognitive approach in that very limited support can be found for scents to alter emotional states (Baron, 1983; Ehrlichman and Halpern, 1988; Lorig and Schwartz, 1988; Ehrlichman and Bastone, 1992; Knasko, 1992; Spangenberg, Crowley, and Henderson, 1996; Bone and Ellen, 1999; Morrin and Ratneshwar, 2000, 2003). For instance, certain studies have failed to establish a significant relationship between ambient odors and pleasure, and/or arousal (Ehrlichman and Halpern, 1988; Cann and Ross, 1989; Ludvigson and Rottman, 1989; Knasko, 1992; Mitchell, Kahn, and Knasko, 1995; Morrin and Ratneshwar, 2000, 2003; Mattila and Wirtz, 2001). In addition, only a small percentage of the tests examined by Bone and Ellen (1999) revealed any influence of scent presence on either pleasure or arousal.

Moreover, in a field study to examine the effects of the presence of scent in a retail environment, Spangenberg, Crowley, and Henderson (1996) found that ambient odors enhanced both the pleasing and arousing nature (or information load) of the setting, and improved perceptions of the store environment, as well as of merchandise quality. However, results indicated that while scents increased "evaluations of less pleasing products", it did not improve those of already positively viewed merchandise (Spangenberg, Crowley, and Henderson, 1996), a finding consistent with empirical

evidence that only perceptions engendered by ambiguous stimuli are likely to be affected by mood alterations (Ehrlichman and Bastone, 1992).

Further support for this outcome was provided in another experiment by the absence of a significant influence of ambient odor on appraisals of familiar brands, whereas its diffusion engendered an opposite effect, leading to the conclusion that scents can only improve judgments of not well liked or well known objects (Morrin and Ratneshwar, 2000). Moreover, a study conducted in an odorized room failed to generate improved evaluations of objects in the environment; however, it lowered hunger ratings, enhanced mood, and increased the amount of time spent by participants on a given task (Knasko, 1995). Likewise, the presence of pleasant scents was also observed to enhance brand memory, subjects investing more attention in terms of viewing duration (Morrin and Ratneshwar, 2000).

In addition, the diffusion of a pleasant odor in an experimental setting had no impact on emotions or assessments of the setting, even though it influenced task performance (Knasko, 1995). Similarly, brand ratings were only marginally affected by the presence of pleasing flower and citrus scents, in comparison to those elicited in unscented environments in two studies (Morrin and Ratneshwar, 2000, 2003). Furthermore, respondent memory was improved by the ambient odors, partly through the mediating effect of attention (Morrin and Ratneshwar, 2000, 2003). Finally, Michon, Chebat, and Turley (2005) found that the interaction of olfactory stimuli and retail density had a significant effect on shoppers' cognitive responses, although it failed to affect mood in a noteworthy manner.

These findings imply that odor effects are treated in an alternative cognitive process and that, consequently, atmospheric cues can have a direct impact on consumer perceptions. Additional studies also sustain that this influence of scent can be demonstrated without a change in affect, the pleasant or unpleasant nature of the scent having been directly transferred by subjects onto objects, persons, and/or the environment (Ehrlichman and Halpern, 1988; Cann and Ross, 1989; Ludvigson and Rottman, 1989; Hirsch and Gay, 1991; Knasko, 1992, 1995; Spangenberg, Crowley, and Henderson, 1996).

Nevertheless, an important nuance is brought to the relationship between ambient scent and merchandise evaluations, on the necessity for congruity between the selected odor and product category, a congruent scent being defined as one that can be expected in, or thematically linked to a given situation or location (Mitchell, Kahn, and Knasko, 1995). The above-mentioned concept is related to the notion of fit, that is, the perceived appropriateness or pertinence of an environmental cue in relation to ad components (Ellen and Bone, 1998). For instance, incongruent cues have been reported to result in negative mood states and attitude towards advertising (Ellen and Bone, 1998).

Empirical evidence does sustain the importance of congruity in olfaction studies (Bone and Jantrania, 1992; Gulas and Bloch, 1995; Morrin and Ratneshwar, 2000, 2003). During a decision-making task, scent fit with the product category was observed to affect various information-processing measures, causing individuals to treat information for longer periods of time and evaluate objects in a more global manner. Conversely, a non congruent odor caused interferences in the cognitive processing (Mitchell, Kahn, and Knasko, 1995). Equally, appropriateness significantly impacted global evaluations of

product categories in a laboratory experiment on performance judgments, whereas pleasantness failed to do so (Bone and Jantrania, 1992). Consequently, Spangenberg, Crowley, and Henderson (1996) did consider the congruity principle in choosing neutral or pleasant ambient scents, in order to counteract any moderating effects of the fit in the relationship between odors and product evaluations.

Another study pushed even further the notion of congruency by testing the impact of matching pleasing stimuli on overall appraisals of the retail setting (Mattila and Wirtz, 2001). Groupings of corresponding ambient cues (slow-tempo music/lavender scent, and fast-tempo music/grapefruit scent) engendered higher mean assessments of the retail environment than their mismatched counterparts, although testing of the factors' direct influences failed to produce significant results. However, an analysis of the variables' main effects revealed that music and scent individually affected consumer evaluations of the setting in a positive manner (Mattila and Wirtz, 2001). Similarly, Babin, Chebat, and Michon (2004) found that as the perceived appropriateness of various combinations of background music, décor, and scents lessened, mall shoppers reported lower positive affect, merchandise quality ratings, assessments of personal shopping value, as well as fewer approach behaviors.

Lastly, Spangenberg, Grohmann, and Sprott (2004) conducted an experiment which paired Christmas-related or non-related music selections with an ambient odor (or absence thereof). Results indicated that even though main effects of the stimuli could not be observed, an interaction of the atmospheric variables significantly affected subjects' attitudes toward the store, merchandise, intentions to visit, and emotions. Specifically,

cue congruity led to more favorable assessments of the products and environment, as well as to positive behavioral intent (Spangenberg, Grohmann, and Sprott, 2004). Conversely, findings on the joint impact of ambient music and scent revealed that only odor effects could be detected on merchandise and global setting appraisals (Morrin and Chebat, 2005).

In general, few studies have examined the combined effects of environmental stimuli on consumer inferences or perceptions, and there remains a need to explore their potential interactions (Baker, Grewal, and Parasuraman, 1994). A similar issue exists with regards to odor effects on consumer evaluations, which few studies have examined (Hirsch and Gay, 1991; Bone and Jantrania, 1992; Hirsch, 1992; Spangenberg, Crowley, and Henderson, 1996; Ellen and Bone, 1998; Bone and Ellen, 1999). Moreover, mixed findings are reported in the literature on the absence of olfaction effects on mood states (Ellen and Bone, 1998; Bone and Ellen, 1999; Morrin and Ratneshwar, 2000, 2003).

2. Effects on Behavior

Mehrabian and Russell (1974) and Bitner (1992) proposed that depending on the atmosphere, consumers either adopt approach or avoidance behaviors. At a basic level, physical approach and avoidance can be related to store patronage intentions, while the exploratory dimension can be linked to diverse ranges of retail offerings (Donovan and Rossiter, 1982). The third aspect, the desire or willingness to communicate, is connected to interactions with sales personnel and floor staff, whereas performance and satisfaction approach and avoidance is connected to repeat-shopping frequency and/or purchase

probability, as well as to an increase in the amount of time and money spent in the store (Donovan and Rossiter, 1982).

The most widely used dependent variables in studying the influence of environmental stimuli in a retail setting are sales (and/or purchase behavior), time spent in the setting, and approach-avoidance behaviors (Turley and Milliman, 2000). Out of 28 studies having examined the effects of atmospheric cues on sales, purchase behavior and impulse buying, 25 have produced significant results (Turley and Milliman, 2000). The main reason for examining purchasing behavior and time spent in the environment separately from other approach-avoidance behaviors is that studies have revealed that they are independent of these responses and should be analyzed as such (Donovan and Rossiter, 1982).

According to a model of the decision process surrounding purchasing, consumers undergo five stages in the marketplace: need recognition, search for information, alternative evaluation, purchase, and its outcomes (Engel, Blackwell, and Miniard, 1990). Once a need is recognized, that is, a difference is perceived between the desired and actual state, customers begin to search for information in order to facilitate decision-making and reduce the risks associated with buying. They then assess several criteria in relation to the nature of the purchase, and choose whether to spend, when, where, and what they will purchase, as well as the manner in which to pay. Following consumption, shoppers determine if the product/service has met expectations and express satisfaction or dissatisfaction at the outcome (Engel, Blackwell, and Miniard, 1990).

Atmospheric cues are therefore particularly important in a retail setting, as they serve as a basis for purchase decisions when consumers lack information on merchandise or service quality, are unwilling to invest the required effort and time to assess intrinsic attributes of the latter, or are placed in situations in which it is difficult to form quality inferences (Zeithaml, 1988).

2.1 Music

Music directly influences shoppers in numerous aspects of the retail experience. For instance, an early experiment observed a negative correlation between the music volume level and shopping time; however, no relationship existed between volume and average sales per person or customer satisfaction (Smith and Curnow, 1966). Hence, the results suggested that expenditures remained unaffected by the presence of loud music (Smith and Curnow, 1966).

In contrast, Milliman (1982, 1986) conducted two empirical studies, manipulating music tempo both in a supermarket and in a restaurant. The results of the in-store study (Milliman, 1982) indicated that shopping time and sales volume increased in the presence of slow music, shoppers reducing their pace and spending 17% more time traveling between observation points in the store. The restaurant study confirmed that these findings could be replicated in a service setting, since eating time and waiting time for tables, as well as alcoholic beverage expenses (but not food bills) increased under the slow-music condition (Milliman, 1986).

Yalch and Spangenberg (1990) built on the Milliman experiments (1982, 1986) by investigating the relationship between types of music provided in a department store (foreground - Top 40 music, background – instrumental music, and no music) and in-store shopping behavior. Consumers stated being in a more active mood and making fewer unplanned purchases when exposed to foreground than to background music during purposeful shopping times, for example, mornings and afternoons (Yalch and Spangenberg, 1990). However, a following study by these authors revealed that older shoppers' expenditures increased in the presence of background music, whereas sales to middle-aged respondents were likely influenced by foreground music (Yalch and Spangenberg, 1993).

In an analogous field experiment, Areni and Kim (1993) explored the impact of background classical music versus Top-40 music in a wine store. Although the environmental factor had little or no effect on the number of items examined, handled, and purchased, the location of the latter, the amount of shopping time, or the frequency of on-site product consumption, it did positively affect the amount of money spent by the clientele in the classical condition (Areni and Kim, 1993). A slow-tempo, sad music selection was also found to be more influential with regards to purchase intent than an up-tempo, happy music piece and silence, in a study investigating the relationship between music, and consumers' moods, attitudes, and behaviors (Alpert and Alpert, 1990). In addition, music tempo (slow) and genre (Top 40) were observed to positively impact approach responses, including buying intent, in a store video simulation experiment (Sweeney and Wyber, 2002).

Finally, the importance of cultural and contextual meaningfulness in the relationship between music and the listener's behavior has also been highlighted in the literature (Dowling and Harwood, 1986). For instance, results of an experiment using a classical conditioning approach have revealed that music liking or disliking can directly affect product preferences and purchase decisions (Gorn, 1982). Equally, a study demonstrated that music with strong national associations (French and German) increased shoppers' product selections and sales, when matched with wines of corresponding origin (North, Hargreaves, and McKendrick, 1999).

Moreover, Herrington and Capella (1994) have suggested that musical preference, as a result of its physical characteristics, familiarity, complexity, as well as of the listener's age and cultural background, could be of foremost importance in the way it affects shopper responses, the latter becoming more positive as preference increases. Hence, both music familiarity and preferences should be controlled for in an experimental context (Bruner II, 1990; MacInnis and Park, 1991; Kellaris and Kent, 1992; Sweeney and Wyber, 2002).

The above-mentioned mixed findings on the influence exerted by music on consumer behavior sustain Grayston's (1974, p. 38) assertion that "... the music must fit the situation in which it is to be used. The wrong music can produce effects that totally neglect the objective of the exercise", a concept similar to that of scent fit, encountered in various olfaction studies (Knasko, 1995; Mitchell, Kahn, and Knasko, 1995; Spangenberg, Crowley, and Henderson, 1996; Mattila and Wirtz, 2001) and of cue fit in advertising contexts (Park and Young, 1986; MacInnis and Park, 1991; Ellen and

Bone, 1998). Nonetheless, the limited available evidence on the capacity for specific characteristics of background music to affect variables such as shopping time and expenditures highlight the necessity to further explore the matter (Herrington and Capella, 1994).

2.2 Scent

In a recent review of olfaction, Bone and Ellen (1999) highlighted the fact that few experiments have explicitly uncovered direct effects of scent presence on behaviors. However, two studies have investigated how ambient scents affect product choice. The first experiment found that subjects spent more time completing a catalog shopping task in a scented than in an unscented room (Bone and Ellen, 1994). Mitchell, Kahn, and Knasko (1995) later observed that when making decisions, respondents exposed to odors that were congruent with the offered products included a wider range of options in their choice set and considered more combinations of the selected merchandise than those in the alternative condition.

Simultaneously, pleasant and unpleasant scents have also been reported in the literature to respectively generate approach and avoidance behaviors, even though odor effects tend to be more subconscious than those of other sensory stimuli and are, hence, more difficult to verbalize (Levine and McBurney, 1986; Ehrlichman and Bastone, 1992), which makes them a particularly pertinent subject of research in a commercial setting (Bone and Jantrania, 1992; Gulas and Bloch, 1995; Spangenberg, Crowley, and Henderson, 1996).

In contrast, Spangenberg, Crowley, and Henderson (1996) observed no impact of the pleasant nature of ambient scent, as it was its presence that induced stronger intentions to visit a store. However, the authors found that scent presence did not cause experiment participants to remain longer in the retail environment, although it did affect their perception of time. In a similar effect to that observed by Milliman (1982) for music, time appeared to consumers to have passed more slowly in the unscented environment, actual time being constant (Spangenberg, Crowley, and Henderson, 1996). This effect is also consistent with the concept of an "optimal state of experience", during which individuals enter a state of flow - related to the quality of subjective experiences - that generates a distorted sense of time (Spangenberg, Crowley, and Henderson, 1996).

On the other hand, an investigation of the impact of scent on purchase intentions has provided rather mixed and product-specific findings (Spangenberg, Crowley, and Henderson, 1996). This result, similar to those observed when examining the effects of ambient odors on merchandise evaluations, may have occurred due to the fact that the selected products were already viewed favorably by shoppers and that, consequently, their intentions to buy were not significantly enhanced by the presence of ambient scent (Spangenberg, Crowley, and Henderson, 1996). However, the diffusion of a mixed floral odor was found, in another experimental setting, to influence the likelihood of purchase and desirability of athletic shoes regardless of the hedonic nature of the stimuli and product, as opposed to an unscented environment (Hirsch and Gay, 1991).

Equally, Hirsch's (1995) study on the effects of ambient odors on slot-machine usage revealed that not all pleasant scents have the same impact on consumer behavior. Only

one of the two olfactory stimuli employed during the manipulations statistically increased the amount of money spent by gamblers in a casino (Hirsch, 1995). Nevertheless, scent presence is reported by Bone and Ellen (1999) to have positively affected intentions to visit and/or return to the store, as well as plans to purchase various products in 43% of the tests they conducted on experimental findings.

Finally, in the first known study on the interactive effects of music and odors, Mattila and Wirtz (2001) reported that matching conditions of two ambient stimuli (slow-tempo music/lavender scent, and fast-tempo music/grapefruit scent) positively affected impulse buying behavior in a store environment, even though none of the atmospheric cues' main effects were found to be significant on the latter. In contrast, Morrin and Chebat's (2005) experiment provided evidence that the presence of a pleasant odor had a negative impact on impulse buying behavior, but that music alone engendered the opposite reactions.

In general, few experiments have observed the main effects of music tempo (Smith and Curnow, 1966; Milliman, 1982, 1986) and ambient odors (Cann and Ross, 1989; Hirsch and Gay, 1991; Knasko, 1992, 1995; Bone and Ellen, 1994; Hirsch, 1995; Mitchell, Kahn, and Knasko, 1995; Spangenberg, Crowley, and Henderson, 1996; Bone and Ellen, 1999; Morrin and Ratneshwar, 2000, 2003; Chebat and Michon, 2003) on consumer behaviors, even more so in terms of actual consumer expenditures for the latter (Gulas and Bloch, 1995; Hirsch, 1995; Bone and Ellen, 1999). Moreover, a review of the literature has only discovered four studies having examined the interactive effects of music tempo and ambient scent on behavioral responses (Mattila and Wirtz, 2001; Babin,

Chebat, and Michon, 2004; Spangenberg, Grohmann, and Sprott, 2004; Morrin and Chebat, 2005).

3. Mediating Effects of Perceptions on Behavior

As previously discussed, a literature review of atmospheric research indicated that individuals may form inferences on merchandise quality, as well as on the global environment, based on environmental factors. However, research states that both emotions and perceptions can play a mediating role in the relationship between atmospheric cues and behavioral responses (Gardner, 1985; Bitner, 1992).

In fact, some authors maintain that point-of-purchase characteristics can affect consumer emotions, which in turn, generate approach or avoidance behaviors (Mehrabian and Russell, 1974; Donovan and Rossiter, 1982; Bellizzi, Crowley, and Hasty, 1983; Gardner, 1985; Alpert and Alpert, 1990; Bitner, 1992; Dubé, Chebat, and Morin, 1995; Wakefield and Baker, 1998). Findings have even demonstrated that affective responses to ambient stimuli are one the main causes of consumer behaviors, as well as of additional time and money spent in the retail environment (Donovan and Rossiter, 1982; Alpert and Alpert, 1990; Donovan et al., 1994; Wakefield and Baker, 1998).

In addition, researchers have expanded the definition of the SOR paradigm by including various perceptions, among others merchandise and global environment evaluations, number of products examined, and purchase intentions for specific products as mediators of the relationship between moods states and behaviors (Spangenberg, Crowley, and

Henderson, 1996; Wakefield and Baker, 1998). Hence, the influence of atmospheric cues is presumed to follow an "emotion-cognition" path, the antecedent cognitive processes being assumed to be unnecessary for emotions to occur (Zajonc and Markus, 1984). For a complete review of the impact of emotions on consumer behavior, see Gardner (1985), and Babin, Darden, and Griffin (1992).

The contrasting "cognition-emotion" theory sustains that perceptions mediate the relationship between environmental stimuli and emotions, and that cognition can be experienced without eliciting emotions; for the latter to be generated, extrinsic and intrinsic cues must be appraised in view of personal experiences and goals (Lazarus, 1991). An article reflecting on the greatly debated respective merits of both models states that: "a stronger conceptual and empirical argument can be made supporting an important and primary role for cognition in forming affective judgments and emotions", although they are difficult – and potentially impossible – to precisely distinguish from one another (Babin, Darden, and Griffin, 1992, p. 135).

Optimal arousal theories also propose that the introduction of low levels of ambient stimuli in an environment can elevate levels of both novelty and pleasure for subjects, thereby generating higher perceptions of the setting that, in turn, lead to approach behaviors (Berlyne, 1971; Bell, Fisher, and Loomis, 1978; McClelland et al., 1953). However, the atmospheric cues have to remain at an "ideal" optimal level, as they cannot outweigh one another without engendering undue stress, even when tolerable (Heimstra and McFarling, 1974; McClelland et al., 1953); this psychological stress is defined as occurring in situations that are both unpleasant and arousing for the individuals

experiencing it (Russell and Pratt, 1980). Such circumstances may engender negative evaluations of the physical surroundings, as well as avoidance behaviors (Heimstra and McFarling, 1974; Baker, 1986).

Furthermore, numerous findings have implied that the effects of atmospheric cues can influence perceptions in absence of a mood shift, through a transfer of the intrinsic hedonic qualities of the stimuli and/or by the associations it evokes, as discussed in earlier sections (Olshavsky, 1985; Zeithaml, 1988; Cacioppo and Petty, 1989; Baker, Grewal, and Parasuraman, 1994; Richardson, Jain, and Dick, 1996; Ellen and Bone, 1998; Bone and Ellen, 1999; Morrin and Chebat, 2005). These evaluations may then serve as a basis for predicting behaviors (Cacioppo and Petty, 1989), including decision-making and acquisition (Olshavsky, 1985).

Generally, earlier research has explored the relationship between price, quality, and value assessments, and purchases (Zeithaml, 1988). In particular, statistical testing of various causal models of patronage intentions found that the "extended beliefs-only model" proved to be a better fit in explaining consumer behavior in retail locations (Darden, Erdem, and Darden, 1983). Comparison analyses then revealed that among other variables, the quality of merchandise and physical appeal of the setting significantly contributed to induce higher attitudes toward shopping and purchase intentions in department stores (Darden, Erdem, and Darden, 1983).

As previously discussed, shoppers choose particular locations to buy at based on personal and environmental characteristics, once a need has been identified (Engel, Blackwell, and

Miniard, 1990). Customers form store images based on the combination of evaluative criteria (such as location, price, advertising, personnel, merchandise quality and variety, etc.), and perceived characteristics of the surroundings. They then compare the importance of the preferred attributes with the overall assessment of the retail setting, and decide whether it is acceptable or not (Engel, Blackwell, and Miniard, 1990). In the case of a shopping mall, the global evaluation constitutes a "meta-wrapping of merchandise" (Michon, Chebat, and Turley, 2005).

Baker, Grewal, and Parasuraman's (1994) study has extended the literature on store image by suggesting that atmospheric cues follow a specific path in influencing consumer perceptions. More specifically, it posits that environmental stimuli, as well as merchandise and service quality, are antecedents of store image. In particular, merchandise evaluations constitute one of the "critical inputs" in influencing store image and customers' decision-making process (Zeithaml, 1988; Baker, Grewal, and Parasuraman, 1994; Grewal and Baker, 1994). Their results confirmed those of Darden, Erdem, and Darden (1983), whose experiment in department stores demonstrated that shopper evaluations of setting attractiveness were more highly correlated to patronage intentions than were merchandise quality, selection, or pricing.

In contrast, additional studies have found that assessments of product quality are instead affected by ambient elements through the clientele's overall perception of the environment (Chebat and Michon, 2003; Michon, Chebat, and Turley, 2005). However, it remains that research has not extensively focused on the impacts of atmospheric cues on consumer perceptions and behaviors, although factors such as perceived quality,

merchandise, prices, and overall store image are likely to mediate the influence of environmental cues on shoppers' willingness to buy (Baker, Levy, and Grewal, 1992). (See Bitner (1992) for an inclusive outline of environmental psychology principles in a marketing context.)

3.1 Music

One of the ways in which music can alter consumer behavior is by affecting store selection. Herrington and Capella (1994) propose that music has an important impact on retailer image - a primary element of store selection - as it can affect decision-making when shoppers are faced with stores of a similar type. It can also generate higher service evaluations which positively affect approach behavior, when combined with emotional responses and perceived wait duration (Hui, Dubé, and Chebat, 1997).

In addition, findings have demonstrated that consumer-drawn merchandise and service quality inferences mediated the relationship between atmospheric cues – music and lighting – and store environment; as product and service evaluations increased, so did the assessments of the setting, the effects of ambient and social factors almost disappearing when the mediating variables were treated as covariates (Baker, Grewal, and Parasuraman,1994).

Similarly, a high-image store environment designed with background, soft-tempo music and subtle lighting enhanced respondents' pleasure, arousal, and willingness to buy (Baker, Levy, and Grewal, 1992). Likewise, an interaction effect of design and ambient

features resulted in improved perceptions of price fairness, which in turn, were positively related to purchase intentions (Grewal and Baker, 1994). Moreover, cognitive factors - including merchandise quality and variety, price specialing, and value for money - have been found to independently affect unplanned spending, and slightly more so than emotional factors (Donovan et al., 1994).

Finally, in a study on retail zoning, both background and foreground music increased purchases as well as the amount of time spent in the environment, a result partially explained by the atmospheric cue's influence on store assessments (Yalch and Spangenberg, 1993). The findings were not related to reports of liking the music itself, an outcome which provided further support for the mediating role of perceptions on consumer responses (Yalch and Spangenberg, 1993).

3.2 Scent

Much interest has been generated by the ability of odors to affect cognition and behavior (Ehrlichman and Bastone, 1992), particularly since studies having adopted an "emotion-cognition" approach have failed to uncover evidence of a mood shift (Spangenberg, Crowley, and Henderson, 1996; Morrin and Ratneshwar, 2000, 2003). Conversely, available evidence on the impacts of olfactory stimuli seems to uphold the premise that "pleasure and arousal do not mediate the effects of environmental cues on perceptions and behaviors" (Chebat and Michon, 2003, p. 536).

In a comparison study of the previously discussed causal theories (Zajonc and Markus, 1984; Lazarus, 1991), the tested model sustained that the presence of ambient scent directly influenced evaluations of the shopping location and of merchandise quality, purchasing behavior being primarily mediated by the latter; additional effects of mall perception on assessments of product quality and affective responses were also observed. Simultaneously, emotions were not found to be strong antecedents to consumer spending (Chebat and Michon, 2003). Thus, strong support was generated for a "cognition-emotion" conceptualization. Likewise, a field experiment on the interactive effects of music, décor, and ambient odors revealed that subject appraisals of cue fit had a significant impact on the latter's judgments of merchandise quality, feelings, on the value they attributed to the shopping experience, as well as on their approach-avoidance behaviors (Babin, Chebat, and Michon, 2004).

Lastly, findings on the notion of scent congruency also uphold that memory and information search measures mediate odor effects on variety-seeking behavior and choice polarization (Mitchell, Kahn, and Knasko, 1995). However, the study did not identify specific paths of influence between the dependent variables (Mitchell, Kahn, and Knasko, 1995). Nevertheless, Michon, Chebat, and Turley (2005) found that ambient scent and retail density significantly affected assessments of product quality through shoppers' global perception of a community mall.

Various research studies testify to the potential for retailers and managers to manipulate environmental stimuli such as music (Milliman, 1982, 1986) and scent (Spangenberg, Crowley, and Henderson, 1996) in order to achieve certain objectives such as improving

merchandise quality and global perceptions of the environment, and/or increasing sales volumes for all or certain products. However, the mixed nature of empirical evidence, and the additional lack of available research on the mediating role of cognitive responses in the relationships between atmospheric cues and purchasing behavior highlight the need for further exploration of the issue.

D. Effects of Moderating Variables

The individual effects of scent and music as well their potential interactive influence on consumers have been well described within the previous sections. Nevertheless, it is highly likely that situational or individual variables will moderate the direction and the intensity of these effects (Bitner, 1992), as it is expected that a particular atmosphere will induce various reactions from different individuals or groups of individuals at a given point in time (Turley and Milliman, 2000).

1. Moderating Effect of Gender

Few studies so far have focused on the potential role of gender as a moderator of the relationship between environmental stimuli, such as music and scent, and consumer perceptions and behaviors (Turley and Milliman, 2000). Nevertheless, various authors have identified interesting research avenues for sex-related dissimilarities. For instance, Wakefield and Baker (1998) suggest that gender may be a differentiating factor in where individuals enjoy shopping, whereas Baker, Grewal, and Parasuraman (1994) state that sex may constitute a determining component of the manner in which individuals associate

atmospheric cues and quality inferences. Available evidence also sustains that wayfinding processes in a shopping mall are affected by gender, female customers relying on verbal messages from other patrons, as opposed to the more visual approach of the male clientele (Chebat, Gélinas-Chebat, and Therrien, 2005).

The core of available research on sex-based disparities in the allocation of attention resources has theorized that men and women employ different strategies during information processing (Wajda and Hu, 2004). Specifically, men tend to be more discriminating and to restrict both the quantity and content of environmental cues considered; rather than comprehensively assessing all of the existing elements, they appraise only a subset of the latter, often employing the heuristic device of extracting a singular, highly prominent piece of information (or attribute) from the setting, on which they form evaluations (Wajda and Hu, 2004). "Additional tactics employed by males include seeking out cues that coincide with well-entrenched memory structures or multiple cues that imply a conceptually singular theme." (Wajda and Hu, 2004, p. 1)

In contrast, women are more inclined to process information in a holistic manner, as they endeavor to assimilate and undertake detailed analyses of all available factors with which they are presented in the surroundings. Hence, they are hypothesized to be highly attuned to even minor changes in the environment (Wajda and Hu, 2004). Research on affective responses also offer a similar conceptualization of the differential impact of sex, a variance in the pleasure and arousal levels of situations having been shown to affect female participants to a greater degree than their male counterparts (Ittelson et al., 1974).

1.1 Music

Herrington and Capella (1994) have stated that gender exerts its effects on shopper responses through musical preference. According to the authors, men exhibit a marked taste for faster and louder music, whereas women are more inclined towards softer, slower music selections (Herrington and Capella, 1994). However, music and sex interactions found to have marginally affected consumer perceptions in Yalch and Spangenberg's (1993) experiment were unrelated to stimuli likableness. Male respondents evaluated the department store as being more inexpensive, mature, and spacious in the presence of foreground music, whereas female subjects assessed the retail setting as sophisticated, less common, more mature, and friendlier in the presence of background music; even so, no behavioral differences in shopping times and expenditures were observed between sexes (Yalch and Spangenberg, 1993).

On the other hand, theoretical and empirical evidence also propose that music effects can be influenced by listener characteristics such as gender, based on differential hearing sensitivities, socially-ascribed sex roles, and processing of auditory cues (Kellaris and Rice, 1993). Partial support for gender to thereby act as a moderator of responses to music was provided by Kellaris and Rice's (1993) study, loudness eliciting adverse reactions from women. Tempo, however, failed to affect "judgments of positive affective properties, sedativeness, or behavioral intent", although its impact may have been overshadowed by the strength of the loudness manipulation (Kellaris and Rice, 1993).

1.2 Scent

Accessibility theories suggest that consumers assess environmental stimuli by establishing relationships between the external information and prior experiences (Bone and Ellen, 1999). It is presumed that sex can act as a moderating variable in that relationship, as "women frequently have more developed schemas with regard to olfactory cues and have more heightened sensitivity to odors than do men" (Bone and Ellen, 1999, p. 255). Yet, mixed findings are reported in the literature on gender differences in self-reports of odor-evoked nostalgia (Hirsch, 1992).

Another explanation for observed sex and odor interactions is that male and female subjects may have dissimilar abilities to "filter out irrelevant aspects" of the situation (Baron, 1983). For example, men attributed lower ratings of job applicants and rendered poorer evaluations of their self-performance when pleasant perfume or cologne was worn by interviewees, whereas women reacted in the opposite manner (Baron, 1983).

Furthermore, although conclusive statistical differences have not been reported between tests of male or female samples, the available olfaction literature does provide confirmation that women may have an enhanced capacity to perceive and label scents, in addition to a heightened sensitivity to the latter (Levine and McBurney, 1986; Richardson and Zucco, 1989; Ellen and Bone, 1998; Bone and Ellen, 1999). In fact, some affective and evaluative responses to ambient odors have been found to be predominantly moderated by gender and scent fit, female subject ratings being generally more positive than those of male respondents (Bone and Ellen, 1999). This gender-related disparity has

been hypothesized to stem from hormonal factors, differences in verbal ability, and/or familiarity with specific scents, such as culinary aromas (Richardson and Zucco, 1989).

2. Effect of Other Moderating Variables

Numerous studies suggest that other personal and contextual effects can also moderate the relationship between atmospherics and consumer responses (Donovan and Rossiter, 1982; Bitner, 1992; Bone and Ellen, 1999).

In terms of personal factors, various traits related to an individual's reaction to his or her physical surroundings have been discussed in the literature. One of these characteristics is the capacity to screen or filter stimuli; "screeners" are able to restrict the information load that they intake from the setting, and thus, are capable of experiencing intense stimulation without being affected. "Nonscreeners", in contrast, are more sensitive to these changes and can easily become highly aroused, exhibiting extreme reactions in certain situations even when faced with low levels of stimulation (Bitner, 1992). Additional traits on which environmental psychology studies have focused include extroversion, neuroticism, and arousal-seeking tendencies (Ittelson et al., 1974).

Age can be an important moderating factor of the effects of environmental stimuli on consumer evaluations and/or behaviors as well (Wakefield and Baker, 1998; Ruiz, Chebat, and Hansen, 2004). Teenagers' reactions to atmospherics, for instance, may very well diverge from older shoppers' responses (Turley and Milliman, 2000). For instance, Yalch and Spangenberg (1988, 1990) found that age moderated the perception of time

spent in the retail environment, as younger customers believed that they had spent more time than anticipated when exposed to background music; older patrons experienced similar effects, though in the presence of foreground music. Likewise, earlier studies have established that age can affect subjects' odor detection and identification capacities (Richardson and Zucco, 1989; Hirsch, 1992). Musical tastes (Yalch and Spangenberg, 1990, 1993; Herrington and Capella, 1994) and olfactory preferences (Engen, 1982; Gulas and Bloch, 1995) have also been found to vary among age groups.

Culture is another important element in determining how shoppers will react to environmental stimuli. As they are partly acquired through learning, responses to atmospheric cues can vary based on one's culture (Kotler, 1973). In fact, the fashion in which a setting is assessed becomes suited to the distinctive characteristics and requirements of the environment that is usually inhabited, individual perception of surroundings being intrinsically tied to "adaptive functioning" in the latter (Holahan, 1982). For instance, a strong relationship can be established between musical tastes and ethnic and/or cultural backgrounds (Herrington and Capella, 1994; North, Hargreaves, and McKendrick, 1999), as well as between odor preferences and culture (Engen, 1982; Hirsch, 1992; Gulas and Bloch, 1995).

Situational factors can also influence an individual's response to the environment. An individual's plan or purpose for being in the environment can affect the level of awareness, recall, as well as feelings about the setting (Bitner, 1992). Contrary to differences in personality traits, which tend to remain stable over time, plans or intentions for being in a particular setting may vary daily or hourly (Bitner, 1992). As an example,

researchers have noted that shopping is more than a functional necessity, as its value can either be of an utilitarian or hedonic nature (Tauber, 1972; Bloch, Sherrell, and Ridgway, 1986; Babin, Darden, and Griffin, 1994).

Therefore, shopping may either be undertaken from a task-oriented perspective, aimed at finding and receiving intended articles or services, and collecting pertinent information, or may be experienced as an "immediate personal gratification", both options being equally valuable to consumers and not necessarily mutually exclusive (Tauber, 1972; Babin, Darden, and Griffin, 1994; Babin and Attaway, 2000). Hence, both hedonic and utilitarian values are likely to influence product or setting evaluations (Babin, Darden, and Griffin, 1994). In fact, a need for additional research on the potential moderating or mediating effects of shopping orientation - depending on the theoretical framework chosen - has been recently expressed by different authors (Spangenberg, Crowley, and Henderson, 1996; Babin and Attaway, 2000).

Finally, expectations about the environment and personal past experiences, or even familiarity with particular settings can also influence shopper responses (Baker, 1986; Bitner, 1992; Ehrlichman and Bastone, 1992; Knasko, 1992; Dubé, Chebat, and Morin, 1995; Chebat, Gélinas-Chebat, and Therrien, 2005). Consumers are likely to transfer the confirmation or disconfirmation of their expectations to the environment, which are based on past dealings with similar or identical surroundings, as well as opinions heard of read about the location (Bitner, 1992). For patrons with little prior knowledge, the setting therefore takes on an added importance in forming evaluations (Baker, 1986).

Questions still linger as to how environmental stimuli can be used as a segmentation tool, whether it is through a moderating or mediating effect. Namely, gender, age, culture, number of children, education level, annual income, geographic, as well as psychographic factors are all potential influences on consumer perceptions and behaviors (Ruiz, Chebat, and Hansen, 2004). Nevertheless, the scope of the present experiment will limit such investigations to sex-related differences, as few studies have highlighted the moderating role of gender between atmospheric cues and the previously identified dependent variables (Turley and Milliman, 2000; Sweeney and Wyber, 2002).

III. Hypothesis Development

The following section presents the conceptual foundations on which the present study is based and from which the research hypotheses were drawn. It proposes known and potential impacts of the selected atmospheric cues on various consumer responses, previously outlined in the literature review. A detailed methodology of the experiment will be provided in the next chapter.

A. Conceptual Background

The current research takes its foundation in environmental psychology and the stimulus-organism-response (SOR) paradigm (Mehrabian and Russell, 1974), as well as Bitner's (1992) servicescape conceptualization. The proposed model is also consistent with Gulas and Bloch's (1995) model of olfaction effects, as well as Herrington and Capella's (1994) structural framework of music's relationship with retail settings. Furthermore, it is affiliated with the "cognition-emotion" theory (Lazarus, 1991), which sustains the preeminence of cognitions in the effects of ambient stimuli on evaluative and affective responses.

However, its design differs from those of similar, previous atmospheric studies in that it is not assumed that emotions will play a role in the hypothesized relationships, that is, the paths linking the environmental cues to consumer perceptions and purchasing behavior. This approach is in concurrence with the theory underlying the Elaboration Likelihood

Model, which provides support for the notion that attitudes can be differentiated from affect (Cacioppo and Petty, 1989). Empirical evidence can be found for this conceptualization, having revealed that affective responses are not always engendered by ambient stimuli, whether of a musical or olfactory nature (Yalch and Spangenberg, 1993; Spangenberg, Crowley, and Henderson, 1996; Bone and Ellen, 1999).

Consequently, the proposed model (as depicted in Figure 3) will limit the experiment to studying the effects of two environmental stimuli: music tempo and pleasant scent. It will assess the influence of the latter on two internal evaluations, merchandise quality and global environment perceptions, as well as on an approach-related measure, purchasing behavior. Finally, the model predicts that perceptions will have an indirect or mediating effect on the amount of money spent in the retail setting, and that gender will moderate the relationship between the environmental stimuli and consumers' evaluative and behavioral responses.

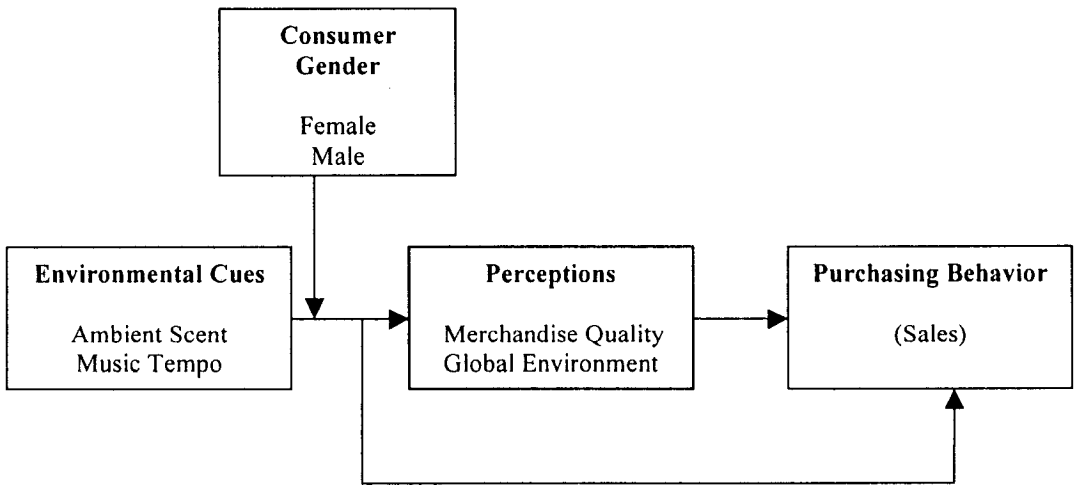

Figure 3 - Proposed model for hypotheses testing

Therefore, the final research question is to evaluate the interactive impact of scent and music on mall shoppers' merchandise quality and global environment perceptions, and to determine whether these assessments affect the clientele's purchasing behavior (actual expenditures). In addition, the experiment will assess whether men and women are differently affected by store atmospherics, that is, when appraising the product range and setting, and when spending money.

B. Research Hypotheses

Although "single-element experiments do not take into consideration the interactive effects likely to occur between different elements in the same store environment" (Baker, Levy, and Grewal, 1992, p. 449), numerous studies have established the existence of valid relationships between retail settings, shopper perceptions, and intended behavioral responses (Smith and Curnow, 1966; Milliman, 1982, 1986; Yalch and Spangenberg, 1988, 1990, 1993; Bitner, 1990; Baker, Levy, and Grewal, 1992; Areni and Kim, 1993; Baker, Grewal, and Parasuraman, 1994). Thus, the following research hypotheses on the combined impact of music tempo and ambient scent are primarily based on the literature pertaining to the main, individual effects of the chosen environmental cues, and when available, on empirical evidence of their interactive influence.

1. Effect of Environmental Cues on Perceptions

As discussed in the previous chapter, conclusive findings with regards to the impact of atmospheric cues on product evaluations can be found in the relevant research (Bellizzi, Crowley, and Hasty, 1983; Gardner and Siomkos, 1986). The first two hypotheses are derived from a cognitive approach to atmospheric stimuli processing (Shostack, 1977; Lazarus, 1991) and in concordance with results yielded in Spangenberg, Crowley, and Henderson's study (1996), that is, that the presence of a pleasant ambient scent will positively influence shopper perceptions of merchandise quality and of the global setting. The experiment also demonstrated that similar odor effects could be observed on global assessments of the environment. Additional support was provided by Michon, Chebat, and Turley's (2005) results, according to which the interactive impact of ambient scent and retail density significantly affected shoppers' cognitive responses.

Although the literature review could not uncover studies having specifically focused on the impact of music tempo on consumer evaluations, numerous research findings suggest that atmospheric cues have an effect on product and retail setting inferences drawn by respondents (Bellizzi, Crowley, and Hasty, 1983; Gardner and Siomkos, 1986; Yalch and Spangenberg, 1993; Baker, Grewal, and Parasuraman, 1994). Furthermore, experiments on cognitive activity have revealed that music should enhance attention mostly under low involvement, environmental background music being a "peripheral cue", particularly if other cognitive cues are absent or significantly reduced (MacInnis and Park, 1991; Chebat, Gélinas-Chebat, and Vaillant, 2001).

Since atmosphere is in itself a multidimensional concept, it is assumed that the influence of the combined environmental factors will be greater than the sum of its parts (Gulas and Bloch, 1995). Thus, it is hypothesized that:

H1: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer perceptions of merchandise quality.

H2: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer perceptions of the global environment.

2. Effect of Environmental Cues on Purchasing Behavior

Few main experiments establish a direct and positive relationship between the presence of pleasant ambient scents and purchase intentions, as well as the amount of money spent by consumers (Hirsch and Gay, 1991; Hirsch, 1995; Spangenberg, Crowley, and Henderson, 1996). Nonetheless, available evidence demonstrates that scent presence may positively affect plans to visit/return to the store, as well as to acquire merchandise (Bone and Ellen, 1999).

Equally, the Milliman studies (1982, 1986) respectively illustrate that shopping time and supermarket sales, in addition to beverage expenditure and the amount of time spent waiting and eating in a restaurant increased in slow-tempo conditions. Furthermore, various studies have indicated that slow music tempo may positively impact approach responses, including buying intent (Alpert and Alpert, 1990; Sweeney and Wyber, 2002). It is therefore hypothesized that:

H3: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer purchases (in dollars spent).

3. Mediating Effect of Perceptions on Purchasing Behavior

As previously discussed, the "cognition-emotion" theory sustains that cognition can occur without emotional responses being engendered (Lazarus, 1991). In turn, these assessments serve as a foundation for subsequent behaviors (Cacioppo and Petty, 1989). Empirical evidence provides support for the premise that emotions do not act as mediators of the relationship between environmental cues, clientele appraisals, and behavioral reactions, including sales (Chebat and Michon, 2003).

Certain studies have observed that consumer behavior is nonetheless affected by overall perceptions of the physical environment and of merchandise quality; namely, their findings reveal that such evaluations independently influence both approach-avoidance behaviors, and expenditures (Zeithaml, 1988; Baker, Levy, and Grewal, 1992; Donovan et al., 1994). Even though the impact of the highlighted shopper perceptions on behaviors has yet to be the subject of in-depth research, there is little doubt of their importance in a service environment. Consequently, it is expected that:

H4: Merchandise quality perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).

H5: Global environment perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).

Based on Baker, Grewal, and Parasuraman's (1994) findings, it is also possible to hypothesize that perceptions will follow a similar path than inferences on product quality, merchandise quality assessments serving as antecedents of overall evaluations of the

setting, and acting as a mediator of the relationship between atmospheric cues and shopper perceptions of the global environment (a concept close to store image). Thus, it is hypothesized that:

H6: Merchandise quality perceptions will mediate the interactive effects of slow-tempo music and of ambient citrus on global environment perceptions.

4. Moderating Effect of Gender

Yalch and Spangenberg (1993) have underlined the role of gender as a potential moderator of music's influence on consumer evaluations, men rating the retail setting more positively, and assessing merchandise as more inexpensive than women, when foreground music was played in the store. Furthermore, sex-related dissimilarities have been reported in the literature, based on differences in auditory sensitivities, acquired sex roles, and processing of musical cues (Kellaris and Rice, 1993).

Similarly, Bone and Ellen's (1999) review of olfaction research suggests that in presence of ambient scent, women tend to have superior affective and evaluative responses than their male counterparts. The said variance may be a potential result of hormonal factors, and/or of women's superior acuity and verbal skills, familiarity with particular smells, or enhanced sensitivity to olfactory cues (Levine and McBurney, 1986; Richardson and Zucco, 1989; Ellen and Bone, 1998; Bone and Ellen, 1999). Hence, it is assumed that:

H7: Consumer gender will moderate the interactive effects of slow-tempo music and ambient citrus scent on consumer perceptions (merchandise quality and global environment), and purchases (in dollars spent).

IV. Research Methodology

This chapter provides a summary of the methodology used in conducting the present experiment on the interactive effects of music and scent on consumer perceptions and purchasing behavior, as well as on the mediating role played by merchandise quality and global environment assessments in this relationship, using gender as a moderator. The first three sections will therefore offer an overview of the experimental setting, design and stimuli to which the subjects were exposed, and will be followed by a description of the variables and scales drawn on to build the questionnaire. The succeeding sections will then examine the sampling and experimental procedures, in addition to the manner in which data collection was performed.

At this time, readers should note that the database was already available to the researcher, information having been gathered in a small neighborhood mall belonging to the *Ivanhoe Group*, a large retail chain in the province of Quebec. The experimentation was the result of a partnership between the *Omer deSerres Commerce Chair* at the *École des Hautes Études Commerciales* (*University of Montreal's* business school) and the *Ivanhoe Group*. The aim of the joined venture was not only to obtain field data, but also to supply shopping center managers with detailed information and a unique insight into their consumers' mind. Thus, certain compromises had to be made, particularly where questionnaire structure and experimentation schedules were concerned, so as to accommodate the mall's availability.

Finally, it is necessary to indicate that, as the author did not participate in the data collection process, the methodology discussed in the present and subsequent sections of this thesis was liberally inspired by conversations with on-site researchers, as well as Master's degree theses having studied other aspects of the database (Paz Gamboa, 1998; Gumbs, 2000).

A. Experimental Setting

In order to evaluate the impact of atmospheric cues on shoppers' cognitive responses and expenditures, field experimentation was chosen as the best research strategy. In environmental psychology, field experimentation allows researchers to reach a balance between internal and external validity; variables under study are manipulated, while extraneous factors in the field setting are permitted to operate naturally (Holahan, 1982). Therefore, part of the level of control attainable in a laboratory setting is traded off to gain some of the contextual richness that is achievable in the field; yet, part of the environment's authenticity is simultaneously relinquished to obtain additional control of the experimental cues at play (Holahan, 1982).

Furthermore, the field experimental strategy was used in order to assess the "covariation of a proposed cause and effect", as well as the "time precedence" of the proposed cause. It also ensured that alternative explanations for the results would be ruled out, and that researchers would be provided with quantitative indicators of the impact of the independent variables (Whitley, 2002). Moreover, reasonable control was gained over

experimental procedures, scheduling, and physical characteristics of the setting. As a result, all respondents had relatively analogous experiences in similar environments, aside from the manipulations of the chosen stimuli in each experimental condition (Whitley, 2002).

Lastly, the independent variables were manipulated to establish rather natural treatment conditions, even more so in this case, given the fact that ambient scents and music were already present in the shopping center, whether controlled by the researcher or not (Whitley, 2002). Nevertheless, controls were implemented for the participants' individual traits to ensure that they would not differ systematically across conditions (Whitley, 2002); these various measures will be discussed in the "Questionnaire" section of the present chapter.

Both practical and academic considerations were at the root of researchers opting for a mall as an appropriate setting for this experimentation. For instance, it is a well-known business fact that shopping centers have experienced difficulties in ensuring their survival these past few years, having to face a growing number of challenges and competitors, such as the appearance of warehouse-style retailers (Labich, 1995) and mass-merchandising discount stores (Lukas, 2004). In a recent study, experts predicted that over the next few years, approximately 19% of malls in the United States would either close their doors or be converted into other types of establishments, such as housing developments or prisons (Lukas, 2004).

Moreover, mall patronage itself is in decline, while the amount of retail space in shopping centers continues to increase (Wakefield and Baker, 1998; Chebat, Gélinas-Chebat, and Therrien, 2005), America having "reached a critical mass in terms of population density" (Lukas, 2004). Consultants were even quoted in a recent article as saying that 38% of participants in an Atlanta-based survey were planning to shop less often in malls than they had in prior years (Labich, 1995). According to Wakefield and Baker (1998), industry experts offer three reasons for the said decline: an abundance of comparable outlets with analogous merchandise, fewer mall outings due to busy lifestyles, and less enjoyable experiences upon reaching the shopping destination.

Thus, these retailers have to find ways of retaining market shares and evolve in order to survive, as it is predicted that by 2010, new shopping venues such as online services, direct mail, catalogues, and 800 numbers (among others) will account for 55% of sales in the United States (Labich, 1995). To attract more clientele, mall owners have to resort to new marketing techniques. Environmental variables, including music and ambient scents, may therefore act as contributing factors in luring consumers back. However, such strategies are still being employed intuitively by managers, partly because of a lack of research on atmospheric elements utilization, especially in a shopping center context. (Wakefield and Baker, 1998; Chebat, Gélinas-Chebat, and Therrien, 2005; Michon, Chebat, and Turley, 2005).

In parallel, the majority of marketing experiments having studied atmospheric variables in retail settings, and particularly so in the case of odors, have taken place in recreated, artificial environments (Baker, Levy, and Grewal, 1992; Spangenberg, Crowley, and Henderson, 1996). As previously discussed, the main advantage of field experimentation is that it remains more realistic than its laboratory-set counterpart. People tend to act more naturally in familiar and non artificial surroundings, a fact that allows researchers to obtain data on subjects' actual emotions, perceptions, and behaviors, instead of collecting mental projections of how they believe they might feel under the circumstances. The results are therefore more representative of the situation, people, and variables being studied.

Furthermore, neighborhood malls are reasonably public environments in which people are likely to possess at least one or more similar characteristics. Consequently, the subsequent setting was elected as the experimental site:

Faubourg de l'Ile Shopping Center
101 Cardinal Léger Blvd.
Pincourt, Quebec J3V 3Y3

The commercial outlet, located in Pincourt, contained a pharmacy, a grocery store and various other retailers. Additional consideration was given to the selection process to ensure that the mall would be a neutral environment (i.e., outside of a downtown area, for example).

B. Experimental Design

In order to verify the specified research hypotheses, a 2 x 2 factorial design containing two environmental factors (music tempo and ambient scent) and four modalities (presence/absence of pleasant ambient scent, presence/absence of slow-tempo music) was constructed as illustrated by Table 5:

		Music Tempo	
		No music	Slow tempo (60 BPM)
Ambient Scent	No scent	Control condition	Condition 2
	Citrus scent	Condition 1	Condition 3

Table 5 - Experimental design

Data gathering began with the control condition, which was characterized by slight modifications to the usual components of the mall's atmosphere. Researchers abstained from diffusing the pleasant ambient scent and requested that the moderate-tempo light rock music usually being played in the environment be silenced. It is important to note here that although ambient scent was not deliberately diffused, there may have been odors present in the setting, originating from other sources in the shopping center.

During the second phase of data collection (Condition 1), researchers still withheld the music, but deliberately vaporized the pleasant ambient scent, whereas in the third phase (Condition 2), the opposite manipulations were performed (no scent/slow-tempo music). Finally, both stimuli were introduced in the environment in the final stage of the operationalization process (Condition 3).

C. Experimental Stimuli

As stated earlier, the main objective of this study is to determine the effects of two atmospheric cues, scent and music, on consumer perceptions and shopping behavior. Hence, the next section will detail the experimental procedures followed in selecting the experimental stimuli.

1. Music

Music selection was the result of a joint effort between researchers and *Musak*, a company specializing in the production of appropriate music selections for retailers and, incidentally, the current music provider for the studied mall. An expert was designated to measure the average tempo of the light rock music (from the 70s to the 90s) usually being played in the environment, which falls under the "familiar adult contemporary favorites" category. The evaluation revealed that the shopping center's typical catalogue had an average of 96 beats per minute (BPM), which qualifies as a moderate tempo.

A new compilation of music excerpts of a similar style, but with the operationalized tempo condition, was then assembled. Song selections were based on the fact that slow-tempo is generally estimated at 60 BPM (Milliman, 1982, 1986; Baker, Levy, and Grewal, 1992; Dubé, Chebat, and Morin, 1995; Kellaris and Kent, 1991; Kellaris and Rice, 1993; Mattila and Wirtz, 2001), and that "adult contemporary" is the music genre with the "most universal appeal" for consumers across demographic characteristics (Herrington and Capella, 1994).

In addition, researchers deliberately chose music that was pleasing (Gorn, 1982; Baker, Levy, and Grewal, 1992; Dubé, Chebat, and Morin, 1995; Chebat, Gélinas-Chebat, and Vaillant, 2001; Sweeney and Wyber, 2002), familiar (Yalch and Spangenberg, 1990; Herrington and Capella, 1994; Sweeney and Wyber, 2002) and congruent with the environment (Grayston, 1974; Herrington and Capella, 1994) to elicit favorable responses to the atmospheric cue from the clientele, though the study's main objective was to assess the impact of its presence in the retail outlet. During the experiment, the music was played in the mall's four corridors at a low volume, in order to ensure that the experimental stimulus remained consistent with the general on-site use of the stimulus. Pretests were conducted to confirm that the manipulations were successful.

2. Scent

The selection process of the pleasant ambient scent was inspired by Spangenberg, Crowley, and Henderson's (1996) experiment, which provided evidence that environmental odors influenced consumer evaluations and behaviors in a retail setting. In order to choose appropriate scents for their experiment, the authors gathered an assortment of "inoffensive" odors, inoffensive odors being usually appreciated or considered neutral by individuals (for example, certain floral scents), as opposed to negative impact of "offensive" and displeasing odors such as sulfuric gas or rotting vegetables (Spangenberg, Crowley, and Henderson, 1996). In total, 26 odors were pre-tested in the following categories: floral, spices, woods, citrus, and mints, after which each scent's hedonic and arousing dimensions were evaluated. All scents were diffused using essential oils bought from a single commercial supplier.

To conduct pre-tests, the researchers randomly intercepted students near the entrance of a large American university pavilion, assigning a total of 26 to 31 respondents to each of the 26 conditions. Every subject was then given a vial containing the olfactory stimulus and a questionnaire containing a ten-item, semantic differential scale measuring global environment quality (Fisher, 1974), a measure of odor intensity (very weak to very strong), as well as measures of the respondents' gender and age. The students were invited to smell the vial as many times as desired while filling out the survey. Researchers presented the essential oils in a vial based on the fact that retailers in order to select an ambient scent for their business, would likely proceed in a similar fashion (Spangenberg, Crowley, and Henderson, 1996).

After pre-tests were completed, the authors classified the various scents using factor scores of an affective and an activation dimension (presented in Appendix I). These results served as a foundation for researchers in the present experiment to select the appropriate olfactory stimulus. Although the aim of this study was not to assess the hedonic quality of the scent itself, but to compare the effects of its presence or absence in a commercial setting, the odor nonetheless had to be pleasing in order to generate favorable emotional, cognitive, and behavioral responses, based on Spangenberg, Crowley, and Henderson's (1996) findings.

Thus, researchers chose a citrus scent that presented the best factor score on the affective dimension (1.11) and a relatively satisfying score on the activation dimension (0.54), following the same procedure; they also ascertained that it was available to their supplier, the *Cannon Hygiene* company. The citrus scent, aptly named "Citrus", was a combination

of lemon, grapefruit, and orange scents. This particular odor was preferred to a pure lemon scent to avoid an instantaneous association generally made by consumers between the smell of lemon and cleaning products (Bone and Jantrania, 1992). Consideration was also given to preserving a neutral aspect with regards to scent congruity or incongruity with products sold in the commercial setting (Gulas and Bloch, 1995; Mitchell, Kahn, and Knasko, 1995; Spangenberg, Crowley, and Henderson, 1996). Furthermore, and even though the selected aroma was not specifically part of the previously discussed pre-test, researchers were confident that it remained akin to the citrus category and would not, consequently, engender biases.

Following an operational pre-test, the chosen "Citrus" scent was diffused during the manipulations within a reasonable range, so as to be perceptible but not aversive (Gulas and Bloch, 1995; Spangenberg, Crowley, and Henderson, 1996). The dispersion system was installed in one of the mall's corridors, between the *Zellers* and *Maxi* stores, where data collection was to take place. The citrus scent was sprayed into the air for three seconds every six minutes, from a dozen diffusers attached to the top of the corridor's walls; this procedure ensured the aroma's constant presence in the atmosphere. Nevertheless, it is important to note that whether the ambient scent was or not deliberately diffused in the retail setting, various odors may have blended with the stimulus, such as cooking smells from restaurants, floral scents from flower shops, body odors, and/or other airborne chemicals. Notwithstanding, the experiment was strategically located away from any immediate threats to minimize potential confounds.

D. Questionnaire

Respondents in the four conditions of the study were asked to complete a survey that included 11 measures, assessed by a total of 31 questions (see integral versions of the questionnaire in Appendix J). As both French and English consumers frequent the shopping center, the document was translated and made available in the clientele's language of preference. In addition, it should be underlined that mall management did not wish for the form to require more than 15 minutes to be filled out, a request that constrained the questionnaire's potential length; supplementary information on the matter is provided in the description of the sampling procedure, in the subsequent section.

Research participants therefore answered open and closed-ended queries on the following subjects:

- Amount of money spent	- Emotions (pleasure, arousal)
- Consumer type (hedonist/utilitarian)	- Approach and avoidance behaviors
- Activities involved in while in the environment	- Perception of ambient cues (music, scent, decor)
- Perception of merchandise quality	- Expectations of the environment (perceived value)
- Perception of service quality	- Socio-demographic characteristics.
- Perception of the global environment	

Table 6 - List of questionnaire-measured variables

More questions were integrated in the survey than were necessary for the scope of this particular experiment, for the use of other M.Sc. theses and *Faubourg de l'Ile* managers. For conciseness purposes, these extraneous variables will not be taken into account in the present section, nor will they be subjected to further investigation in the course of this study. Measurement and scale reliability issues will be addressed in the next subsections,

while respondent characteristics and manipulation checks will be discussed in the "Results and Data Analysis" chapter.

1. Purchasing Behavior (Amount of Money Spent)

In order to assess purchasing behavior, an open question required consumers to disclose the approximate amount of money - in dollars – that they had spent during their visit at the mall, excluding food items (see question #2 in Appendix J). Purchasing behavior, as translated in terms of actual expenditure, has been examined in various experiments: (Milliman, 1982, 1986; Areni and Kim, 1993; Yalch and Spangenberg, 1993; Hirsch, 1995; Chebat and Michon, 2003).

2. Perception of Merchandise Quality

Shoppers evaluated the quality of merchandise offered in the mall by answering the following three seven-point semantic differential scales:

5.	How would you qualify the style of the products proposed in this shopping centre?
6.	Is the product selection of this shopping centre:
7.	The quality of the products available in this shopping centre is rather:

Table 7 - Questions assessing consumer perception of merchandise quality

Developed by Bellizzi, Crowley, and Hasty (1983), these measures have also been used by other authors to quantify the effects of ambient scent on consumers' perception of merchandise in a retail environment (Spangenberg, Crowley, and Henderson, 1996; Chebat and Michon, 2003; Babin, Chebat, and Michon, 2004; Morrin and Chebat, 2005). More specifically, the questions respectively assess respondent appraisals of the

style (Outdated – Up to date), selection (Inadequate – Adequate), and quality of the products (Low – High) offered in the shopping center (see questions #5 to #7 in Appendix J).

3. Perception of the Global Environment

Research subjects' perception of the global mall environment was measured with an eight-item, seven-point semantic differential scale adapted from Fisher's "Judgments of Environmental Quality Scale" (1974). The original 14 bipolar adjectives were reduced to 8, in order to shorten the length of the questionnaire, as illustrated by Table 8:

10.	Up to which point is each one of the following adjectives appropriate with what you perceived today of the environment of this shopping centre:		
a)	Tense	-	Relaxed
b)	Uncomfortable	-	Comfortable
c)	Depressing	-	Cheerful
d)	Drab	-	Colorful
e)	Boring	-	Stimulating
f)	Unlively	-	Lively
g)	Dull	-	Bright
h)	Uninteresting	-	Interesting

Table 8 - Items assessing consumer perception of the global environment

Similar tailoring of the scale has occurred in four other experiments studying the influence of color (Bellizzi, Crowley, and Hasty, 1983) and pleasant ambient scents (Spangenberg, Crowley, and Henderson, 1996; Chebat and Michon, 2003; Michon, Chebat, and Turley, 2005) in laboratory-recreated stores, as well as in additional studies on the congruent effects of music and scent on consumer evaluations of a retail setting (Mattila and Wirtz, 2001; Morrin and Chebat, 2005).

4. Perception of Environmental Cues

Questions pertaining to the impact of the chosen environmental stimuli were also included in the survey, not only for their informational value to the shopping center's management, but to enrich the interpretation of the findings and resulting discussion as well. Three Likert-type, seven-point scales were employed to assess consumer responses to the atmospheric cues' pleasantness, degree of "annoyance", and appropriateness (Strongly agree – Strongly disagree), as depicted in Table 9 and Table 10:

14.	The background music makes shopping in this shopping centre pleasant:
15.	The background music in this shopping centre bothered me:
16.	The background music in this shopping centre is appropriate:

Table 9 - Questions assessing consumer perception of ambient music

17.	The odors smelled makes shopping in this shopping centre pleasant:
18.	The odors smelled in this shopping centre bothered me:
19.	The odors smelled in this shopping centre is appropriate:

Table 10 - Questions assessing consumer perception of ambient scent

These measures were based on a scale used in Baker, Levy, and Grewal's experiment (1992) to determine the effects of social and ambient cues (music, lighting) on respondents' pleasure, arousal, and willingness to buy; they also served a similar purpose by assessing consumer perceptions in Baker, Grewal, and Parasuraman's (1994) study. For the current research purposes, the terms "background music" were simply substituted with "odors smelled."

5. Scale Reliability Tests

It has been demonstrated that for the most part, questionnaire measures were based on scales having already been tested and validated through previous studies, in a similar

context. Nonetheless, as recommended, Cronbach's alpha tests were performed to ensure reliability (Nunnally, 1978).

Using a principal component extraction method, factorial analyses were then conducted to assess internal consistency, that is, the property among scale items to measure a same construct. Tests results are presented in Table 11:

Factor	Construct	Questions	Cronbach's Alpha (α)	Factorial Analysis (%)
1	Perception of merchandise quality	5, 6, 7	0.8726	79.27
1	Perception of the global environment	10	0.9376	68.23
1	Perception of ambient music	14, 15, 16	0.8338	75.29
1	Perception of ambient scent	17, 18, 19	0.7474	66.88

Table 11 - Reliability tests of multi-item measures (N = 990)

As can be observed, all multi-item measures exhibited extensive or exemplary Cronbach's alpha coefficients higher than the acceptable score of > 0.70 (Whitley, 2002). Furthermore, solely one factor was extracted for each of the evaluated constructs; these factors, in turn, explained more than 65% of the variance. Readers should note that, being phrased negatively, the second item of both scales assessing atmospheric stimuli perceptions (questions #15 and #17) were reversed and recoded before analysis.

E. Sampling Procedure

A between-subject design was proposed to verify the research hypotheses and control for the variance effects of participant's personal characteristics; thus, each group of respondents was exposed to only one of the experimental conditions, as previously

described in the "Experimental Design" section. The random assignment of subjects was based on scheduling the implementation of each treatment, as is usual in field experiments.

The target population for this study was comprised of consumers aged 18 years and older, found at the chosen site. Employees of the shopping center were forewarned about the experimentation and consequently, were asked not to participate in the survey. The mall's clientele essentially originated from the primary commercial zone, as illustrated by Table 12:

Commercial Zone	Municipalities	Percentage (%) of mall clientele
Primary	Dorion, L'Ile-Perrot, Notre-Dame-de-l'Ile-Perrot, Pincourt, Terrasse-Vaudreuil, Vaudreuil	71.6 %
Secondary	Hudson, L'Ile-Cadieux, Les Cèdres, Pointe-des-Cascades, Sainte-Anne-de-Bellevue, Saint-Lazare, Vaudreuil-sur-le-Lac	18.0 %
External origin	Non disclosed	10.4 %

Table 12 - *Faubourg de l'Ile* shopping center clientele distribution

The commercial zone's limits were Sainte-Anne-de-Bellevue (North), Saint-Lazare (West), Les Cèdres (South), and Notre-Dame-de-l'Ile-Perrot (East). The *Faubourg de l'Ile* shopping center is, as previously mentioned, located on L'Ile-Perrot in the municipality of Pincourt; it faces Montreal's West Island and is situated east of the county regional municipality of Vaudreuil-Soulange (Nantel and Bédane, 1997).

The rule of thumb for factorial designs being that at least 30 subjects were needed per condition, a minimum of 120 shoppers was necessary to implement the actual 2 x 2 factorial design. Nevertheless, 991 questionnaires were collected to ascertain that the

sample size would be sufficient to observe small to medium effects of the independent variables for $\alpha = 0.5$ (Whitley, 2002). Table 13 provides an overview of the distribution of respondents across conditions:

Condition	Number of Respondents	Percentage of Sample Population (%)
Control condition	447	45.1
Condition 1	145	14.6
Condition 2	144	14.5
Condition 3	255	25.7
Total	991	100.00

Table 13 - Number of respondents per experimental condition

Although a total of 447 questionnaires were filled out by control group participants, only 145 and 144 forms were respectively completed during the first and second experimental treatments. Finally, 255 responses were gathered from consumers in the third condition.

Lastly, it is important to note that the schedule was arranged with consideration to the mall's operational needs and the fact that other experimentations were also planned to occur in the allotted time periods; in order not to overly disturb clients and encourage them to participate in the research, a decision was made in collaboration with the shopping center's management to limit data collection to 25 questionnaires a day throughout the second and third phases.

F. Data Collection

Data collection took place in the months of March and May, 1998, these two months being known by mall owners to be identical in terms of sales volume and shopper traffic.

It was accomplished in four weekly phases, throughout different time periods. Researchers gathered data on most of the days, and during most open hours, to ascertain that all types of consumers were represented, as depicted in the following table:

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
11:00 – 6:00	11:00 – 6:00	11:00 – 6:00	11:00 – 9:00	11:00 – 9:00	11:00 – 5:00	12:00 – 5:00

Table 14 - Experimental schedule

As a control measure, no data was gathered during holidays, special promotions or activities, in order to keep elements such as point-of-purchase displays, store layouts, and in-store promotions as constant as possible across conditions (Milliman, 1982; Areni and Kim, 1993; Hirsch, 1995). These constraints also explain why a different number of forms were completed for each experimental condition.

Prior to the experiment, a kiosk was set up in the shopping center's main corridor, between the *Maxi* and *Zellers* stores; it consisted of a table, chairs, and featured two laminated posters on a stand inviting clients to participate in the survey. The posters contained the *École des Hautes Études Commerciales*, *Ivanhoe Group*, and *Faubourg de l'Ile* logos, with the following caption: "The students are listening to your needs. Give them a few minutes..." Collecting data on a daily basis required three of four graduate students (from the M.Sc. level at the *École des Hautes Études Commerciales*) to act as researchers; following their recruitment, all received written instructions to prepare them for data gathering. Students harbored a name tag printed with the university and the mall's logo for the duration of their role as researchers. They were also asked not to wear perfume so as not to interfere with the ambient scent stimuli and bias results (Spangenberg, Crowley, and Henderson, 1996).

Data collection was performed with the help of a single, self-report questionnaire in four distinct phases corresponding to the control and experimental conditions. In this context, the researchers' participation was limited to a greeting role; they simply approached consumers in a random fashion, providing their name and presenting themselves as students from the *École des Hautes Études Commerciales* conducting a study on the mall. The true aim of the experiment was concealed in order to avoid main testing effects. After this brief introduction, researchers asked patrons for their help in answering a fifteen-minute survey. Upon receiving a positive answer, they invited respondents to sit at a table prepared for the task at hand. The questionnaire was available in both French and English versions, the selection being left to the clientele's preference. Subjects were given as much time as needed to complete the measures. Once the surveys were filled out, researchers gathered the forms and thanked the shoppers for their collaboration. As soon as they were available, the students approached other customers.

In summary, the current experiment assessed the perception of merchandise quality, overall evaluation of the retail environment, as well as purchasing behavior of consumers in a small Canadian neighborhood mall. Participants were randomly divided into four conditions (presence/absence of pleasant ambient citrus scent, presence/absence of slow-tempo music) and asked to answer a self-report questionnaire measuring the impact of the selected atmospheric cues on the dependent variables. Scale reliability and construct validity of all multi-item measures were established after testing.

V. Results and Data Analysis

The following chapter provides an overview of the results and various analyses conducted to interpret the data collected using the experimental procedures described in the previous section. A demographic profile of research participants is offered, after which the statistical methods used to test hypotheses are outlined. Finally, significant findings are presented. A recapitulative table is supplied at the end of the chapter. Readers should note that all calculations were performed with the help of the "Statistical Package for the Social Sciences" (SPSS 8.0) software.

A. Demographic Profile of the Respondents

As previously mentioned, a total of 991 questionnaires were gathered throughout the data collection period. One of the completed forms was excluded because of the outlying amount of money spent by the subject during the trip at the mall ($1,200). Yet, it is highly unlikely that overall results were affected by the removal, considering the fact that the effective number of usable consumer responses remained almost unaltered, as depicted in Table 15:

Condition	Number of Questionnaires	Percentage of Sample (%)
Control condition	447	45.2
Condition 1	144	14.5
Condition 2	144	14.5
Condition 3	255	25.8
Total	990	100.0

Table 15 - Usable number of questionnaires per experimental condition

The survey included a series of questions on the individual characteristics of customers partaking in the study, such as their first language, age, gender, and marital status, the number of children living at home, the last level of education they had completed, their main occupation, gross family income, and postal code. A demographic profile of the respondents was compiled from the collected data and is presented in Table 16 (see following pages).

Across conditions, mall shoppers were roughly split in a 60%-40% women/men ratio, and had mostly French as a first language (84.2%). While a third of the clientele were between 18 and 34 years of age (32.8%), approximately half fell within the 35 to 54 category (46.8%). Research participants were more than twice as likely to be married (54.8%) than to be single (24.3%), and either had no children (52.3%), or two or less children living at home (34.9%).

Furthermore, a vast majority of the respondents stated being college/university educated (60.5%), and declared "working" as their main occupation (59.8%). Lastly, consumers were divided in a rather equitable fashion within the following regrouped income categories: less than $29,999 (23.9%), $30,000 to $49,999 (26.6%), $50,000 to $79,999 (24.5%); however, the proportion decreased drastically in the $80,000 and more range (10.8%). The family revenue question also generated the highest rate of "Do not know/Refuse" replies (8.1%) and missing values (6.2%), as individuals are usually more reluctant to disclose financial information.

Demographic Characteristics	Control Condition		Condition 1		Condition 2		Condition 3		Across Conditions	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Language										
English	75	16.8	21	14.6	21	14.6	37	14.5	154	15.6
French	371	83.0	123	85.4	123	85.4	217	85.1	834	84.2
Missing variables	1	0.2	0	0.0	0	0.0	1	0.4	2	0.2
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0
Sex										
Female	238	53.2	91	63.2	100	69.4	169	66.3	598	60.4
Male	195	43.6	52	36.1	42	29.2	83	32.5	372	37.6
Missing variables	14	3.2	1	0.7	2	1.4	3	1.2	20	2.0
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0
Age										
18-24	45	10.1	18	12.5	26	18.1	47	18.4	136	13.7
25-34	82	18.3	30	20.8	27	18.8	50	19.6	189	19.1
35-44	124	27.7	30	20.8	44	30.6	58	22.7	256	25.9
45-54	100	22.4	28	19.5	22	15.2	57	22.4	207	20.9
55-65	46	10.3	25	17.4	13	9.0	30	11.8	114	11.5
65 and more	37	8.3	12	8.3	10	6.9	12	4.7	71	7.2
Missing variables	13	2.9	1	0.7	2	1.4	1	0.4	17	1.7
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0
Marital status										
Married	245	54.8	72	50.0	73	50.7	153	60.0	543	54.8
Single	102	22.8	38	26.4	40	27.8	61	23.9	241	24.3
Other	86	19.2	34	23.6	29	20.1	40	15.7	189	19.1
Missing variables	14	3.2	0	0.0	2	1.4	1	0.4	17	1.7
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0
Number of children at home										
0	238	53.2	79	54.8	65	45.1	136	53.3	518	52.3
1	67	15.0	27	18.8	26	18.1	39	15.3	159	16.1
2	86	19.2	21	14.6	33	22.9	46	18.1	186	18.8
3 or more	37	8.3	13	9.0	15	10.4	20	7.8	85	8.6
Missing variables	19	4.3	4	2.8	5	3.5	14	5.5	42	4.2
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0

Demographic Characteristics	Control Condition		Condition 1		Condition 2		Condition 3		Across Conditions	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Level of studies completed										
Primary	11	2.5	2	1.4	6	4.2	7	2.7	26	2.6
Secondary	145	32.4	45	31.3	51	35.4	92	36.1	333	33.6
College	150	33.6	50	34.7	45	31.2	96	37.6	341	34.4
University	124	27.7	46	31.9	32	22.2	56	22.0	258	26.1
Do not know/Refuse	1	0.2	1	0.7	3	2.1	3	1.2	8	0.8
Missing variables	16	3.6	0	0.0	7	4.9	1	. 0.4	24	2.4
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0
Main occupation										
Working	277	62.0	83	57.6	78	54.2	154	60.4	592	59.8
Studying	23	5.1	7	4.9	16	11.1	21	8.2	67	6.8
Retired	62	13.9	32	22.2	16	11.1	28	11.0	138	13.9
Unemployed/Job seeker	13	2.9	4	2.8	6	4.2	11	4.3	34	3.4
At home	44	9.8	11	7.6	22	15.2	35	13.7	112	11.3
Missing variables	28	6.3	7	4.9	6	4.2	6	2.4	47	4.7
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0
Family's gross income										
Less than 15,000$	29	6.5	14	9.6	18	12.5	20	7.8	81	8.2
15,000$ to 29,999$	75	16.8	25	17.4	22	15.3	33	13.0	155	15.7
30,000$ to 39,999$	69	15.5	24	16.6	20	13.9	36	14.1	149	15.1
40,000$ to 49,999$	53	11.9	18	12.5	15	10.4	28	11.0	114	11.5
50,000$ to 59,999$	42	9.4	17	11.8	19	13.2	38	14.9	116	11.7
60,000$ to 79,999$	64	14.3	19	13.2	10	6.9	34	13.3	127	12.8
80,000$ to 99,999$	31	6.9	4	2.8	3	2.1	22	8.6	60	6.1
100,000$ and more	23	5.1	7	4.9	6	4.2	11	4.3	47	4.7
Do not know/Refuse	34	7.6	8	5.6	19	13.2	19	7.5	80	8.1
Missing variables	27	6.0	8	5.6	12	8.3	14	5.5	61	6.2
Total	447	100.0	144	100.0	144	100.0	255	100.0	990	100.0

Table 16 – Demographic profile of respondents (N = 990)

In general, the distribution of participants was somewhat similar to that of the Quebec population, which has a median age of 43 and a median household income of $47,000, and did not reveal clusters of young or old shoppers with varying olfactory sensitivities and musical preferences. Nevertheless, additional consideration was given to the fact that in field experiments, random sampling is based on scheduling the implementation of treatment conditions, as opposed to unsystematically assigning respondents to each experimental group (Whitley, 2002). Consequently, the distribution of subjects may not have been balanced across conditions, even if it seemed to follow indiscriminate patterns.

To investigate whether participants' demographic characteristics were independent of the manipulations, a chi-square test (χ^2) was conducted on each of the variables. Results of the multi-way frequency analysis reached significance (at $p < .05$) for three individual traits: sex, age, and main occupation. These attributes were therefore controlled within calculations as covariates - aside from gender, which was later assessed as a moderator - in order to rule them out as potential alternative explanations for any research findings.

Moreover, it should be taken into consideration that missing values were not replaced by means, given the sample size ($N = 990$) and the small percentage of variables they represented, that is, less than 6.2% for the sample (see detailed percentages in Table 16).

B. Manipulation Checks

Prior to testing hypotheses, manipulation checks were performed to ensure that subjects truly experienced different levels of the independent variables within the four experimental conditions, as well as to offer mall management additional information on customer preferences. Since three survey questions assessed the various evaluative aspects of each environmental stimulus, mean single measures of ambient music and scent perceptions were calculated beforehand.

1. Music

Research participants' observations on the presence/absence of slow-tempo music were analyzed using a one-way ANOVA, with the cognitive response elicited by music acting as the dependent variable:

Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Perception of ambient music					
Between Groups	33.244	1	33.244	11.235	.001
Within Groups	2888.054	976	2.959		
Total	2921.298	977			

Table 17 - Manipulation check for the absence/presence of music (slow-tempo)

Results presented in Table 17 demonstrate that the manipulation was successful, the presence of slow-tempo music having a significant impact on the perception of ambient music ($F = 11.235$, $p < .01$).

As can be further observed in Figure 4, the presence of slow-tempo music (Mean $_{\text{slow-tempo music}}$ = 2.963) generated higher evaluations of atmospheric music than its absence (Mean $_{\text{no music}}$ = 3.339).

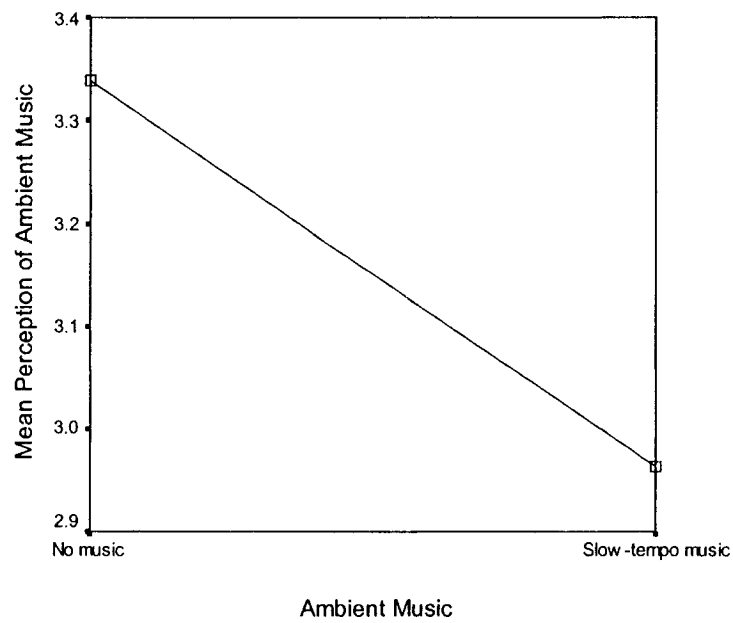

Figure 4 - Manipulation check for the absence/presence of music (slow-tempo)

It is essential for readers to understand that due to the fact that the relevant numerical scales ranged from "Strongly agree" to "Strongly disagree", a smaller mean score on the *y* axis actually constitutes a superior perception of the environmental cue. Hence, the background music rendered shopping at the mall a pleasant experience, was not bothersome, and was considered appropriate.

2. Scent

A one-way ANOVA was also conducted to ensure that the subjects' self-report appraisals of ambient scent differed between the experimental conditions. The presence/absence of

the citrus odor, and consumer evaluations of the stimuli were respectively used as the independent and dependent variables in the computation.

Dependent Variable	Sum of Squares	df	Mean Square	F	Sig.
Perception of ambient scent					
Between Groups	35.435	1	35.435	16.089	.000
Within Groups	2123.117	964	2.202		
Total	2158.553	965			

Table 18 - Manipulation check for the absence/presence of scent (citrus)

Results in Table 18 indicate that the second manipulation also achieved its purpose, the planned contrasts between the vaporization of citrus scent and lack thereof being significant ($F = 16.089$, $p < .01$).

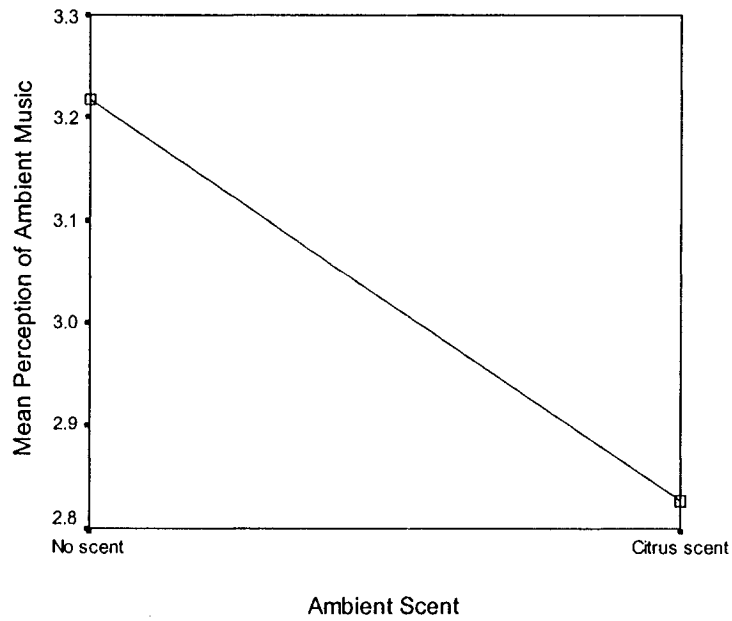

Figure 5 - Manipulation check for the absence/presence of scent (citrus)

Hence, the diffusion of the ambient odor exerted a significant influence on the perception the latter ($Mean_{citrus\ scent} = 2.827$ against $Mean_{no\ scent} = 3.217$), as illustrated in Figure 5.

Readers should interpret the aforementioned mean scores in a similar manner than those engendered by the presence of music, the numerical scale statements again ranging from positive to negative. Thus, respondents in the citrus conditions were not annoyed by the scent's presence, thought it appropriate, and reported shopping in the mall as more pleasant than those in non-odorized experimental groups.

C. Hypotheses Testing

This section reviews the statistical tests and methods used to determine whether the available data sustained the assumed relationships. As different questions assessed each construct, unweighted, mean averages were computed for consumer perceptions (merchandise quality and global environment), as well as purchasing behavior; the following calculations were then undertaken using these single, cumulative measures. A summary of descriptive statistics for the dependent variables (means and standard deviations) can be found in Appendix K. When key interactions were revealed, independent sample t-tests were conducted to verify for which conditions differences could be observed between means (significant results tables for the latter are available in Appendix L and Appendix M).

1. Effect of Environmental Cues on Perceptions and Purchasing Behavior

The first step in testing the proposed model was to establish whether a direct interactive effect of music tempo and citrus scent could be detected on respondent evaluations of

product quality, of the retail setting, and on the amount of money they had spent at the mall (these relationships were respectively conceptualized in the first, second, and third hypotheses).

Consequently, a two-way MANOVA was performed, using both atmospheric cues as independent variables, and sex, age, as well as main occupation as covariates.

Factors	Wilk's Lambda F	Sig.
Music	0.929	0.426
Scent	0.563	0.002
Music * Scent	4.114	0.009

Dependent Variables	Source	Sum of Squares	df	Mean Square	F	Sig.
Perception of Merchandise Quality	Music	0.860	1	0.860	0.710	0.400
	Scent	2.990	1	2.990	2.467	0.117
	Music * Scent	2.515E-02	1	2.515E-02	0.021	0.885
	Error	1003.494	828	1.212		
Perception of Global Environment	Music	0.244	1	0.244	0.176	0.675
	Scent	0.424	1	0.424	0.306	0.580
	Music * Scent	1.601E-03	1	1.601E-03	0.001	0.973
	Error	1148.780	828	1.387		
Purchasing Behavior (In dollars spent)	Music	3197.574	1	3197.574	0.994	0.319
	Scent	38025.831	1	38025.831	11.827	0.001
	Music * Scent	37363.456	1	37363.456	11.621	0.001
	Error	2662256.537	828	3215.286		

Table 19 - Analysis of variance: Effects of music tempo and citrus scent on the dependent variables

Statistical analyses in Table 19 reveal that music tempo did not exert a main effect on shopper expenditures ($F = 0.994$, $p = .319$). In contrast, the presence of an ambient citrus scent significantly affected individual spending ($F = 11.827$, $p < .01$). Nevertheless, the interactive effects of the environmental stimuli on sales were significant as well ($F = 11.621$, $p < .01$).

More specifically, Figure 6 illustrates that in the absence of music, consumers disbursed somewhat similar amounts of money, whether citrus scent was or not diffused in the setting (Mean $_{\text{no scent}}$ = 48.888, in comparison to Mean $_{\text{citrus scent}}$ = 49.135). On the other hand, the presence of slow-tempo music alone resulted in participants significantly increasing their purchases at the mall (Mean $_{\text{no scent}}$ = 60.631, t = 4.113, p < .01), in contrast to when combined with the ambient odor (Mean $_{\text{citrus scent}}$ = 30.835).

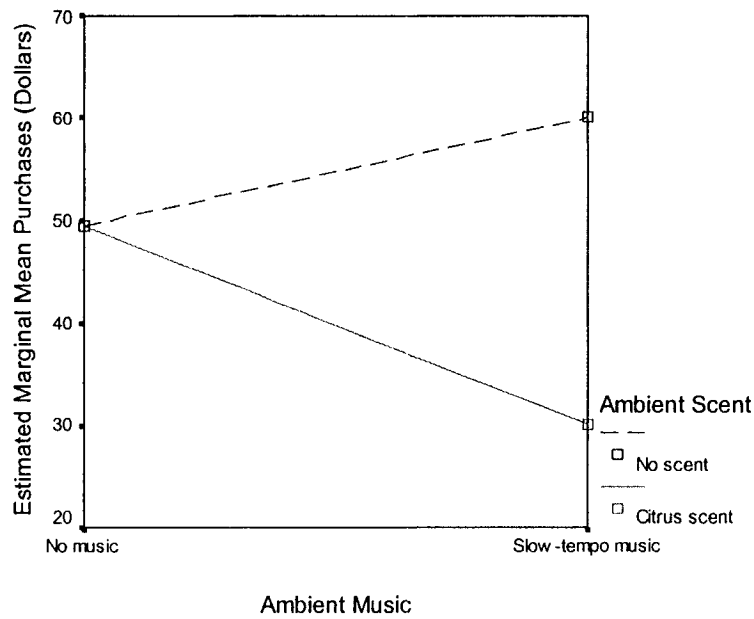

Figure 6 - Effects of music tempo and citrus scent on purchasing behavior

Likewise, the citrus scent had a negative effect on sales when paired with the music, comparatively to its sole impact (Mean $_{\text{citrus scent}}$ = 49.135, t = 3.175, p < .01). Equally, a significant decrease in expenditures was generated by the incorporation of both atmospheric cues in the shopping environment, as opposed to the control condition (Mean $_{\text{no scent}}$ = 48.888, t = 4.676, p < .01). Hence, the selected olfactory stimuli had an adverse and independent influence on spending.

Thus, the first three hypotheses are rejected; although the music and odor interaction did affect sales, it was in a negative manner.

H1: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer perceptions of merchandise quality.

H2: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer perceptions of the global environment.

H3: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer purchases (in dollars spent).

However, it had been proposed that sex-based dissimilarities would alter the relationship between the environmental stimuli and the dependent variables. Hence, the computations were repeated including gender as a fixed factor in the equation, while age and main occupation remained as covariates.

Factors	Wilk's Lambda F	Sig.
Gender	1.264	0.285
Music * Gender	0.096	0.962
Scent * Gender	0.563	0.639
Music * Scent * Gender	4.114	0.007

Dependent Variables	Source	Sum of Squares	df	Mean Square	F	Sig.
Perception of Merchandise Quality	Gender	4.428	1	4.428	3.683	0.550
	Music * Gender	0.256	1	0.256	0.213	0.645
	Scent * Gender	1.141	1	1.141	0.949	0.330
	Music * Scent * Gender	10.809	1	10.809	8.989	0.003
	Error	992.046	825	1.202		
Perception of Global Environment	Gender	2.117	1	2.117	1.538	0.215
	Music * Gender	0.302	1	0.302	0.219	0.640
	Scent * Gender	1.182	1	1.182	0.859	0.354
	Music * Scent * Gender	12.633	1	12.633	9.179	0.003
	Error	1135.464	825	1.376		
Purchasing Behavior (In dollars spent)	Gender	351.156	1	351.156	0.109	0.741
	Music * Gender	46.343	1	46.343	0.014	0.905
	Scent * Gender	2062.185	1	2062.185	0.640	0.424
	Music * Scent * Gender	2907.052	1	2907.052	0.902	0.342
	Error	2657743.959	825	3221.508		

Table 20 - Analysis of variance: Effects of music tempo, citrus scent, and gender on the dependent variables

With the integration of sex, numerous changes were observed in the influence of atmospheric cues on respondent evaluations and purchasing behavior (see Table 20). To begin with, the interactive effect of ambient music and citrus odor originally detected on the amount of money spent was no longer significant.

Secondly, the three-way interaction of music tempo, ambient scent, and gender on participant assessments of merchandise quality ($F = 8.989$, $p < .01$), and of the global setting ($F = 9.179$, $p < .01$) became significant. These findings offer potential evidence that sex may have acted as a moderating variable, and that shopper perceptions may have mediated the path linking the environmental stimuli and expenditures; these implications will be explored in the following subsections.

2. Moderating Effect of Gender

It was hypothesized that gender would moderate the influence of atmospheric factors on consumer evaluations and sales volume. Based on Baron and Kenny's (1986) procedures, a pure moderating effect is said to exist when the main and interactive effects of moderator and predictor variables significantly impact designated outcomes.

Referring back to Table 20 the MANOVA results show that the combination of music tempo, ambient odor, and sex did affect shoppers' merchandise quality and global environment perceptions (respectively $F = 8.989$ and $F = 9.179$, $p < .01$). However, it did not influence their purchasing behavior, as it reversed the previous finding of a significant "music x odor" interactive effect on the latter. Since none of the main effects

on the dependent variables were significant as well, gender was identified as a quasi-moderator of the assumed relationships (Sharma, Durand, and Gur-Arie, 1981). Hence, H7 is rejected.

> **H7:** Consumer gender will moderate the interactive effects of slow-tempo music and ambient citrus scent on consumer perceptions (merchandise quality and global environment), and purchases (in dollars spent).

Nonetheless, previous test results have suggested that differences occurred in the manner in which men and women appraised both product quality and the retail location. To determine the nature of the affect, further investigations were conducted. The database was split and multivariate analyses were performed for male and female subjects, focusing on their assessments of merchandise quality and of the global setting, as the environmental cues significantly impacted overall sales.

Factors	Gender (Female)		Gender (Male)	
	Wilks' Lambda	Sig.	Wilk's Lambda	Sig.
Music	0.340	0.796	0.674	0.568
Scent	2.306	0.077	2.691	0.046
Music * Scent	4.813	0.003	3.357	0.019

Dependent Variables	Source	Gender (Female)		Gender (Male)	
		F	Sig.	F	Sig.
Perception of Merchandise Quality	Music	0.016	0.900	0.687	0.408
	Scent	0.030	0.862	2.367	0.125
	Music * Scent	5.689	0.018	3.287	0.070
Perception of Global Environment	Music	0.441	0.507	0.023	0.879
	Scent	0.381	0.537	0.539	0.463
	Music * Scent	6.285	0.013	2.908	0.089

Table 21 - Analysis of variance: Effects of music tempo and citrus scent on male and female consumer perceptions

Findings demonstrate that the quasi-moderating influence of gender on shopper perceptions followed similar patterns (see Table 21 for MANOVA results). The

interactive effects of music tempo, ambient scent, and sex on both evaluations were just marginally significant for female respondents ($F = 3.287$ and $F = 2.908$, $p < .10$), whereas male participants' appraisals were significantly affected ($F = 5.689$ and $F = 6.285$, $p < .05$) by the atmospheric stimuli interaction.

In particular, Figure 7 illustrates that men provided higher assessments of merchandise quality in the absence of citrus scent (Mean $_{\text{no scent}} = 5.444$), than in its presence (Mean $_{\text{citrus scent}} = 5.113$) when music was being played in the setting.

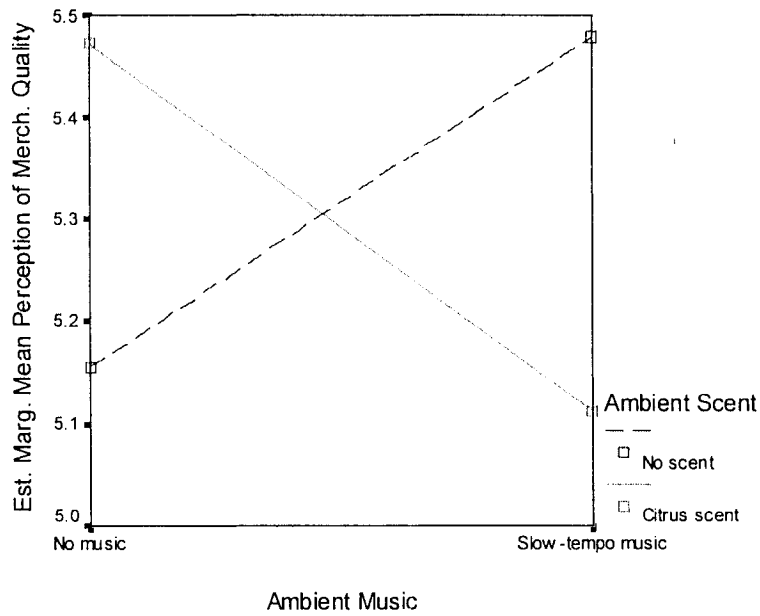

Figure 7 - Effects of music tempo, citrus scent, and gender on male perceptions of merchandise quality

Yet, male shoppers reacted in an opposite fashion to the ambient odor in the no music experimental condition (Mean $_{\text{no scent}} = 5.156$ vs. Mean $_{\text{citrus scent}} = 5.496$).

Likewise, Figure 8 demonstrates that in the presence of music, men perceived the shopping center more positively without the addition of ambient scent to the environmental features (Mean $_{\text{no scent}}$ = 5.226 vs. Mean $_{\text{citrus scent}}$ = 4.781).

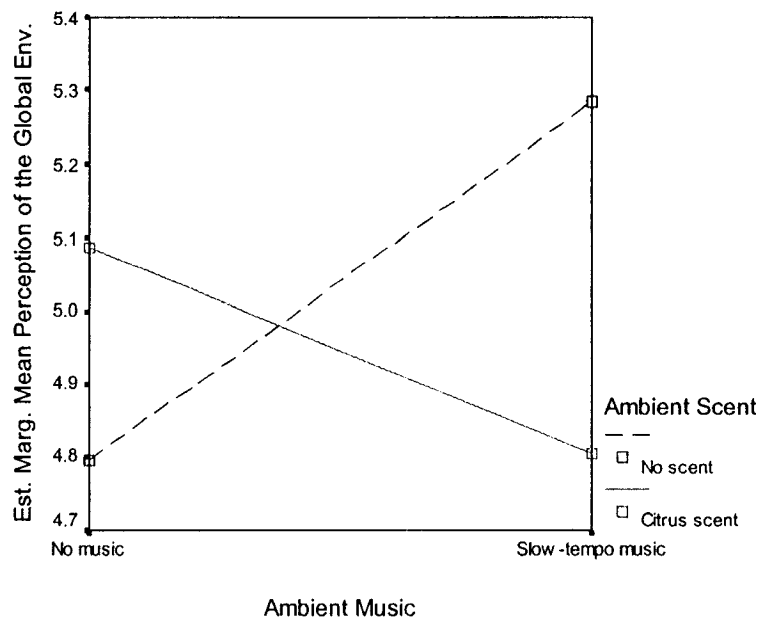

Figure 8 - Effects of music tempo, citrus scent, and gender on male perceptions of the global environment

Conversely, male consumers reported higher overall evaluations of the retail outlet in the presence of the chosen citrus odor (Mean $_{\text{citrus scent}}$ = 5.115), than in its absence (Mean $_{\text{no scent}}$ = 4.810), when slow-tempo music was not being played in the setting.

In contrast, a very different relationship can be observed between atmospheric cues and female assessments of merchandise quality (see Figure 9).

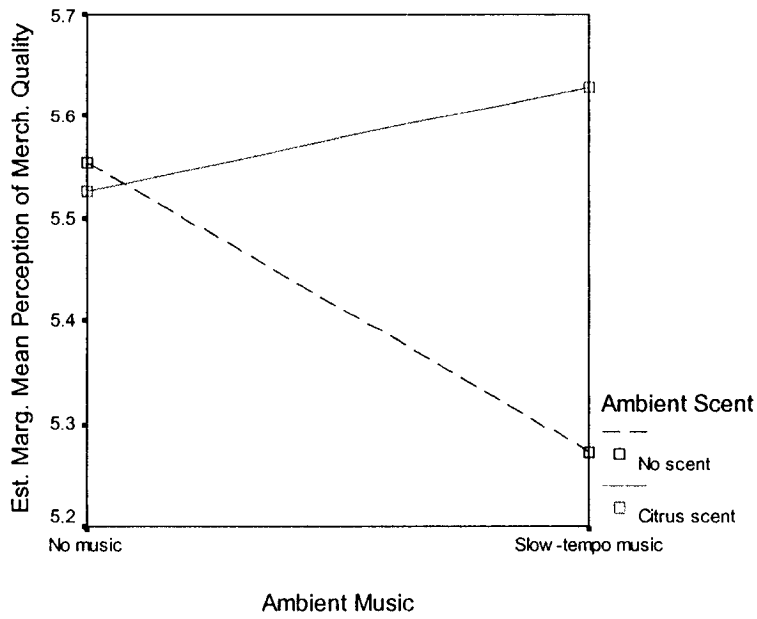

Figure 9 - Effects of music tempo, citrus scent, and gender on female perceptions of merchandise quality

The presence of ambient scent did, to some extent, impact women's perceptions of merchandise quality, since its pairing with music resulted in higher evaluations of product quality (Mean $_{\text{citrus scent}}$ = 5.613), in contrast to its sole influence on the latter (Mean $_{\text{no scent}}$ = 5.260). Conversely, female appraisals were almost unaltered by the diffusion of the citrus odor when music was not being played in the shopping center (Mean $_{\text{no scent}}$ = 5.570 and Mean $_{\text{citrus scent}}$ = 5.534).

Finally, the combined effects of the independent variables on female assessments of the global environment followed conflicting paths, as shown in Figure 10. Women perceived the retail setting more favorably in the presence of ambient scent and slow-tempo music

(Mean $_{\text{citrus scent}}$ = 5.268) than in the absence of the selected odor (Mean $_{\text{no scent}}$ = 5.012). However, scent alone - that is, without the diffusion of music - negatively affected their evaluations of the surroundings, engendering a slight decrease in the reported ratings (Mean $_{\text{no scent}}$ = 5.224, in comparison to Mean $_{\text{citrus scent}}$ = 5.092).

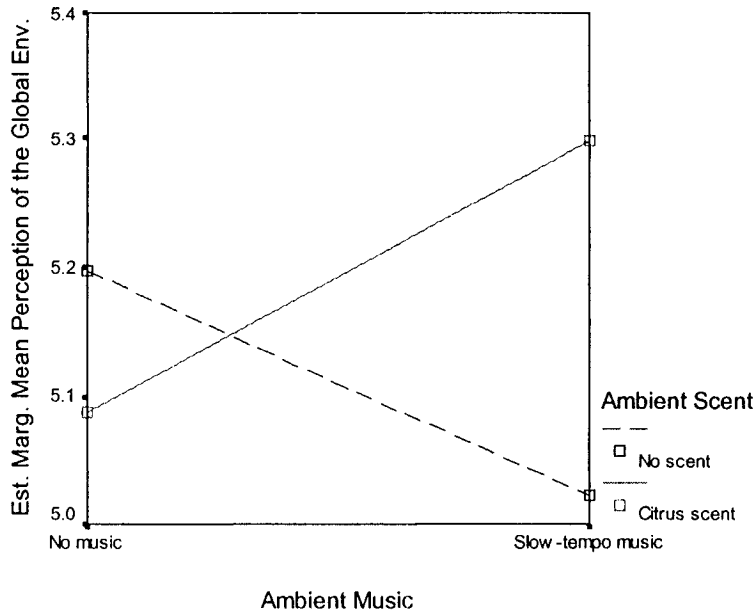

Figure 10 - Effects of music tempo, citrus scent, and gender on female perceptions of the global environment

In general, male and female subjects had diverging reactions to the chosen environmental stimuli. Men tended to have higher responses to single cue groupings (either music or scent), whereas women had a propensity to be positively influenced by the simultaneous presence or absence of citrus scent and music.

Additional independent samples test results only revealed significant gender differences in the control and interaction conditions. In the absence of atmospheric factors, male customers reported lower assessments of the quality of products ($t = -4.150$, $p < .01$), as

well as of the shopping mall ($t = -3.207$, $p < .01$), than their female counterparts. The situation repeated itself when subjects were exposed to both slow-tempo music and ambient odor, men providing lower evaluations of merchandise quality and of the global environment (respectively, $t = -2.680$, $p < .01$, and $t = -2.405$, $p < .05$) than women.

Finally, when assessing purchase means across conditions, female respondents had a tendency to spend more money than male participants, the sole exception being found in the "slow-tempo music x no scent" experimental group (Mean $_{male}$ = 67.528, in comparison to Mean $_{female}$ = 57.744). Still, the only significant difference in sales was observed in the interactive condition, men having marginally disbursed less than women during their visit at the mall ($t = -1.862$, $p < .10$).

3. Mediating Effect of Perceptions on Purchasing Behavior

Multiple backward, linear regressions were performed to understand the role played by merchandise quality and overall environment perceptions in determining consumer expenditures and to test the three remaining hypotheses (H4, H5, and H6), following Baron and Kenny's (1986) specifications. As earlier findings indicated that significant disparities could be noticed between male and female responses, mediation tests were conducted by gender.

In the first round, purchasing behavior was regressed on the atmospheric cues and their interaction, a newly computed "music x scent" variable. Results illustrate that the expected effects were detectable for both sexes.

More specifically, Table 22 demonstrates that the male clientele spent more money at the mall in the presence of music tempo ($t = 2.373$, $p < .05$), and marginally so when the selected odor was diffused ($t = 1.713$, $p < .10$). However, the interactive effects of the environmental stimuli caused men to decrease their purchases ($t = -2.617$, $p < .01$).

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Purchasing Behavior	Regression	44523.656	3	14841.219	4.778	0.003
(In dollars spent)	Residual	1062225	342	3105.920		
	Total	1106748	345			

Model	Predictors	B	t	Sig.	R Square
Purchasing Behavior	Music	52.586	2.373	0.018	0.040
(In dollars spent)	Scent	36.028	1.713	0.088	
	Music * Scent	- 37.097	- 2.617	0.009	

Table 22 - Regression: Effects of music tempo and citrus scent on male purchasing behavior

In a similar manner (see Table 23), sales engendered by female shoppers significantly increased in the presence of music ($t = 2.031$, $p < .05$), and were marginally affected by that of citrus scent ($t = 1.698$, $p < .10$).

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Purchasing Behavior	Regression	36945.246	3	12315.082	3.869	0.009
(In dollars spent)	Residual	1709411	537	3183.262		
	Total	1746357	540			

Model	Predictors	B	t	Sig.	R Square
Purchasing Behavior	Music	32.719	2.031	0.043	0.021
(In dollars spent)	Scent	27.881	1.698	0.090	
	Music * Scent	- 25.140	- 2.412	0.016	

Table 23 - Regression: Effects of music tempo and citrus scent on female purchasing behavior

On the other hand, the behavioral responses of women were negatively influenced by the joint impact of music tempo and ambient scent ($t = -2.412$, $p < .05$). Thus, the first

condition was equally fulfilled for both genders, as the amount of money spent on-site by all consumers was directly affected by the environmental stimuli.

The second step of the Baron and Kenny (1986) procedure involved assessing both perceptions as dependent variables, and music, scent, as well as their interaction as the independent variables.

Results, as shown in Table 24, illustrate that the atmospheric cues positively influenced male appraisals of product quality ($t_{music} = 2.247$, $p < .05$, and $t_{scent} = 2.751$, $p < .01$), as well as of the global setting ($t_{music} = 2.308$, and $t_{scent} = 2.317$, $p < .05$).

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Perception of Merchandise Quality	Regression	9.567	3	3.189	2.627	0.050
	Residual	443.045	365	1.214		
	Total	452.611	368			
Perception of Global Environment	Regression	8.552	3	2.851	1.962	0.119
	Residual	523.050	360	1.453		
	Total	531.603	363			

Model	Predictors	B	t	Sig.	R Square
Perception of Merchandise Quality	Music	0.951	2.247	0.025	0.021
	Scent	1.114	2.751	0.006	
	Music * Scent	- 0.667	- 2.458	0.014	
Perception of Global Environment	Music	1.080	2.308	0.022	0.016
	Scent	1.036	2.317	0.021	
	Music * Scent	- 0.693	- 2.314	0.021	

Table 24 - Regression: Effects of music tempo and citrus scent on male consumer perceptions

Although their interactive effect also had a significant impact on both evaluations, it was in a negative manner (respectively $t = -2.458$, and $t = -2.314$, $p < .05$). Thus, the perceptions of men were directly affected by music tempo and citrus scent.

In contrast, a very different relationship can be observed between the environmental stimuli and female assessments.

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Perception of Merchandise Quality	Regression	5.439	3	1.813	1.525	0.207
	Residual	700.093	589	1.189		
	Total	705.533	592			
Perception of Global Environment	Regression	2.850	3	0.950	0.678	0.566
	Residual	818.309	584	1.401		
	Total	821.159	587			

Model	Predictors	B	t	Sig.	R Square
Perception of Merchandise Quality	Music	- 0.429	- 1.445	0.149	0.008
	Scent	- 0.143	- 0.470	0.639	
	Music * Scent	0.202	1.047	0.295	
Perception of Global Environment	Music	- 0.386	- 1.186	0.236	0.059
	Scent	- 0.234	- 0.707	0.480	
	Music * Scent	0.223	1.056	0.292	

Table 25 - Regression: Effects of music tempo and citrus scent on female consumer perceptions

In fact, the analysis engendered completely opposite findings, as none of the links between music, ambient odor, and perceptions proved significant (see Table 25 above). Consequently, the second condition to establish mediation is only fulfilled for male consumers.

Finally, a third regression equation was performed to determine whether customer evaluations would significantly account for variations in the clientele's purchasing behavior (Baron and Kenny, 1986). Test results failed to highlight a mediating effect of male merchandise quality appraisals, as their influence on expenditures was not significant.

Furthermore, the previously observed main impact of music, as well as the interactive effect of music tempo and ambient scent remained significant themselves, as shown in Table 26.

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Purchasing	Regression	48183.723	4	12045.931	3.854	0.004
Behavior	Residual	1056530	348	3125.830		
(In dollars spent)	Total	1104714	342			

Model	Predictors	B	t	Sig.	R Square
Purchasing	Music	49.688	2.219	0.027	0.044
Behavior	Scent	32.714	1.529	0.127	
(In dollars spent)	Music * Scent	- 35.108	- 2.444	0.015	
	Merchandise Quality	2.864	1.041	0.299	

Table 26 - Regression: Effects of music tempo, citrus scent, and perception of merchandise quality on male purchasing behavior

In addition, the earlier influence of the independent variables on male purchasing behavior could still be detected in the model posing overall evaluations of the environment as a mediator. Table 27 also demonstrates that there was no significant effect of the latter on sales.

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Purchasing	Regression	49282.401	4	12320.600	3.973	0.004
Behavior	Residual	1035715	334	3100.944		
(In dollars spent)	Total	1084998	338			

Model	Predictors	B	t	Sig.	R Square
Purchasing	Music	55.396	2.452	0.015	0.045
Behavior	Scent	39.106	1.817	0.070	
(In dollars spent)	Music * Scent	- 38.940	- 2.693	0.007	
	Global Environment	2.391	0.932	0.352	

Table 27 - Regression: Effects of music tempo, citrus scent, and perception of the global environment on male purchasing behavior

Similarly, Table 28 illustrates that none of the relationships between music, scent, and expenditures, nor their directions, were changed by the introduction of female merchandise quality perceptions as a mediating variable in the calculations.

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Purchasing	Regression	42618.725	4	10654.681	3.330	0.010
Behavior	Residual	1698935	531	3199.500		
(In dollars spent)	Total	1741553	535			

Model	Predictors	B	t	Sig.	R Square
Purchasing	Music	35.128	2.159	0.031	0.024
Behavior	Scent	29.852	1.796	0.073	
(In dollars spent)	Music * Scent	- 26.583	- 2.524	0.012	
	Merchandise Quality	2.865	0.056	0.194	

Table 28 - Regression: Effects of music tempo, citrus scent, and perception of merchandise quality on female purchasing behavior

Finally, sales remained affected by music, as well as by its interaction with ambient scent, as observed in prior results. However, the citrus odor no longer had a significant influence on female purchases in this model. Moreover, findings revealed a direct link between female assessments of the global environment and the amount of money spent by women in the retail setting, as shown in Table 29.

Model	Source	Sum of Squares	df	Mean Square	F	Sig.
Purchasing	Regression	51745.276	4	12936.319	4.076	0.003
Behavior	Residual	1675835	528	3173.930		
(In dollars spent)	Total	1727580	532			

Model	Predictors	B	t	Sig.	R Square
Purchasing	Music	34.947	2.145	0.032	0.030
Behavior	Scent	27.064	1.631	0.103	
(In dollars spent)	Music * Scent	- 25.777	- 2.447	0.015	
	Global Environment	4.372	2.140	0.033	

Table 29 - Regression: Effects of music tempo, citrus scent, and perception of the global environment on female purchasing behavior

Thus, based on the conducted tests, the third, fourth, and sixth hypotheses are rejected as none of the third step results established a mediating effect for either one of the studied perceptions.

H4: Merchandise quality perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).

H5: Global environment perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).

H6: Merchandise quality perceptions will mediate the interactive effects of slow-tempo music and ambient citrus on global environment perceptions.

Nonetheless, in order to determine whether some of the empirical evidence reported in the literature could be sustained by findings of the present experiment, additional correlation tests were performed on male and female evaluations of product quality and of the shopping center. Results showed that the two types of assessments were strongly correlated for both men (Pearson coeff. = 0.643, $p < .01$), and women (Pearson coeff. = 0.463, $p < .01$).

In summary, the experimental data was analyzed to determine the interactive effects of music tempo and citrus scent on merchandise quality and overall perceptions of the retail setting, as well as on the amount of money spent by consumers in a neighborhood mall; various mediating and moderating relationships were also tested. A recapitulative table of hypotheses and findings is presented on the following pages.

Hypotheses	Status	Findings
H1: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer perceptions of merchandise quality.	Rejected	- No main effect of music. - No main effect of scent. - No interactive effect of music and scent. - Significant interactive effect of music, and scent when gender is introduced.
H2: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer perceptions of the global environment.	Rejected	- No main effect of music. - No main effect of scent. - No interactive effect of music and scent. - Significant interactive effect of music, and scent when gender is introduced.
H3: The interactive effects of slow-tempo music and ambient citrus scent will positively affect consumer purchases (in dollars spent).	Rejected	- No main effect of music. - Significant main effect of scent. - Significant interactive effect of music and scent (negative for "slow-tempo music/citrus scent condition). - No interactive effect of music and scent when gender is introduced (reversal, see below in H7 for additional results). - Significant interactive effect of scent on male and female purchasing behavior.
H4: Merchandise quality perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).	Rejected	- No mediating effect of perceptions of merchandise quality. - Significant main effect of music on male perceptions of merchandise quality (positive). - Marginally significant main effect of scent on male perception of merchandise quality (positive). - Significant interactive effect of music and scent on male perceptions of merchandise quality (negative). - No significant effects of music and scent on female perception of merchandise quality (main or interactive). - No significant effect of male or female perceptions of merchandise quality on purchasing behavior.
H5: Global environment perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).	Rejected	- No mediating effect of perceptions of the global environment. - Significant main effect of music on male perceptions of the global environment (positive). - Marginally significant effect of scent on male perception of the global environment (positive). - Significant interactive effect of music and scent on male perception of the global environment (negative). - No significant effects of music and scent on female perception of the global environment (main or interactive).

Hypotheses	Status	Findings
H5: Global environment perceptions will mediate the interactive effects of slow-tempo music and ambient citrus scent on consumer purchases (in dollars spent).	Rejected	- No significant effect of male perception of the global environment on purchasing behavior. - Significant effect of female perception of the global environment on purchasing behavior (positive).
H6: Merchandise quality perceptions will mediate the interactive effects of slow-tempo music and ambient citrus on global environment perceptions.	Rejected	- No mediating effect of merchandise quality perceptions.
H7: Consumer gender will moderate the interactive effects of slow-tempo music and ambient citrus scent on consumer perceptions (merchandise quality and global environment), and purchases (in dollars spent).	Rejected	- Quasi-moderating effect of gender on consumer perceptions. - No significant effects of gender on both perceptions (main or combined with either music/scent). - Significant interactive effect of gender on perceptions (three-way interaction). - Significant interactive effects of music and scent on both male perceptions (positive for "no music/ citrus" and "slow-tempo music/no scent" conditions). - Marginally significant interactive effect of music and scent on female perception of merchandise quality (positive for "slow-tempo music/citrus" condition). - Marginally significant interactive effects of music and scent on female perception of the global environment (positive for "no music/no scent" and "slow-tempo music/citrus" conditions). - No moderating effect of gender on consumer purchases. - No significant effects of gender on purchasing behavior (main or interactive). - Significant main effect of music on both male and female purchasing behavior (positive). - Marginally significant main effect of scent on both male and female purchasing behavior (positive). - Significant interactive effect of music and scent for both male and female purchasing behavior (negative).
General Observations		
- Propensity for higher male responses in single cue conditions. - Propensity for higher female responses in conditions combining the presence/absence of cues. - Propensity for higher female purchases across conditions (except for "slow-tempo music/no scent" condition, lone significant difference in interactive condition). - Significantly higher female perceptions of merchandise quality and of the global environment in control and "slow-tempo music/citrus scent" condition.		

Table 30 - Summary table of hypotheses testing results

VI. Discussion

In summary, the object of the present report was to investigate the interactive effects of ambient music and scent on consumer evaluations of merchandise quality and of the shopping center environment on purchasing behavior, in addition to studying whether clientele assessments and gender respectively affected the relationships as potential mediator and moderator variables. The following chapter offers a general discussion on the results engendered by the data analysis. Limitations, theoretical and practical implications, as well as future research directions will then be outlined.

A. General Discussion

In this section, the observed impacts of atmospheric cues on the dependent variables, the role played by gender as a moderator, and the mediating influence of perceptions on expenditures will be reviewed. Links will be established between the obtained findings and the literature review, to highlight concurrent or separate conclusions from those drawn from previous research.

1. Effect of Environmental Cues on Perceptions and Purchasing Behavior

The present research was unable to confirm the existence of main or interactive effects of slow-music tempo and citrus scent on merchandise quality and global environment perceptions, none of the relationships having proved significant. This result was unusual,

stimulate cognitive processes (MacInnis and Park, 1991), or may have simply seemed not to fit within the commercial context (Chebat, Gélinas-Chebat, and Vaillant, 2001).

Likewise, the selected ambient odor not only failed to affect shopper assessments of product quality and of the setting, but was also found to independently and significantly decrease sales, contrary to prior findings (Gardner and Siomkos, 1986; Hirsch and Gay, 1991; Hirsch, 1995). A potential rationale may be that the citrus scent was incongruent with the offered merchandise (Mitchell, Kahn, and Knasko, 1995; Spangenberg, Crowley, and Henderson, 1996), or the environment (Hirsch, 1995), thereby engendering a negative reaction. Another probable cause may be the absence of controls for the intensity of the odor (Richardson and Zucco, 1989; Ehrlichman and Bastone, 1992; Gulas and Bloch, 1995); however, the latter remains quite unlikely, the manipulation checks having insured that the odor was not bothersome.

In addition, a pre-test of the chosen ambient scent was deemed unnecessary, as it was inferred that the stimuli would engender similar effects as those of the citrus category in Spangenberg, Crowley, and Henderson's experiment (1996). Consequently, an alternative explanation is that the arousal quality of the citrus scent was above the acceptable threshold level for consumers and produced the negative effect (Berlyne, 1971; Heimstra and McFarling, 1974; Bell, Fisher, and Loomis, 1978; Baker, 1986), although earlier empirical evidence reveals that the introduction of a pleasant lemon scent during a performance task failed to affect the arousal, mood states, and environment ratings of respondents (Knasko, 1992). Thus, the most plausible rationales for the negative odor

effect are either the above-mentioned notion of scent fit, or the failure of the selected scent to alter merchandise and overall setting perceptions.

Nevertheless, the most likely explanation for the lack of interactive effects of music and scent on shopper evaluations and negative influence on expenditures may be the absence of congruity between the atmospheric stimuli. A more relaxing scent, such as lavender, might have proven a better fit with the slow-tempo music selection (Ludvigson and Rottman, 1989; Knasko, 1992; Mattila and Wirtz, 2001). As discussed in earlier sections, the lack of appropriateness of environmental cues can negatively affect consumer responses to the setting (Babin, Chebat, and Michon, 2004).

A second unforeseen finding of the present study is that the analysis of the atmospheric cues' interaction indicated that within the "slow-tempo music x no scent" condition, subjects actually spent more money at the mall. It is of great importance to identify a condition that significantly increases purchases, as it is often very difficult for marketing practitioners to quantify the actual influence of store aesthetics on sales, or other dependent variables (Richardson, Jain, and Dick, 1996). This result may also shed light on the absence of a direct link between music tempo and consumer purchases, although various studies have suggested that music can increase sales (Alpert and Alpert, 1990; Milliman, 1982, 1986; North, Hargreaves, and McKendrick, 1999).

Due to the fact that sex was hypothesized to affect the relationship between the environmental stimuli and the dependent variables, the three-way interactions of slow-

tempo music, citrus scent, and gender were tested to gain further insight on potential variations. The modification caused a reversal of the effects on both consumer perceptions and purchases, the loss of significance for the latter establishing the existence of a direct, unmoderated path between atmospheric cues and sales. These alterations will be discussed in the "Moderating Effect of Gender" subsection.

2. Moderating Effect of Gender

As previously discussed, it was assumed that sex would moderate the influence of atmospheric cues on consumer evaluations and sales volume. After computations revealed that only the "music x scent x gender" interaction was significant for merchandise quality and global environment perceptions, sex was identified as a quasi-moderator of the assumed relationships (Sharma, Durand, and Gur-Arie, 1981; Baron and Kenny, 1986). This result was unpredicted, as studies have reported the role played by gender as a moderator of both atmospheric cues' effect on consumer evaluations (Kellaris and Rice, 1993; Herrington and Capella, 1994; Bone and Ellen, 1999).

Further investigations then demonstrated that once sex was introduced in the equation, the influence of music and scent on shopper perceptions followed similar patterns, becoming marginally significant for female respondents, but truly so for their male counterparts. This finding confirmed the general consensus in the literature that women tend to have higher responses to environmental stimuli than men (Kellaris and Rice, 1993; Bone and Ellen, 1999).

In general, men had more positive evaluations of merchandise quality and of the retail setting in conditions where either music or an ambient odor was present. In contrast, female perceptions of product quality remained almost identical when music was not being played in the mall, but higher in the "slow-music tempo x citrus scent" condition. In addition, women reported higher appraisals of the retail location when part of the experimental groups having been exposed to the combined presence or absence of cues.

Hence, researchers obtained higher male responses in single cue conditions, whereas women preferred matched combinations of the selected atmospheric cues. Thus, mall managers should consider focusing on one environmental variable when targeting men, and on appropriate juxtapositions of ambient stimuli when female clientele is preponderant. Preeminence may also be given to female shoppers' preferences, a comparison of the various cell means having revealed that women, in average, had a tendency to spend more money than men across conditions, although the differences did not prove to be statistically significant.

An explanation of the observed variance between male and female reactions to environmental variables may lay in the literature. Optimal arousal theories suggest that each ambient cue has an "ideal" optimal level (Berlyne, 1971; McClelland et al., 1953). Adding atmospheric stimuli is postulated to increase the level of novelty and pleasure experienced by individuals, which enhances their perceptions of the setting and, in turn, encourages them to adopt approach behaviors (Berlyne, 1971; McClelland et al., 1953). However, Heimstra and McFarling (1974) contend that no stimulus, among which noise and odors, should dominate others in an ambient environment even if it remains tolerable,

as the presence of an extreme stimulus can lead to sensory overload, a stressful situation for the individual. An excessive amount of one or more ambient cues may result in an unpleasant perception of the environment, and even cause the person to take action and avoid it in the future (Heimstra and McFarling, 1974; Baker, 1986). Consequently, the current findings may be explained by the fact that men may have lower thresholds of tolerance than women to the number, or the combined effects of atmospheric stimuli.

3. Mediating Effect of Perceptions on Purchasing Behavior

Contrary to expectations, findings revealed that no mediating effect of merchandise quality and global environment perceptions on purchasing behavior could be observed. As the cognitive approach was not sustained, it is possible that Zajonc and Markus' (1984) "emotion-cognition" model would have proven to be a better fit and that the environmental stimuli first affected consumer emotions, before beliefs and evaluations of merchandise and mall were formed (Mehrabian and Russell, 1974; Gardner, 1985). Hence, the study should be replicated using both potential mediators in comparable structural equation models to determine the preeminence of a particular path.

In contrast to Baker, Grewal, and Parasuraman's (1994) results, no specific paths were observable between inferences on product quality, and overall evaluations of the setting, although both measures were highly correlated with one another. However, even though neither male nor female shoppers' judgments of the setting served as mediators of their purchasing behavior, in no way does it signify that no other mediating variables were influencing the data set (Bell, Fisher, and Loomis, 1978).

In general, consumers spent more money at the mall in the presence of music tempo, as opposed to only spending marginally so when the selected odor was diffused. However, the interactive effects of the environmental stimuli caused shoppers to limit their expenditures. In a similar manner, the combined influence of music and ambient scent caused male participants to lower their evaluations of the setting and product quality, whereas main effects engendered a favorable reaction.

Conversely, women exhibited opposite responses, as none of the hypothesized relationships proved significant. Finally, the analyses established the existence of only one significant relationship, that is, between female perceptions of the global environment and purchasing behavior. The overall lack of influence of atmospheric cues on consumer perceptions therefore seems to indicate that the latter are more likely to follow an emotion-cognition path in mediating behavioral responses.

In summary, the obtained results suggest that "retailers might be better advised to use a single environmental cue rather than introduce incongruent combinations of music and scent" (Spangenberg, Grohmann, and Sprott, 2004, p. 6), the notion of appropriateness offering a valid rationale for many of the observed effects.

B. Limitations

Contrary to most of the research having been undertaken on environmental stimuli, the current experiment was carried out in a genuine retail setting, with actual consumers. In

parallel, the available literature has also reported that a vast majority of studies have observed store atmosphere on a global level and investigated single components, but have failed to consider the likely interactions or configurations of ambient cues (Baker, Levy, and Grewal, 1992; Mattila and Wirtz, 2001; Michon, Chebat, and Turley, 2005). Hence, the present exploratory research contributes to the available knowledge on the influence of atmospheric cues in a retail setting. Nonetheless, there are intrinsic risks and limitations to all experimental designs and procedures that should be understood and considered when interpreting findings.

The first series of potential inherent threats to this study were to its internal validity. Researchers tried to ensure that the observed impacts on the dependent variables were uniquely generated by the variations in the independent variables, having kept all atmospheric elements except for music and scent constant in the environment (lights, decor, etc.) as well as physical elements in the mall (no special activities or promotions, etc.) to ensure that shoppers only experienced effects generated by stimuli manipulations (Whitley, 2002). However, it remains impossible to control every aspect of the independent variables within in a field setting.

Hence, potential confounds may have interfered in the manipulation process, notably with other dimensions of music such as pitch, familiarity, tempo modulation, music selection, and preferences, etc. (Bruner, 1990; Kellaris and Kent, 1991; Areni and Kim, 1993; Hui, Dubé, and Chebat, 1997; Chebat, Gélinas-Chebat, and Vaillant, 2001) In addition, similar biases due to the intensity of the citrus scent and the duration of

exposure (Levine and McBurney, 1986), as well as the amount of time spent in, and number of visited locations in the mall (Michon, Chebat, and Turley, 2005), may all have affected the degree to which the manipulated cues influenced consumers.

It is also possible that the participants' responses may have been affected by elements other than the experimental variables, creating demand effects: the atmosphere within the shops (exogenous and uncontrolled additional music and scents, etc.), their promotional policies, the merchandise layouts, crowding, as well as the behavior of other shoppers and sales personnel (Hui, Dubé, and Chebat, 1997; Michon, Chebat, and Turley, 2005).

Moreover, the emotional state of respondents before or during their trip at the mall were not considered within the scope of the present experiment, although mood can affect as well as be differentially affected by various factors in the environment, such as the climate, for instance (Mehrabian and Russell, 1974; Donovan et al., 1994). Whether the sample was constituted of individuals in a favorable or unfavorable emotional state may have generated biases as well, as it may have lead them to be more cooperative or inclined to fill out a questionnaire.

Finally, another limit pertains to the scheduling of experimental conditions. Conducting a field study involved compromising with mall management, more specifically so on the subject of time considerations and the nature of the gathered information. Hence, joined decisions and concessions were made in relation to the questionnaire and data collection schedules in order for researchers to undertake the experiment.

On the other hand, there may be external validity issues with the experimental design. Of course, the location itself provided greater external validity, the experiment having been planned to take place in a neutral neighborhood, with regular customers. Nonetheless, it is possible that the demographic characteristics of the mall's clientele did not correspond to those of the general population, due to the specific nature of the environment. Consequently, the generalization of the results may very well be limited to similar settings, and could not be transposed to other types of service environments such as restaurants, hotels, or other types of commercial venues (Baker, Grewal, and Parasuraman, 1994; Spangenberg, Crowley, and Henderson, 1996), including larger types of shopping centers, where entertainment is considered a more essential component of the experience (Turley and Milliman, 2000; Michon, Chebat, and Turley, 2005).

In addition, other mall clienteles – particularly so if originating from locations such as downtown areas or culturally-driven neighborhoods, for instance – could substantially differ from that of the selected experimental setting. As cultural and/or ethnic backgrounds constitute a driving factor of responses to atmospherics (Kotler, 1973; Holahan, 1982; Herrington and Capella, 1994; Turley and Milliman, 2000), varying demographic profiles could lead to different results.

Lastly, findings may not be generalized to different odors than the particular, chosen citrus scent (Spangenberg, Crowley, and Henderson, 1996; Turley and Milliman, 2000). In a similar way, the engendered relationships were observed in the presence or absence of slow-tempo, light rock music. Replications of the study with other music selections may not produce the same results.

C. Implications for Researchers and Practitioners

The current experiment had both theoretical and managerial implications, which will be discussed in the following section.

1. Theoretical Implications

As previously discussed, cues comprised in a service environment are processed holistically (Bitner, 1992; Baker, Levy, and Grewal, 1992; Wakefield and Baker, 1998; Mattila and Wirtz, 2001). In general, a deeper understanding and knowledge of the influence exerted by the introduction of combined stimuli in a retail setting - such as ambient music and scent - is therefore of "enormous practical and theoretical benefit to the science and practice of environmental psychology" (Spangenberg, Grohmann, and Sprott, 2004, p. 6). Atmospheric variables deserve to be further explored, particularly so given that perceived differences in a single element have the potential to color consumers' interpretation of their entire experience in the environment (Babin, Chebat, and Michon, 2004; Michon, Chebat, and Turley, 2005).

In addition, the conducted experiment constitutes a valuable contribution to research on ambient scents, background music, and field research on environmental cues, areas where significant findings are somewhat contradictory and observed relationships often seem at odds with one another (Mattila and Wirtz, 2001; Michon, Chebat, and Turley, 2005). Practitioners very much need to expand the knowledge base on these matters as well, in

order to draw guidelines from the literature on how to manipulate stimuli to craft more appealing settings (Bitner, 1992; Gulas and Bloch, 1995).

Furthermore, many studies have observed store atmosphere on a global level and investigated single components, but not taken into consideration the interactions likely to occur between different elements of a setting, and therefore, have failed to examine the combined effects of global configurations of ambient cues on customers' store-induced emotions, perceptions, and behaviors (Baker, Levy, and Grewal, 1992; Mattila and Wirtz, 2001; Michon, Chebat, and Turley, 2005). Thus, the current research addresses a gap in the literature and other experiments are necessary to deepen our understanding of consumer behaviors and evaluations in retail environments.

Nevertheless, this study first and foremost provides marketers with insight into the actual effects of two atmospheric stimuli on concrete consumer responses in a commercial setting. Most of the studies on ambient music and scent having employed artificially-recreated environments, the current research offered valuable information on the allocation of resources and the creation of more efficient staging of the physical surroundings (Shostack, 1977; Turley and Milliman, 2000; Chebat and Michon, 2003). As Kotler (1973, p. 48) stated: "In some cases, the place, more specifically the atmosphere of the place, is more influential than the product itself in the purchase decision. In some cases, the atmosphere is the primary product."

2. Managerial Implications

Atmospherics constitute an area of environmental psychology that offers great opportunities for enhancing service settings' efficiency and effectiveness (Yalch and Spangenberg, 1990). Since retail profitability is determined in part by meeting the three main objectives of optimizing store frequentation, helping customers to have positive shopping experiences and encouraging long-term consumer patronage, ambient cues may be manipulated by retailers to attain these goals when their effects are well defined, detailed, and explained (Donovan et al., 1994; Herrington and Capella, 1994; Spangenberg, Grohmann, and Sprott, 2004).

America's shopping malls attract more than 200 million consumers monthly, have a labor force of more than 17 million workers, and account for almost $2 trillion dollars in annual sales (Lukas, 2004). Given the established positive relationship between perceptions and purchasing behavior (Bellizzi, Crowley, and Hasty, 1983; Yalch and Spangenberg, 1993), fostering favorable inferences by providing consumers with pleasant retail settings is therefore a valuable undertaking for managers.

Thus, the present experiment also provides retailers with important guidelines on ways to improve efficiency and effectiveness. Improving store environments by helping consumers form better evaluations could assist managers in increasing long-term patronage and sales volumes. Achieving such a goal constitutes an undeniable advantage, since it has been reported that it is often hard for marketing practitioners to measure the impact of their location's atmosphere on consumer purchases, or other dependent

variables (Richardson, Jain, and Dick, 1996). Furthermore, as costs of manipulating atmospheric stimuli decrease, their utilization in stores and shopping centers becomes more enticing to retailers (Miller, 1993).

In addition, ambient cues are controllable elements at the point of interaction between the firm and its customers that may influence customer satisfaction, which depends directly on the management and monitoring of individual service encounters (Bitner, 1990). This may be of utmost importance, especially since environmental factors can affect customer evaluations and satisfaction in a service failure context (Bitner, 1990). As reported by Lukas (2004, p. 247) from an interview with Paco Underhill: "Nobody is building malls in North America to serve a new audience; they're building malls to co-opt or steal somebody else's audience."

Lastly, the current research sheds new light on the way male and female shoppers process atmospheric stimuli in a retail setting. As demonstrated by the results of the present experiment, not all combinations of ambient cues positively affect shoppers. Thus, both mall managers and marketers must understand not only the influence of particular elements in the surroundings on consumers, but their relationship to individual characteristics such as gender as well, in order to tailor the experience to their target clientele (Kellaris and Rice, 1993; Ruiz, Chebat, and Hansen, 2004).

D. Future Research Directions

Several studies reported in the literature tend to support the influence of ambient scent and music on consumer emotions, perceptions, and behaviors. The first issue that needs to be addressed in future research is the integration of neuroanatomical research on sensory attributes in conceptual frameworks, model design and hypothesis development (Ehrlichman and Bastone, 1992). Although academic knowledge in this field is still in its infancy, available findings should nonetheless be considered and integrated into within a marketing research context.

In addition, cognitive processes responsible for observed effects of environmental cues' influence in service settings - such as attention, encoding, storage, and retrieval - should be further traced (Engel, Blackwell, and Miniard, 1990; Kellaris and Mantel, 1996); for instance, the level of cognitive involvement, in contrast to its affective counterpart, has been reported to affect music's capacity to influence consumer behavior and should be assessed as well in experimental designs (Park and Young, 1986; Bruner II, 1990). Similar reflections have been made with regards to ambient scent, particularly so when investigating shopper perceptions (Knasko, 1995).

Moreover, practical knowledge of the impacts of background music itself is somewhat limited (Bruner II, 1990). Despite the available literature, academics need to stress the necessity of conducting additional studies on the direct and indirect effects of music's physical characteristics on the shopping experience: shopping time, shopping enjoyment, store evaluations, and so forth. Variables such as the customers' degree of familiarity

with the selected pieces, music enjoyment, and prior mood need to be considered as the most important moderators or predictors to assess; for instance, research on repetition would indicate that music becomes less enjoyable if repetition renders it too familiar to listeners (Bruner II, 1990).

On the other hand, music that highly excites consumers in anxiety situations may lead the latter to experience anger, and as a result, to negatively judge the service setting (Yalch and Spangenberg, 1990). Shoppers' personal preferences and therefore, demographic characteristics of the target clientele like age, income, family life cycle, and education can also ultimately affect their reactions, service evaluations, buying decisions and spending limit (Yalch and Spangenberg, 1990). All constitute factors on which supplementary research is very much needed, given that the selection of music is of great importance.

Furthermore, Spangenberg, Crowley, and Henderson (1996) have suggested various avenues of inquiry on ambient scent, such as the potential interactive effects of ambient odors and product characteristics on perceptions and purchase intentions of the latter, as well as the need to explore a broader range of scents, including offensive odors. They have also highlighted the importance of scent's distinctiveness and its congruency or incongruency with product offerings as subjects of further experimentation (Spangenberg, Crowley, and Henderson, 1996).

In addition, music and scents are not the only environmental cues that compose a store's atmosphere; color, temperature, spatial layout, and lighting are other stimuli with which

music and scents could presumably interact (Turley and Milliman, 2000). Social factors can also play an influential role as well, as they are reported to either be positively or negatively affect consumers' assessments of the setting. For instance, all elements appearing in Bitner's (1992) conceptualization of the servicescape could potentially be combined with the chosen stimuli for different experimental purposes.

Finally, Mattila and Wirtz (2001) have suggested that the notion of gestalt evaluations, aesthetic complementary, the principle of unity-in-variety, as well as ensemble effects and other related theories be extended to customers' perceptions of retail locations. In concurrence with numerous authors in the field of environmental psychology (Berlyne, 1971; Mehrabian and Russell, 1974; Bell, Fisher, and Loomis, 1978; Bitner, 1992), the authors sustain that individuals perceive servicescapes in a holistic fashion; their responses depend on stimuli configuration, that is, on the congruence, fit, or appropriateness of the selected combinations of cues. Such comprehension of the impact of congruence would further theoretical understanding of atmospherics on consumer behavior and retail/service environmental categorization, particularly since the generated interactions can produce unexpected effects (Babin, Chebat, and Michon, 2004; Michon, Chebat, and Turley, 2005).

In conclusion, additional field studies in a variety of retail settings, whether considering the main effects of music and scent or the impact of their congruency, are needed to enhance the validity, reliability and generalizability of results, the diverse nature of service operations often limiting the significance of present findings to similar settings.

VII. Conclusion

Retailers are increasingly investing efforts and resources in integrating environmental stimuli to their commercial venues, in the hopes of appealing to the hedonic aspects of shopping, of revamping their image, and of retaining customers in their establishments. But is it really worth it? The current experiment attempted to assess the interactive effects of ambient music and scent on mall consumers' merchandise quality and global environment perceptions, as well as their influence on actual purchases. In addition, it investigated how gender-based differences intervened in the relationship between atmospheric factors, and the formation of evaluative and behavioral responses.

One of the key findings of this study was that citrus scent had an independent, adverse affect on expenditures, even though the combined impact of the selected ambient cues also significantly affected sales. Contrary to inferences drawn from the available literature, further analyses did not uncover a mediating effect of merchandise quality perceptions and overall assessments of the setting on purchasing behavior.

Moreover, direct relationships could not be established between the independent variables and shopper evaluations, as main and interactive effects of the stimuli failed to reach a significant level. Nevertheless, the results revealed noteworthy gender-based dissimilarities between subjects, such as enhanced reactions to environmental elements from women, and marked preferences for specific cue combinations (matched stimuli for female participants and single factor for male respondents).

As atmospheric planning can make the difference between success and failure in service settings (Bitner, 1990), it undeniably takes on an added importance in retailing decisions, particularly in view of the fact that it remains one of the only ways to differentiate a business from its competitors, as well as to retain market segments (Kotler, 1973; Baker, Levy, and Grewal, 1992; Mattila and Wirtz, 2001). It is therefore essential for marketing practitioners to rely on empirical evidence before integrating stimuli such as music and scent in a retail environment, in order to ensure that the selected manipulations induce the appropriate cognitive and behavioral responses (Baker, Levy, and Grewal, 1992; Herrington and Capella, 1994). In today's reality, the stakes are simply too high.

Bibliography

Alpert, J.I. and Alpert, M.I. (1990). "Music Influences on Mood and Purchase Intentions". *Psychology & Marketing,* 7 (2), 109-133.

Anonymous (1996). "Stores are alive with the sound of music". *Chain Store Age,* 72 (5), 156-158.

Areni, C.S. and Kim, D. (1993). "The Influence of Background Music on Shopping Behavior: Classical versus Top-Forty Music in a Wine Store" in *Advances in Consumer Research,* Vol. 20, L. McAlister and M.L. Rothschild, Eds. Provo, UT: Association for Consumer Research, 336-340.

Babin, B.J. and Attaway, J.S. (2000). "Atmospheric Affect as a Tool for Creating Value and Gaining Share of Customer". *Journal of Business Research,* 49 (2), 91-99.

Babin, B.J., Chebat, J.C., and Michon, R. (2004). "Perceived Appropriateness and its Effect on Quality, Affect, and Behavior". *Journal of Retailing and Consumer Services,* 11 (5), 287-298.

Babin, B.J., Darden, W.R., and Griffin, M. (1992). "Some Comments on the Role of Emotions in Consumer Behavior" in *AMA Educator's Conference Proceedings: Enhancing Knowledge Development in Marketing,* Vol. 3, R.P. Leone and V. Kumar, Eds. Chicago, IL: American Marketing Association, 130-139.

Babin, B.J., Darden, W.R., and Griffin, M. (1994). "Work and/or Fun: Measuring Hedonic and Utilitarian Shopping Value". *Journal of Consumer Research,* 20 (4), 644-656.

Bainbridge, J. (1998). "Scenting opportunities". *Marketing*, (Feb. 19), 36-37.

Baker, J. (1986). "The Role of the Environment in Marketing Services: The Consumer Perspective" in *The Services Challenge: Integrating for Competitive Advantage,* J.A. Czepiel, C.A. Congram and J. Shanahan, Eds. Chicago, IL: American Marketing Association, 79-84.

Baker, J., Grewal, D., and Parasuraman, A. (1994). "The Influence of Store Environment on Quality Inferences and Store Image". *Journal of the Academy of Marketing Science,* 22 (4), 328-339.

Baker, J., Levy, M., and Grewal, D. (1992). "An Experimental Approach to Making Retail Store Environmental Decisions". *Journal of Retailing,* 68 (4), 445-460.

Baron, R.A. (1983). "Sweet Smell of Success? The Impact of Pleasant Artificial Scents on Evaluations of Job Applicants". *Journal of Applied Psychology,* 68 (4), 709-713.

Baron, R.M. and Kenny, D.A. (1986). "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations". *Journal of Personality and Social Psychology,* 51 (6), 1173-1182.

Bell, P.A., Fisher, J.D., and Loomis, R.J. (1978). *Environmental Psychology.* Philadelphia, PA: W.B. Saunders Co.

Bellizzi, J.A., Crowley, A.E., and Hasty, R.W. (1983). "The Effects of Color in Store Design". *Journal of Retailing,* 59 (1), 21-45.

Berlyne, D.E. (1971). *Aesthetics and Psychobiology.* New York: Meredith Corporation.

Berman, B. and Evans, J.R. (1992). *Retail Management: A Strategic Approach.* New York: Macmillan.

Bitner, M.J. (1990). "Evaluating Service Encounters: The Effects of Physical Surroundings and Employee Responses". *Journal of Marketing,* 54 (2), 69-82.

Bitner, M.J. (1992). "Servicescapes: The Impact of Physical Surroundings on Customers and Employees". *Journal of Marketing,* 56 (2), 57-71.

Bloch, P.H., Sherrell, D.L., and Ridgway, N.M. (1986). "Consumer Search: An Extended Framework". *Journal of Consumer Research,* 13 (1), 119-126.

Bone, P.F. and Ellen, P.S. (1994). "Olfaction and Marketing: Does It Make Sense to Use Scents?" Unpublished Working Paper, Morgantown, WV: West Virginia University.

Bone, P.F. and Ellen, P.S. (1999). "Scents in The Marketplace: Explaining a Fraction of Olfaction". *Journal of Retailing,* 75 (2), 243-262.

Bone, P.F. and Jantrania, S. (1992). "Olfaction as a Cue for Product Quality". *Marketing Letters,* 3 (3), 289-296.

Bruner II, G.C. (1990). "Music, Mood, and Marketing". *Journal of Marketing,* 54 (4), 94-104.

Cacioppo, J.T. and Petty, R.E. (1989). "The Elaboration Likelihood Model: The Role of Affect and Affect-Laden Information Processing in Persuasion" in *Cognitive and Affective Responses to Advertising,* A.Tybout and P. Caferata, Eds. Lexington, MA: Lexington Books, 69-89.

Cann, A. and Ross, D.A. (1989). "Olfactory Stimuli as Context Cues in Human Memory". *American Journal of Psychology,* 102 (1), 91-102.

Chebat, J.C., Gélinas-Chebat, C., and Therrien, K. (2005). "Lost in a Mall: The Effects of Gender, Familiarity with the Shopping Mall and the Shopping Values on Shoppers' Wayfinding Processes". *Journal of Business Research,* (Forthcoming).

Chebat, J.C., Gélinas-Chebat, C., and Vaillant, D. (2001). "Environmental Background Music and In-Store Selling". *Journal of Business Research,* 54 (2), 115-123.

Chebat, J.C. and Michon, R. (2003). "Impact of Ambient Odors on Mall Shoppers' Emotions, Cognition, and Spending: A Test of Competitive Causal Theories". *Journal of Business Research,* 56 (7), 529-539.

Darden, W.R., Erdem, O., and Darden, D.K. (1983). "A Comparison and Test of Three Causal Models of Patronage Intentions" in *Patronage Behavior and Retail Management,* W.R. Darden and R.F. Lusch, Eds. New York: North-Holland.

Donovan, R.J. and Rossiter, J.R. (1982). "Store Atmosphere: An Environmental Psychology Approach". *Journal of Retailing,* 58 (1), 34-57.

Donovan, R.J., Rossiter, J.R., Marcoolyn, G., and Nesdale, A. (1994). "Store Atmosphere and Purchasing Behavior". *Journal of Retailing,* 70 (3), 283-294.

Dowling, W.J. and Harwood, D.L. (1986). *Music Cognition.* Orlando, FL: Academic Press.

Dubé, L., Chebat, J.C., and Morin, S. (1995). "The Effects of Background Music on Consumers' Desire to Affiliate in Buyer-Seller Interactions". *Psychology & Marketing,* 12 (4), 305-319.

Dubé, L. and Morin, S. (2001). "Background Music, Pleasure, and Store Evaluation: Intensity Effects and Psychological Mechanisms". *Journal of Business Research,* 54 (2), 107-113.

Ehrlichman, H. and Bastone, L. (1992). "Olfaction and Emotion" in *Science of Olfaction,* M.J. Serby and K.L. Chobor, Eds. New York: Springer-Verlag, 410-438.

Ehrlichman, H. and Halpern, J.N. (1988). "Affect and Memory: Effects of Pleasant and Unpleasant Odors on Retrieval of Happy and Unhappy Memories". *Journal of Personality and Social Psychology,* 55 (5), 769-779.

Ellen, P.S. and Bone, P.F. (1998). "Does It Matter If It Smells? Olfactory Stimuli as Advertising Executional Cues". *Journal of Advertising,* 27 (4), 29-39.

Engel, J.F., Blackwell, R.D., and Miniard, P.W. (1990). *Consumer Behavior.* Hinsdale, IL: The Dryden Press.

Engen, T. (1982). *The Perception of Odors.* New York: Academic Press.

Fisher, J.D. (1974). "Situation-Specific Variables as Determinants of Perceived Environmental Aesthetic Quality and Perceived Crowdedness". *Journal of Research in Personality,* 8, 177-188.

Gardner, M.P. (1985). "Mood States and Consumer Behavior: A Critical Review". *Journal of Consumer Research,* 12 (3), 281-300.

Gardner, M.P. and Siomkos, G.J. (1986). "Toward a Methodology for Assessing Effects of In-Store Atmospherics" in *Advances in Consumer Research,* Vol. 13, R. Lutz, Ed. Provo, UT: Association for Consumer Research, 27-31.

Gorn, G.J. (1982). "The Effects of Music In Advertising On Choice Behavior: A Classical Conditioning Approach". *Journal of Marketing,* 46 (1), 94-101.

Grayston, D. (1974). "Music while you work". *Industrial Management,* 4 (3), 38-39.

Grewal, D. and Baker, J. (1994). "Do Retail Store Environmental Factors Affect Consumers' Price Acceptability? An Empirical Examination". *International Journal of Research in Marketing,* 11 (2), 107-115.

Gulas, C.S. and Bloch, P.H. (1995). "Right Under Our Noses: Ambient Scent and Consumer Responses". *Journal of Business and Psychology,* 10 (1), 87-98.

Gumbs, T. (2000). "Effets combinés de l'odeur ambiante et du tempo musical en tant que variables atmosphériques sur la clientèle d'un centre commercial". M.Sc. in Administration Thesis, Montreal, QC: École des Hautes Études Commerciales.

Heimstra, N.W. and McFarling, L.H. (1974). *Environmental Psychology.* Monterey, CA: Brooks/Cole Publishing Co.

Herrington, J.D. and Capella, L.M. (1994). "Practical Applications of Music in Service Settings". *Journal of Services Marketing,* 8 (3), 50-65.

Hirsch, A.R. (1992). "Nostalgia: A Neuropsychiatric Understanding" in *Advances in Consumer Research,* Vol. 19, J. F. Sherry Jr. and B. Sternthal, Eds. Provo, UT: Association for Consumer Research, 390-395.

Hirsch, A.R. (1995). "Effects of Ambient Odors on Slot-Machine Usage in a Las Vegas Casino". *Psychology & Marketing,* 12 (7), 585-594.

Hirsch, A.R. and Gay, S.E. (1991). "The Effect of Ambient Olfactory Stimuli on the Evaluation of a Common Consumer Product". *Chemical Senses,* 16, 535-51.

Holahan, C.J. (1982). *Environmental Psychology.* New York: Random House, Inc.

Hui, M.K., Dubé, L., and Chebat, J.C. (1997). "The Impact of Music on Consumer's Reactions to Waiting for Services". *Journal of Retailing,* 73 (1), 87-104.

Ittelson, W.H., Proshansky, H.M., Rivlin, L.G., and Winkel, G.H. (1974). *An Introduction to Environmental Psychology.* New York: Holt, Rinehart and Winston, Inc.

Kellaris, J.J. and Kent, R.J. (1991). "Exploring Tempo and Modality Effects on Consumer Responses to Music" in *Advances in Consumer Research,* Vol. 18, R. H. Holman and M. R. Solomon, Eds. Provo, UT: Association for Consumer Research, 243-248.

Kellaris, J.J. and Kent, R.J. (1992). "The Influence of Music on Consumers' Temporal Perceptions: Does Time Fly When You're Having Fun?" *Journal of Consumer Psychology,* 1 (4), 365-376.

Kellaris, J.J. and Mantel, S.P. (1996). "Shaping Time Perceptions with Background Music: The Effect of Congruity and Arousal on Estimates of Ad Durations". *Psychology & Marketing,* 13 (5), 501-515.

Kellaris, J.J. and Rice, R.C. (1993). "The Influence of Tempo, Loudness, and Gender of Listener on Responses to Music". *Psychology & Marketing,* 10 (1), 15-29.

Knasko, S.C. (1992). "Ambient Odor's Effect on Creativity, Mood, and Perceived Health". *Chemical Senses,* 17 (1), 27-35.

Knasko, S.C. (1995). "Pleasant Odors and Congruency: Effects on Approach Behaviors". *Chemical Senses,* 20 (5), 479-487.

Kotler, P. (1973). "Atmospherics as a Marketing Tool". *Journal of Retailing,* 49 (4), 48-64.

Labich, K. (1995). "What it will take to keep people hanging out at the mall". *Fortune,* 131 (10), 102-106.

Laird, D.A. (1932). "How the Consumer Estimates Quality by Subconscious Sensory Impressions". *Journal of Applied Psychology,* 16 (3), 241-246.

Lazarus, R.S. (1991). *Emotion and Adaptation.* New York: Oxford University Press.

Levine, J.M. and McBurney, D.H. (1986). "The Role of Olfaction in Social Perception and Behavior" in *Physical Appearance, Stigma, and Social Behavior: The Ontario Symposium,* C.P. Herman, M.P. Zanna and E.T. Higgins, Eds. Hillsdale, NJ: L. Erlbaum Associates, 179-217.

Lorig, T.S. and Schwartz, G.E. (1988). "Brain and Odor: I. Alteration of Human EEG by Odor Administration". *Psychobiology,* 16 (3), 281-284.

Ludvigson, H.W. and Rottman, T.R. (1989). "Effects of Ambient Odors of Lavender and Cloves on Cognition, Memory, Affect, and Mood". *Chemical Senses,* 14 (4), 525-536.

Lukas, P. (2004). "Our Malls, Ourselves". *Fortune,* 150 (8), 243-249.

MacInnis, D.J. and Park, W.C. (1991). "The Differential Role of Characteristics of Music on High- and Low-Involvement Consumers' Processing of Ads". *Journal of Consumer Research,* 18 (2), 161-173.

Mattila, A.S. and Wirtz, J. (2001). "Congruency of scent and music as a driver of in-store evaluations and behavior". *Journal of Retailing,* 77 (2), 273-289.

McClelland, D.C., Atkinson, J.W., Clark, R.A., and Lowell, E.L. (1953). *The Achievement Motive*. New York: Appleton-Century-Crofts, Inc.

Mehrabian, A. and Russell, J.A. (1974). *An Approach to Environmental Psychology.* Cambridge, MA: MIT Press.

Michon, R., Chebat, J.C., and Turley, L.W. (2005). "Mall Atmospherics: The Interaction Effects of the Mall Environment on Shopping Behavior". *Journal of Business Research,* 58 (5), 576-583.

Miller, C. (1993). "Scent as a marketing tool: Retailers - and even a casino - seek sweet smell of success". *Marketing News,* 27 (2), 1.

Milliman, R.E. (1982). "Using Background Music to Affect the Behavior of Supermarket Shoppers". *Journal of Marketing,* 46 (3), 86-91.

Milliman, R.E. (1986). "The Influence of Background Music on the Behavior of Restaurant Patrons". *Journal of Consumer Research,* 13 (2), 286-289.

Mitchell, D.J., Kahn, B.E., and Knasko, S.C. (1995). "There's Something in the Air: Effects of Congruent or Incongruent Ambient Odor on Consumer Decision Making". *Journal of Consumer Research,* 22 (2), 229-238.

Morrin, M. and Chebat, J.C. (2005). "Person-Place Congruency: The Interactive Effects of Shopper Style and Atmospherics on Consumer Expenditures". *Journal of Service Research,* (Forthcoming).

Morrin, M. and Ratneshwar, S. (2000). "The Impact of Ambient Scent on Evaluation, Attention, and Memory for Familiar and Unfamiliar Brands". *Journal of Business Research,* 49 (2), 157-165.

Morrin, M. and Ratneshwar, S. (2003). "Does It Make Sense to Use Scents to Enhance Brand Memory?" *Journal of Marketing Research,* 40 (1), 10-25.

Nantel, J. and Bédane, J. (1997). "Une analyse du positionnement stratégique du Faubourg de l'Ile". Confidential Report, Montreal, QC: Omer deSerres Commerce Chair, École des Hautes Études Commerciales.

North, A.C. and Hargreaves, D.J. (1997). *The Social Psychology of Music.* Oxford: Oxford University Press.

North, A.C., Hargreaves, D.J., and McKendrick, J. (1999). "The Influence of In-Store Music on Wine Selections". *Journal of Applied Psychology,* 84 (2), 271-276.

Nunnally, J.C. (1978). *Psychometric Theory.* New York: McGraw-Hill.

Olshavsky, R.W. (1985). "Perceived Quality in Consumer Decision Making: An Integrated Theoretical Perspective" in *Perceived Quality: How Consumers View Stores and Merchandise,* J. Jacoby and J.C. Olson, Eds. Lexington, MA: D.C. Heath and Company, 3-29.

Park, W.C. and Young, M.S. (1986). "Consumer Response to Television Commercials: The Impact of Involvement and Background Music on Brand Attitude Formation". *Journal of Marketing Research,* 23 (1), 11-24.

Paz Gamboa, A. (1998). "Effets de l'odeur ambiante en tant que variable atmosphérique sur la clientèle d'un centre commercial". M.Sc. in Administration Thesis, Montreal, QC: École des Hautes Études Commerciales.

Popcorn, F. (1991). *The Popcorn Report.* New York: Harper-Collins Publishers, Inc.

Richardson, J.T.E. and Zucco, G.M. (1989). "Cognition and Olfaction: A Review". *Psychological Bulletin,* 105 (3), 352-360.

Richardson, P., Jain, A.K., and Dick, A. (1996). "The Influence of Store Aesthetics on Evaluation of Private Label Brands". *Journal of Product & Brand Management,* 5 (1), 19-28.

Ruiz, J.P., Chebat, J.C., and Hansen, P. (2004). "Another Trip to the Mall: Psychographic Profiles Revised". *Journal of Retailing and Consumer Services,* 11 (6), 333-350.

Russell, J.A. and Mehrabian, A. (1978). "Approach-Avoidance and Affiliation as Functions of the Emotion-Eliciting Quality of an Environment". *Environment and Behavior,* 10 (3), 355-387.

Russell, J.A. and Pratt, G. (1980). "A Description of the Affective Quality Attributed to Environments". *Journal of Personality and Social Psychology,* 38 (2), 311-322.

Sharma, S., Durand, R.M., and Gur-Arie, O. (1981). "Identification and Analysis of Moderator Variables". *Journal of Marketing Research,* 18 (3), 291-300.

Shostack, G.L. (1977). "Breaking Free from Product Marketing". *Journal of Marketing,* 41 (2), 73-80.

Smith, P.C. and Curnow, R. (1966). ""Arousal Hypothesis" and the Effects of Music on Purchasing Behavior". *Journal of Applied Psychology,* 50 (3), 255-256.

Spangenberg, E.R., Crowley, A.E., and Henderson, P.W. (1996). "Improving the Store Environment: Do Olfactory Cues Affect Evaluations and Behaviors?" *Journal of Marketing,* 60 (2), 67-80.

Spangenberg, E.R., Grohmann, B., and Sprott, D.E. (2004). "It's Beginning to Smell (and Sound) a Lot Like Christmas: The Interactive Effects of Ambient Scent and Music in a Retail Setting". *Journal of Business Research,* (Forthcoming).

Sweeney, J.C. and Wyber, F. (2002). "The Role of Cognitions and Emotions in the Music-Approach-Avoidance Behavior Relationship". *Journal of Services Marketing,* 16 (1), 51-69.

Tauber, E.M. (1972). "Why Do People Shop?" *Journal of Marketing,* 36 (4), 46-49.

Turley, L.W. and Milliman, R.E. (2000). "Atmospheric Effects on Shopping Behavior: A Review of the Experimental Evidence". *Journal of Business Research,* 49 (2), 193-211.

Wajda, T.A. and Hu, M. (2004). "Gender Differences in Cognitive Structure: Preferred Levels of Taxonomic Abstraction", 7th ACR Conference on Gender, Marketing & Consumer Behavior, Madison, WI.

Wakefield, K.L. and Baker, J. (1998). "Excitement at the Mall: Determinants and Effects on Shopping Response". *Journal of Retailing,* 74 (4), 515-539.

Whitley, B.E. (2002). *Principles of Research in Behavioral Science*. New York: McGraw-Hill.

Yalch, R.F. and Spangenberg, E.R. (1988). "An Environmental Psychological Study of Foreground and Background Music as Retail Atmospheric Factors" in *AMA Educator's Conference Proceedings: Efficiency and Effectiveness in Marketing,* No. 54, A.W. Walle, Ed. Chicago, IL: American Marketing Association, 106-110.

Yalch, R.F. and Spangenberg, E.R. (1990). "Effects of Store Music on Shopping Behavior". *Journal of Consumer Marketing,* 7 (2), 55-63.

Yalch, R.F. and Spangenberg, E.R. (1993). "Using Store Music for Retail Zoning: A Field Experiment" in *Advances in Consumer Research,* Vol. 20, L. McAlister and M.L. Rothschild, Eds. Provo, UT: Association for Consumer Research, 632-636.

Zajonc, R.B. and Markus, H. (1984). "Affect and Cognition: The Hard Interface" in *Emotions, Cognition, and Behavior,* C.E. Izard, J. Kagan and R.B. Zajonc, Eds. Cambridge: University Press, 63-103.

Zeithaml, V.A. (1988). "Consumer Perceptions of Price, Quality, and Value: A Means-End Model and Synthesis of Evidence". *Journal of Marketing,* 52 (3), 2-22.

Appendix A - Summary Table of Key Atmospheric Studies

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Cox (1964)	Actual supermarket shoppers	Latin squares	Shelf space Product categories	Sales	Explained the relationship between shelf space and product sales for four products (hominy, baking soda, Tang, and powdered coffee cream). Hominy was the only product that yielded significant increases in sales due to shelf space.
Smith and Curnow (1966)	1,100 Actual supermarket shoppers	Field experiments	Music	Sales Time Rating of loudness	Believed that time in store and sales would be adversely related to "loud" music. Time in store was significantly shorter in the "loud" condition, but total sales were not influenced by music loudness. However, sales per minute increased since customers spent less time in the store.
Kotzan and Evanson (1969)	Actual shoppers	Latin squares	Shelf facing Product type	Sales	Identified the optimal number of shelf facings for four drugstore products. A significant relationship between the number of shelf facings and sales.
Cox (1970)	Actual shoppers	Randomized block design	Shelf space Brand level	Unit sales	There is a significant relationship between shelf space and impulse products. Increasing shelf space for staple brands is not as effective.
Frank and Massey (1970)	Actual shoppers	Field experiment	Shelf rows Shelf level Store volume	Sales	Adding additional shelf rows in high volume stores is generally more effective than changing shelf level.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Curhan (1972)	Actual shoppers	Field experiment	Shelf space	Unit sales	Tested a model that hypothesized that several variables mediated the shelf space-unit sales relationship. Although shelf facing changes only explained 1% of variance, it does have significantly more impact on private brands than it does on national brands.
Curhan (1974)	Actual shoppers	Fractional factorial design	Display space Price advertising Display location	Sales	Tested the effects of the independent variables on four different product categories. Display space was the only variable significant for all four products.
Chevalier (1975)	Actual shoppers	Factorial design	Display price Competitive structure	Unit sales	Display is most effective for mature products, and product differentiation is low. No significant differences between sales increases for deep (12%) and threshold (6%) price cuts. Displays with price cuts are particularly effective.
Woodside and Waddle (1975)	Actual shoppers	Latin squares	Sign price	Units sold	Consumers responded to a point-of-sale advertisement by purchasing more units than they did when a price reduction was utilized. They also found a significant price and advertising interaction.
Grossbart, Mittelstaedt, Curtis, and Rogers (1975)	243 adults	Causal design	Pastoralism Urbanism Environmental adaptation Stimulus seeking Environmental trust Antiquarianism Need for privacy	Physical design Crowding	Tests the relationship between environmental predispositions and atmospherics. The results indicate that pastoralism and need for privacy are positively related to responsiveness to store atmospherics while urbanism, environmental adaptation, stimulus seeking, environmental trust, and age are negatively related.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
McKinnon, Kelly, and Robinson (1981)	Actual shoppers	Randomized block design	Product type Price level Sign type	Sales	Significant interaction between price and sign type. At a regular price, a benefit sign works best. When on sale, a price-only sign or a benefit sign are both effective; however, a benefit sign is more effective.
Patton (1981)	175 female homemakers	2 x 3 factorial design Lab experiment	Product quality Display type	Brand choice	When faced with equal quality, the majority chose brands with the most available information. When quality is unequal, the effects of information decrease. However, "market share" was higher for all products that had more extensive information.
Donovan and Rossiter (1982)	30 graduate business students	Descriptive	Pleasure Arousal Dominance Information rate	Approach-avoidance behavior intentions	Purpose was to test whether approach-avoidance behavior can be predicted from reported PAD emotional sates inside a store and information rate. In pleasant environments, enjoyment, shopping time, and spending increases as arousal increases. Dominance does not appear to strongly influence in-store behavior.
Milliman (1982)	Actual supermarket shoppers	Field experiment	Music tempo	Traffic pace Sales volume Music awareness	Purpose was to test the effect of music and music tempo on traffic pace, sales volume, and music awareness in a supermarket. Music tempo is related to both traffic pace and sales volume but is not related to awareness.
Wilkinson, Mason, and Paksoy (1982)	Actual supermarket shoppers	Field experiment Factorial design	Price Display Advertising	Unit sales	Display and price changes had more effect on sales for the four products studied than advertising. A price x display interaction was also significant for two of the four products.
Bellizzi, Crowley, and Hasty (1983)	125 females	Lab experiment	Colors	Approach behavior Physical attraction Environment and merchandise perceptions	Colors do not influence approach behavior but are associated with physical attraction. The effect of color on perceptions of the environment and merchandise was mixed. People are drawn to warm colors, but they find them to be unpleasant.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Gagnon and Osterhaus (1985)	Actual shoppers	Field experiment	Floor display Type of store-within-store location	Sales	Collected sales data from 24 pharmacies and 24 grocery stores on the effects of pop displays. Pop displays increased sales of ointment by 388% in grocery stores and 107% in pharmacies.
Andrus (1986)	190 patients	Post-test only design	Waiting room Furniture Exam room equipment Office organization Temperature Music	Satisfaction	The purpose was to see whether dental patient satisfaction is influenced by the independent variables. They were not manipulated to test effects on satisfaction. Patients reported that organization exam room equipment, and comfort of waiting room furniture influenced satisfaction. Patients may not have been aware of music and temperature.
Gardner and Siomkos (1986)	80 employees of a major corporation	2 x 2 factorial design	Verbal descriptions Method type (role play and third person)	Ratings Evaluations	Explored the use of an alternative methodology for atmospheric research by using verbal descriptions rather than performing field or laboratory experiments. Findings suggest that verbal descriptions can systematically influence perceptions.
Milliman (1986)	Actual restaurant patrons	Field experiment	Music tempo	Service time Customer time at table Customer groups leaving before seating Amount of food purchased Amount of bar purchases Gross margin	Music tempo influences customer time at table, bar purchases, and gross margin. Music did not influence service time, leaving before being seated, or food purchases.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Bateson and Hui (1987)	30 British MBA students	Descriptive design	Dominance Arousal Pleasure Personal control Crowding Retail store	Approach avoidance	Crowding is perceived as an unpleasant experience in shopping and bank exchanges. Dominance is positively correlated with pleasure and personal control and is negatively correlated with crowding. Arousal was uncorrelated with any other variable.
Yalch and Spangenberg (1988)	86 shoppers	Field experiment	Department shopped Music variation Time shopped Shopper characteristics	Pleasure Arousal Dominance Money spent Music liking	Younger shoppers reported spending more time shopping when background music was played, while older shoppers perceived they spent more time in the store when foreground music was played. Musical conditions had significant effects on arousal but not on pleasure or dominance.
Bawa, Landwehr, and Krishna (1989)	597 coffee buyers	Descriptive design	Brand loyalty Promotion sensitivity Price importance New product trial Store type	Sales UPC scanner information	Consumers shopping in stores with larger assortments tend to be more sensitive to in-store promotions. Special displays work best in stores with larger product assortments and who use in-store promotions most frequently. Brand loyalty is lowest in stores with large assortments and high display activity.
Iyer (1989)	68 panel members	2 x 2 factorial design	Store layout Knowledge Time pressure	Unplanned purchases	Unplanned purchasing behavior is related to knowledge of the store environment and time pressure. Lower knowledge of the store environment influences higher unplanned purchases.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Obermiller and Bitner (1989)	39 undergraduate students	2 x 2 x 4 factorial design in a lab	Atmosphere favorability Involvement Product	Product evaluation	For involved shoppers a favorable atmosphere resulted in lowered evaluations relative to an unfavorable atmosphere. The retail atmosphere should be pleasant, but it should not detract from the merchandise.
Park, Iyer, and Smith (1989)	68 panel members	2 x 2 factorial design	Store layout knowledge Time pressure	Unplanned purchases Brand switching Purchase volume	Both store knowledge and time available for shopping influenced unplanned brand switching and purchase volume. Consumers who shop in the condition of low store knowledge and pressure switch brands due to inability to find their preferred brand.
Ward, Bitner, and Gossett (1989)	15 marketing students	Word associations	Organizations Attitude toward students Work habits Ability/knowledge Personal traits Appearance of office	Specific associations	Examined aspects of professional service environments that communicate information on service delivery. The authors used marketing professors as a service and developed a methodology (SEEM) for attaching meaning to aspects of a service environment.
Bitner (1990)	145 travelers	Factorial design	Organization Explanation Offer to compensate	Disconfirmation Attribution Satisfaction Intended behaviors	Environment influences attributions when service failure occurs. Subjects in the organized travel agency condition were less likely to expect the failure to occur again.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Eroglu and Machleit (1990)	112 adults	Lab experiments	Retail density Shopping motives Perceived risk Time pressure	Crowding perceptions Satisfaction	Density does increase perceptions of creating and task-oriented shopping and greater perceptions of crowding than non task-oriented shoppers perceived risk and the pressure intensify perceptions of mental crowding only in high-density conditions. High mental density and lower pressures lead to reduced satisfaction.
Yalch and Spangenberg (1990)	Actual department store shoppers	Field experiments	Music Age	Mood Impulse behavior Time perceptions Music liking	Customers preferred foreground to background music across age groups. Younger shoppers reported increased time in the store with background music, while older shoppers reacted this way to foreground music. When purposefully shopping, shoppers made fewer impulse purchases with foreground music. Shopping behavior and music have a complex interaction.
Hui and Bateson (1991)	115 British adults	Factorial design	Consumer density Choice Service setting	Perceived choice Perceived control Perceived crowding Pleasure Approach-avoidance	Perceived control can be used to explain the effects of consumer choice and consumer density on the emotional and behavioural outcomes of the service encounter. Choice mediates the influence of density on perceived crowding. This study used slides to represent the environment of a bank and a bar.
Baker, Levy, and Grewal (1992)	147 undergraduate students	Factorial design	Ambient levels Social levels	Willingness to buy Arousal Pleasure	Used videotapes to measure ambient variables (music and lighting) and social levels (retail salespeople) on consumers. Found that social factors influenced arousal and that social x ambiance interaction occurred for pleasure and willingness to buy.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Bateson and Hui (1992)	123 British residents and 92 British railway passengers	Lab experiment and a field quasi-experiment	Density Choice scenario Camera type Actual setting	Perceived control Perceived crowding	The purpose was to test the use of two environmental simulations (photographic slides and videotapes) with actual field perceptions. The authors found that video representations can be used for valuables that lend themselves to visual representation.
Bellizzi and Hite (1992)	70 adult women and 107 undergraduate students	2 x 2 factorial design	Color	Purchase rates Shopping time Purchase intentions Approach-avoidance intentions	Conducted two simulation experiments to test the effects of the store color (blue versus red) to induce feelings or moods and purchase intentions. Consumers react more favourably to a blue environment. Also, the blue store resulted in higher simulated purchase rates. Color effects were more strongly linked to pleasure than they are to arousal and dominance.
Edwards and Shackley (1992)	250 city shoppers	Descriptive	Window display	Sales Recall	Sales increase when window displays are used, particularly for new products. Well-known brand needs are also effective elements of a display window. Recall of window information varies by design and colors used in the display.
Ward, Bitner, and Barnes (1992)	86 undergraduate students	Descriptive correlations	Family resemblance Exterior family resemblance Interior family resemblance Typicality Attitude Frequency of instantiation Market share	Attribute resemblance	Applies family resemblance approach to studying how retail environments are perceived and the relation of these perceptions to typicality. Environmental features are very important in the categorization of retail store. They found that the extensive strongly influences perceptions of the store.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Areni and Kim (1993)	Actual shoppers	Field experiment	Music Gender Customer type Age	Information search Purchase behavior Consumption behavior Time spent shopping	Studied the differing effects of classical and top 40 music on wine shoppers. Classical music resulted in significantly higher sales because "classical music led them to buy more expensive items".
Crowley (1993)	100 females	Lab experiment	Four colors (red, yellow, green, and blue)	Environmental quality scale	Factor analysis of the environmental quality scale produced two color-related factors, an activation dimension and an evaluation dimension. The activation component within subjects' response to color exhibits a U-shaped pattern across wavelengths. Also, the evaluation dimension exhibits an increasingly linear trend as evaluations move from longer to shorter wavelengths.
Chebat, Gélinas-Chebat, and Filiatrault (1993)	427 undergraduate students	2 x 3 factorial design	Visual stimulation Music tempo	Attention level Mood Time estimation	The authors hypothesized that mood and attention mediated the relationship between musical and visual cues and time perceptions. They found that music affects the dependent variables; however, it mainly affected them as a moderator. Music detracts from the effects of visual stimuli in a retail atmosphere.
Yalch and Spangenberg (1993)	Actual shoppers	Field experiments	Music Department Time of week Age Gender Musical preferences	Music perceptions Mood Shopping behavior Merchandise perceptions Store perception	Overall, the effects of the type of music played were negligible. However, music effects tend to vary by the type of shopper and by department. Younger males liked foreground music; older females liked background music.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Akhter, Andrews, and Durvasula (1994)	209 students 160 students	Factorial design	Store favorability Product type	Brand beliefs Brand attitude Brand evaluation Purchase intention	Reports results of two related experiments. Brand-related judgments are more positive when evaluated in a favorable store compared with an unfavorable store. This relationship held across all three products (beer, watches, and TVs), except for purchase intentions of beer, which were not influenced by store favorability.
Areni and Kim (1994)	171 actual shoppers	Field experiment	Customer type Lighting	Number of items examined Number of items handled Shelf level Sampling behavior Amount of time spent Total sales	Lighting influenced number of items examined and handled. A lighting shelf level interaction was significant, but lighting by customer type was not. A main effect for customer type was, however, significant. Brighter stores cause more handling and examination but do not influence sales or time spent in the store.
Baker, Grewal, and Parasuraman (1994)	297 undergraduate students	2 x 2 x 2 factorial design	Ambient factors Design factors Social factors	Merchandise quality Service quality Store image	This study combined several related atmospheric variables together to note the effect of these categories of variables on merchandise quality, service quality, and store image. Ambient and social factors have greater influence than design factors on service and merchandise quality perceptions and on store image.
Donovan, Rossiter, Marcoolyn, and Nesdale (1994)	60 18-35-year-old females	Field study	Pleasure Arousal	Unplanned time Unplanned purchases	Pleasure is significantly associated with extra time and unplanned spending in pleasant atmospheres but not when the atmosphere is unpleasant. Higher arousal reduces unplanned spending in unpleasant atmospheres, but arousal is not significant in pleasant atmospheres.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Gulas and Schewe (1994)	76 supermarket shoppers	Field study	Music style	Time spent shopping Store attributes Emotions Items purchased Amount spent	This study explained age-linked music effects on shopping behavior. Baby boomers reacted stronger by purchasing more in classic rock conditions than older consumers did to big band music. However, 66% of the sample could not recall the music that played when they shopped.
Machleit, Kellaris, and Eroglu (1994)	76 undergraduate students 140 bookstore keepers 232 discount store shoppers	Lab experiment Field experiment Field experiment	Crowding	Perceived crowding Satisfaction Crowding expectations	Tested alternative perceived crowding scales in laboratory and field studies. In a lab situation, the authors found crowding to be negatively related to shopping satisfaction. In the field studies, there was no significant correlation between crowding and satisfaction. The authors concluded that consumers have expectations about the conditions they will face when they go shopping. These expectations may be missing in laboratory experiments.
Pinto and Leonidas (1994)	120 parents of child patients	Descriptive	Cleanliness Parking Convenience Privacy Office condition Size of waiting room Temperature Decorations	Facility satisfaction Overall satisfaction with care provided	This study compares patient attitudes associated with an "old office" and a "new office". Satisfaction with the facility increased, but overall satisfaction with the service did not. However, the subjects were very satisfied with service in the old office, which left little room for improvement.
Wakefield and Blodgett (1994)	Junior and senior students	Lab experiment	Stadium videotapes	Perceived quality Perceived satisfaction Repatronage	The authors examined the servicescape quality-satisfaction repatronage relationship by using videotapes of two major league baseball stadiums. They found that different atmospheres do tend to affect perceptions of quality and satisfaction and future purchase intentions.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Ward and Eaton (1994)	Information not available	2 x 2 factorial design	Quality Decorative style	Emotions Competence Expectations	Decorative style and quality function as a cue to competence in service providers and also to evoke strong emotions in subjects. Different styles of environments, even when both are organized and of high quality, influence attribution of blame for service failure.
Chebat, Gélinas-Chebat, Vaninsky, and Filiatrault (1995)	155 Canadian undergraduate students	Lab experiment	Mood manipulation Pleasure Arousal Dominance	Time estimate Waiting time acceptable Memorization	Mood had no effect on perceptions of waiting time. Pleasure is the component of the mood scale that had the most direct effects on approach-avoidance.
Chebat, Filiatrault, Gélinas-Chebat, and Vaninsky (1995)	162 undergraduate students	Lab experiment	Mood manipulation videos	Pleasure Arousal Dominance Perceived quality Attribution	Respondents were exposed to a waiting video and one of two mock manipulation videos to gauge the effect of waiting attribution on mood and service quality. Mood does not influence the attribution process, but mood and attribution affect perceived quality.
Dubé, Chebat, and Morin (1995)	270 French-Canadian undergraduate students	Lab experiment	Pleasure Arousal	Desire to affiliate Retrospective thought listing	Found main effect and interactive effects of music-induced pleasure and arousal on consumer's desire to affiliate with bank personnel. Music does appear to influence buyer-seller interactions.
Hirsch (1995)	Actual gamblers	Field experiment	Ambient odors	Amount gambled	Tested the effects of two ambient odors on the amount taken in by slot machines in a Las Vegas casino. One odorant significantly increased the amount gambled while the other did not. The effective odorant apparently enhanced the gambling mood of casino patrons.

Citation	Sample	Design	Independent Variables	Dependent Variables	Purpose/Findings
Mitchell, Kahn, and Knasko (1995)	155 university students	Lab experiment	Ambient odor Product type	Memory Information search Choice Variety seeking	Explored the effects of congruent and incongruent odors on purchase behavior. The results indicate that congruent odors increase processing time, holistic processing, self references, and variety-seeking behavior.
Smith and Burns (1996)	380 grocery store shoppers	Field experiment	Power aisle composition	Price perceptions	Increasing the number of SKUs in a power aisle and decreasing the quantity of each item led to the perception of higher prices in that power aisle.
Spangenberg, Crowley, and Henderson (1996)	308 undergraduate students	2 x 3 lab experiment	Scent affect Scent intensity	Evaluations of the store Evaluations of the store environment Evaluations of the merchandise Evaluations of specific products Intentions to visit the store Purchase intentions for specific products Actual versus perceived time spent Number of products examined	The presence or absence of a scent affects both evaluations and in-store behaviors. However, particular scents or scent intensity did not dramatically affect the results. Subjects in scented conditions perceived that they spent less time in store than they actually did, while those in an unscented condition perceived they spent more time in the store than they actually did.
Hui, Dubé, and Chebat (1997)	116 Canadian undergraduate students	Lab experiment	Music	Time estimation Emotional evaluation of the environment Emotional response to waiting Recommendation of the service	Tested the effects of pleasurable and non pleasurable music on the four dependent variables. Their results indicated that music produces significant effects on all four dependent variables and that those effects are moderated by whether consumers like to dislike the music. Pleasurable music produced longer perceived wait duration.

Table 31 - Summary table of key atmospheric studies (Turley and Milliman, 2000, p. 198)

Appendix B - Comparison Table of Environmental Cues Typologies

Kotler (1973)	Baker (1986)	Bitner (1992)	Turley and Milliman (2000)
- Aural dimension - Olfactory dimension - Tactile dimension - Visual dimension	- Ambient factors	- Ambient conditions	- General interior variables
- Tactile dimension - Visual dimension	- Design factors	- Spatial layout and functionality	- Layout and design variables - Point-of-purchase and decoration variables
	- Design factors - Social factors	- Signs, symbols, and artifacts	- Exterior variables - General interior variables - Layout and design variables - Point-of-purchase and decoration variables - Human variables
	- Social factors	*	- Human variables

Table 32 - Table of comparison of environmental variables typologies (Adapted from Gumbs, 2000)

☐ = Categories of typologies into which music and scent figure.

*** N.B.:** It is important to note that Turley and Milliman (2000) added to the previous typologies by including variables that affect not only consumers, but employees as well. Nevertheless, Bitner (1992) recognized that the internal responses of both patrons and service personnel to the environment may have influenced the nature of their interactions.

Appendix C - Mehrabian-Russell Model (1974)

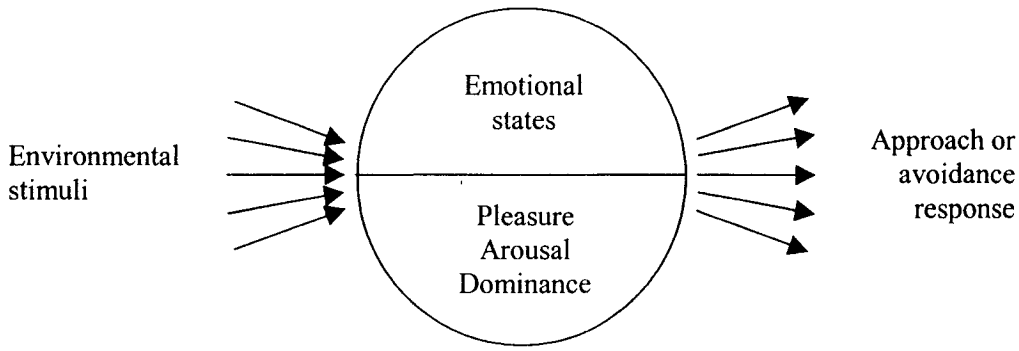

Figure 11 - The Mehrabian-Russell model of environmental influence (Richardson et al., 1996, p. 20)

Appendix D - Aspects of Approach-Avoidance Behaviors

Aspects
1. A desire *physically* to stay in (approach) or to get out (avoid) the environment.
2. A desire or willingness to look around and to *explore* the environment (approach) versus a tendency to avoid moving through or interacting with the environment or a tendency to remain inanimate in the environment (avoidance).
3. A desire or willingness to *communicate* with others in the environment (approach) as opposed to a tendency to avoid interacting with others or to ignore communication attempts from others (avoidance).
4. The degree of enhancement (approach) or hindrance (avoidance) of *performance and satisfaction* with task performances.

Table 33 - Aspects of approach-avoidance behaviors (Donovan and Rossiter, 1982, p. 37)

Appendix E - Structural Framework of Music Effects in a Retail Setting

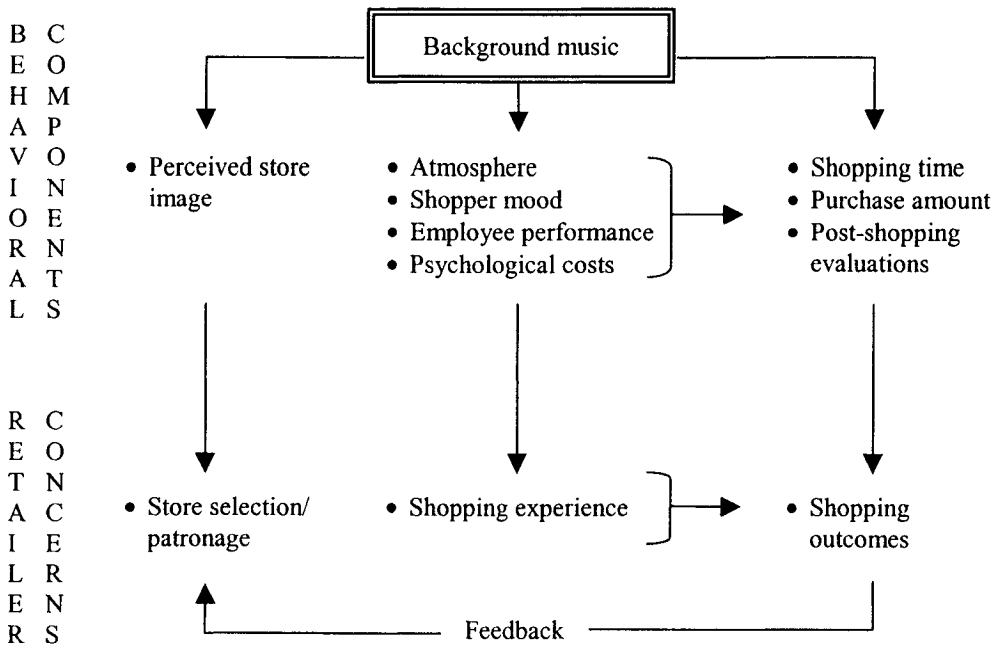

Figure 12 - Structural framework for relationship of music to a retail environment (Herrington and Capella, 1994, p. 51)

Appendix F - Model of Ambient Scent Effects on Consumer Responses

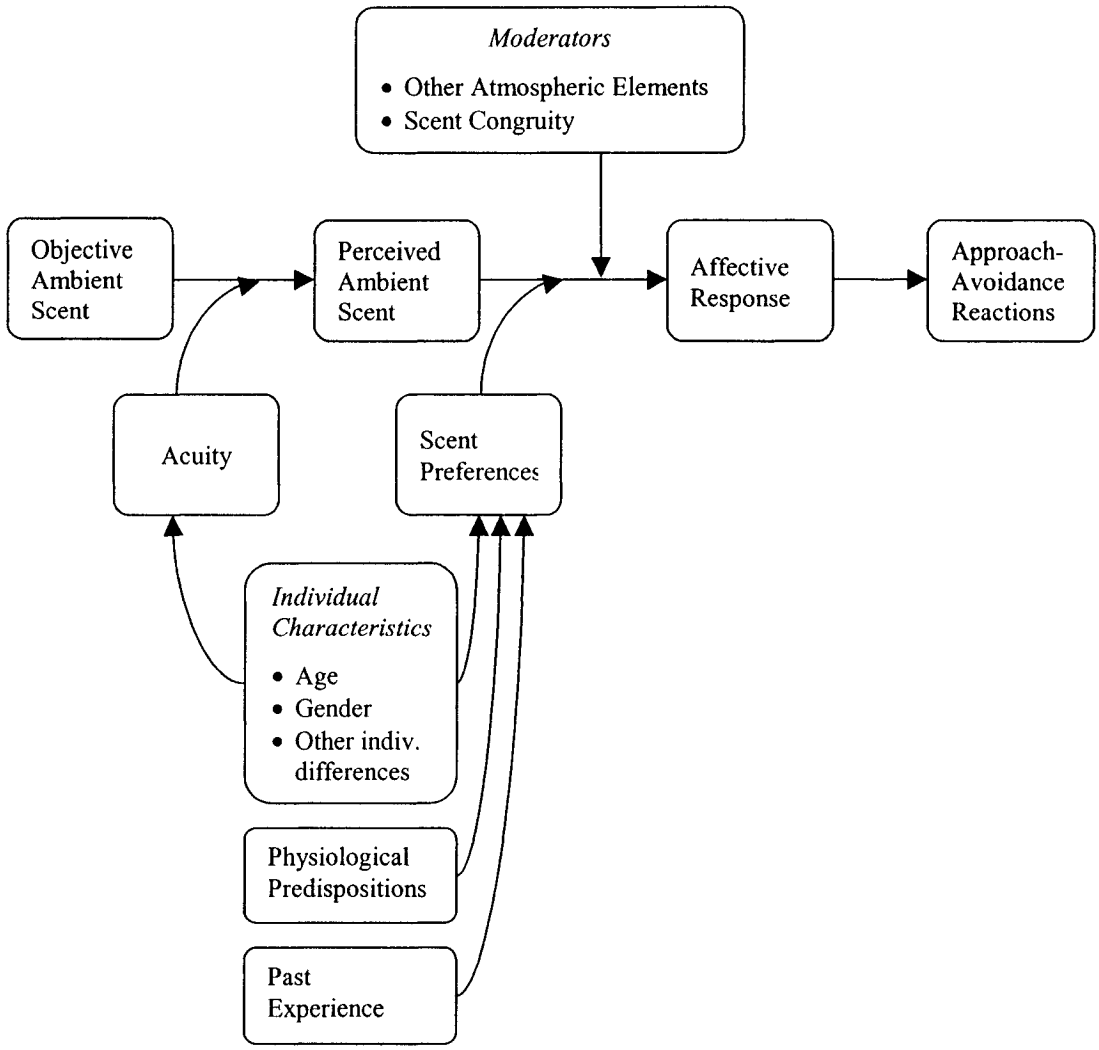

Figure 13 - Proposed model of the influence of ambient scent on consumer responses (Gulas and Bloch, 1995, p. 90)

Appendix G - Basic Factors of Music

Factor	Components	Definition
Time	Rhythm	Pattern of accents given to beats or notes in a song.
	Tempo	Speed or rate at which a rhythm progresses.
	Phrasing	Length of time a note sounds in comparison with the rhythmic period it occupies. For example, a staccato note sounds for only a small part of a bar whereas a legato note may be sustained until the nest note sounds.
Pitch	Melody	Succession of notes occurring over time throughout a song. Changes in melody can be either ascending (up in pitch) or descending (down in pitch). Leaps in pitch are possible, as are repetitions of single notes. Melody is viewed as "horizontal" because it occurs over time.
	Keys	Melodies can be played in a variety of keys, which are referred to by one of the first seven letters of the alphabet plus an indication of sharp or flat.
	Note	Series of notes, arranged in a scale of ascending pitch, which provides the tonal substance of a song. In any given key, several modes are possible; the two best known in contemporary Western culture are the major and the minor modes.
	Harmonies	Harmonies can be consonant or dissonant; the former refers to notes or chords producing an agreeable subjective reaction whereas the latter refers to sounds evoking an unpleasant reaction. Harmonies are viewed as "vertical" because it refers to notes played simultaneously.
Texture	Timbre	Timbre refers to the distinctiveness in tone that makes one instrument sound different from another even if they both play the same melody.
	Orchestration	Orchestration (or instrumentation) is the art of weaving together the unique sonic properties of multiple instruments to produce the complex textural fabric of a musical work.
	Volume	Volume can be used to make one note louder than others around it, to make a passage of notes louder than other passages (dynamics), or to make a whole song louder than others.
	Dynamics	Passages of notes louder than other passages and their alternation.

Table 34 - Basic factors of music (Adapted from Bruner II, 1990)

Appendix H - Emotional Expressions Related to Music Components

Expressions	Definition
Time-related expressions	1. Duple rhythms produce a rigid and controlled expression in comparison with triple rhythm, which is more relaxed or abandoned. 2. The faster the tempo, the more animation and happiness is expressed. 3. Even, rhythmic movement can represent the unimpeded flow of some feeling; dotted, jerky, uneven rhythms produce more complex expressions. 4. Firm rhythms suggest a serious mood whereas smooth-flowing rhythms are more playful. 5. Staccato notes give more emphasis to a passage than legato notes.
Pitch-related expressions	1. "Up" and "down" in pitch not only correspond to up and down in the physical world, but can also imply "out-an-in" as well as "away-and-back" respectively. 2. Rising and falling pitch can convey a growing or diminishing intensity in a given emotional context. 3. Songs in higher keys are generally considered to be happier than songs in lower keys. 4. Music in the major mode expresses more animated and positive feelings than music in the minor mode. 5. Complex harmonies are more agitated and sad than simple harmonies, which are more serene and happy.
Texture-related expressions	1. Loudness can suggest animation or proximity whereas low volume implies tranquility or distance. 2. Crescendo (soft to loud) expresses an increase in force whereas diminuendo (loud to soft) suggests a decrease in power. 3. The timbre of brass instruments conveys a feeling of cold, hard force whereas reed instruments produce a lonely, melancholy expression.

* Based on information given by Cooke (1962) and Zettl (1973).

Table 35 - Emotional expressions ascribed to various components of music (Bruner II, 1990, p. 95)

Appendix I - Ambient Scent Pre-Test Scores

Scent Category	Individual Scent Tested	Number of Subjects	Affective Dimension Score[b]	Activation Dimension Score[c]
Florals:	Lavender[d]	30	-.26	-.09
	Ylang ylang	30	-.31	-.92
	Blue chamomile	26	-.78	.07
	Geranium	25	-.29	.06
Spices:	Cinnamon leaf	27	.17	.03
	Nutmeg	27	-.53	-.15
	Clove buds	26	.53	-.38
	Sage	27	-.32	.00
	Cardamon	25	-.30	.14
	Rosemary	29	-.17	.08
	Marjoram	31	-.33	.21
	Ginger[d]	30	-.62	-.31
Woods:	Juniper berry	26	-.36	.15
	Spruce	29	.16	.04
	Sandalwood	27	.25	-.61
	Cedarwood	27	-.07	-.37
	Birch	26	.66	.24
	Rosewood	23	.29	.16
	Pine	30	-.72	-.27
Citrus:	Lemon	26	1.11	.54
	Tunisian neroli	26	.31	-.15
	Bergamot	23	.17	.70
	Orange[e]	30	.37	.60
Mints:	Peppermint	24	.75	.10
	Pennyroyal	24	-.07	.14
	Spearmint[e]	30	.49	.35

[a] Factor scores are for each scent from principle components factor analysis implementing orthogonal rotation in SPSSPC+.

[b] Scale items representing affect: positive, attractive, relaxed, comfortable, and good.

[c] Scale items representing activation: stimulating, lively, bright, motivating, and interesting.

[d] Scents used in the main study: d = affectively neutral.

[e] Scents used in the main study: e = affectively pleasing.

Table 36 - Pretest olfactory stimuli and factor scores[a] (Spangenberg, Crowley, and Henderson, 1996, p. 72)

Appendix J - Questionnaires

Questionnaire (English)

Date: Condition 1
Time:

---

1. Do you visit this shopping centre?

   Very seldom ① ② ③ ④ ⑤ ⑥ ⑦ Very often

2. What is approximately the total amount of your purchases for today (excluding food)?

   _____

3. State your level of agreement with the following statements:

	Strongly Disagree				Strongly Agree
a) This shopping trip was truly a joy.	①	②	③	④	⑤
b) This shopping trip truly felt like an escape.	①	②	③	④	⑤
c) Compared with other things I could have done, the time spent shopping was truly enjoyable.	①	②	③	④	⑤
d) I enjoyed being immersed in exciting new products.	①	②	③	④	⑤
e) While shopping, I felt a sense of adventure.	①	②	③	④	⑤
f) I accomplished just what I wanted to on this shopping trip.	①	②	③	④	⑤
g) I couldn't buy what I really needed.	①	②	③	④	⑤
h) While shopping, I found just the item(s) I was looking for.	①	②	③	④	⑤

4. Answer "yes" or "no" to the following statements: "Today, during my visit at this shopping centre..."

	Yes	No
a) I walked in the mall for the exercise.	☐	☐
b) I talked with other shoppers met today in the mall.	☐	☐
c) I visited a medical/dental/vision care office in the mall.	☐	☐
d) I completed transactions in a financial institution.	☐	☐
e) I went to a photo shop to have a film developed or to purchase an item.	☐	☐
f) I browsed in a mall store without planning to buy.	☐	☐
g) I bought a snack in the mall.	☐	☐
h) I shopped in a mall store to buy something today.	☐	☐
i) I made unplanned purchases.	☐	☐

5. How would you qualify the style of the products proposed in this shopping centre?

Outdated (1) (2) (3) (4) (5) (6) (7) Up to date

6. Is the product selection of this shopping centre:

Inadequate (1) (2) (3) (4) (5) (6) (7) Adequate

7. The quality of the products available in this shopping centre is rather:

Low (1) (2) (3) (4) (5) (6) (7) High

8. The quality of this shopping centre's services is:

Very poor (1) (2) (3) (4) (5) (6) (7) Excellent

9. My feelings toward this shopping centre's services can best be described as:

Very unsatisfied (1) (2) (3) (4) (5) (6) (7) Very satisfied

10. Up to which point is each one of the following adjectives appropriate with what you perceived today of the environment of this shopping centre:

a)	Tense	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Relaxed
b)	Uncomfortable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Comfortable
c)	Depressing	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Cheerful
d)	Drab	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Colorful
e)	Boring	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Stimulating
f)	Unlively	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Lively
g)	Dull	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Bright
h)	Uninteresting	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Interesting

11. Presently, I feel:

a)	Happy	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Unhappy
b)	Pleased	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Annoyed
c)	Satisfied	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Unsatisfied
d)	Contented	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Melancholic
e)	Stimulated	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Relaxed
f)	Excited	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Calm
g)	Wide-awake	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Sleepy
h)	Aroused	(1)	(2)	(3)	(4)	(5)	(6)	(7)	Unaroused

12. How would you evaluate your reactions:

	Strongly Disagree						Strongly Agree
a) I would avoid returning in this shopping centre.	1	2	3	4	5	6	7
b) This shopping centre is a place where I would easily speak to a salesperson.	1	2	3	4	5	6	7
c) This shopping centre is a place where I might try to avoid talking to a salesperson.	1	2	3	4	5	6	7
d) I like this shopping centre.	1	2	3	4	5	6	7
e) This is a kind of place where I would spend more money than expected.	1	2	3	4	5	6	7

13. In your opinion, these attributes are important:

	Totally Disagree						Totally Agree
a) The shopping centre is located near my home.	1	2	3	4	5	6	7
b) It is easy to get to the shopping centre.	1	2	3	4	5	6	7
c) It is easy to park near the shopping centre.	1	2	3	4	5	6	7
d) This shopping centre is located near my work.	1	2	3	4	5	6	7
e) Finding the products I am looking for is easy in this shopping centre.	1	2	3	4	5	6	7

14. The background music makes shopping in this shopping centre pleasant:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

15. The background music centre in this shopping centre bothered me:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

16. The background music in this shopping centre was appropriate:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

17. The odors smelled make shopping in this shopping centre pleasant:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

18. The odors smelled in this shopping centre bothered me:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

19. The odors smelled in this shopping centre were appropriate:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

20. The decorations make shopping in this shopping centre pleasant:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

21. The decorations in this shopping centre bothered me:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

22. The decorations in this shopping centre were appropriate:

Strongly agree (1) (2) (3) (4) (5) (6) (7) Strongly disagree

23. Globally, what is your evaluation of the shopping centre?

Clearly below my expectations (1) (2) (3) (4) (5) (6) (7) Clearly above my expectations

24. Sex:

☐ Female ☐ Male

25. Age:

☐ 18 to 24 ☐ 25 to 34 ☐ 35 to 44

☐ 45 to 54 ☐ 55 to 64 ☐ 65 and more

26. Marital status:

☐ Married ☐ Single ☐ Other

27. Number of children living at home:

☐ Zero (0) ☐ One (1) ☐ Two (2) ☐ Three or more (3 and +)

28. What level of studies have you completed?

☐ Primary
☐ Secondary
☐ College
☐ University
☐ Do no know / refuse

29. Which of the following situations corresponds best to your main occupation?

☐ Working
☐ Studying
☐ Retired
☐ Unemployed / job seeker
☐ At home

30. In which of the following categories is your family gross income?

☐ Less than 15,000$
☐ From 15,000$ to 29,999$
☐ From 30,000$ to 39,999$
☐ From 40,000$ to 49,999$
☐ From 50,000$ to 59,999$
☐ From 60,000$ to 79,999$
☐ From 80,000$ to 99,999$
☐ 100,000$ and more
☐ Do not know / refuse

31. What is your zip code?

☐☐☐ ☐☐☐

Thank you very much for your patience and your help.

Have a nice day!

Questionnaire (French)

Date :
Heure :

Condition 1

---

1. Fréquentez-vous ce centre commercial ?

   Très rarement (1) (2) (3) (4) (5) (6) (7) Très souvent

2. Pour aujourd'hui, quel est le montant approximatif total de vos achats (en excluant l'alimentation) ?

   _____

3. Indiquez votre degré d'accord avec les énoncés suivants :

	Fortement en désaccord				Fortement en accord
a) Ma dernière visite fut heureuse.	1	2	3	4	5
b) Cette séance de magasinage m'a permis de m'évader de ma routine.	1	2	3	4	5
c) En comparaison avec d'autres activités que j'aurais pu faire, cette séance de magasinage m'a semblée être du temps bien utilisé.	1	2	3	4	5
d) J'aime me retrouver dans un environnement offrant de nouveaux produits.	1	2	3	4	5
e) En magasinant, j'ai ressenti la sensation de l'aventure.	1	2	3	4	5
f) Lors de cette séance de magasinage, j'ai fait ce que je devais faire.	1	2	3	4	5
g) Je n'ai pas pu acheter ce dont j'avais besoin.	1	2	3	4	5
h) En magasinant dans ce centre commercial, j'ai pu acheter les items que je cherchais.	1	2	3	4	5

4. Veuillez répondre par oui ou par non aux énoncés suivants : "Aujourd'hui, lors de ma visite dans ce centre commercial..."

	Oui	Non
a) Je me suis rendu(e) dans le centre commercial pour l'exercice que ça procure.	☐	☐
b) J'ai discuté avec d'autres magasineurs rencontrés à l'intérieur du centre commercial.	☐	☐
c) J'avais un rendez-vous dans une clinique de santé (médecin, dentiste ou optométriste) à l'intérieur du centre commercial.	☐	☐
d) J'ai fait des transactions dans une institution bancaire.	☐	☐
e) J'ai fait développer un film et/ou j'ai acheté quelque chose à un photographe.	☐	☐
f) Je suis entré(e) dans un magasin du centre commercial sans avoir l'intention d'acheter.	☐	☐
g) J'ai pris un casse-croûte dans le centre commercial.	☐	☐
h) J'ai magasiné dans une boutique du centre commercial pour acheter quelque chose.	☐	☐
i) J'ai fait un achat non planifié.	☐	☐

5. Comment évaluez-vous le style des produits proposés dans ce centre commercial ?

Démodé (1) (2) (3) (4) (5) (6) (7) À la mode

6. À votre avis, la sélection des produits dans ce centre commercial est plutôt :

Inadéquate (1) (2) (3) (4) (5) (6) (7) Adéquate

7. Selon vous, la qualité des produits proposés dans ce centre commercial est plutôt :

Mauvaise (1) (2) (3) (4) (5) (6) (7) Bonne

8. La qualité du service dans ce centre commercial est :

Très mauvaise (1) (2) (3) (4) (5) (6) (7) Excellente

9. Mon sentiment vis-à-vis du service offert dans ce centre commercial :

Très insatisfait (1) (2) (3) (4) (5) (6) (7) Très satisfait

10. Jusqu'à quel point chacun des adjectifs suivants correspond à ce que vous avez perçu de l'environnement de ce centre commercial :

a)	Tendu	1	2	3	4	5	6	7	Détendu
b)	Inconfortable	1	2	3	4	5	6	7	Confortable
c)	Déprimant	1	2	3	4	5	6	7	Joyeux
d)	Monotone	1	2	3	4	5	6	7	Coloré
e)	Ennuyant	1	2	3	4	5	6	7	Stimulant
f)	Non animé	1	2	3	4	5	6	7	Animé
g)	Terne	1	2	3	4	5	6	7	Brillant
h)	Inintéressant	1	2	3	4	5	6	7	Intéressant

11. En ce moment, je me sens :

a)	Heureux(se)	1	2	3	4	5	6	7	Malheureux(se)
b)	Réjoui(e)	1	2	3	4	5	6	7	Agacé(e)
c)	Satisfait(e)	1	2	3	4	5	6	7	Insatisfait(e)
d)	Jovial(e)	1	2	3	4	5	6	7	Mélancolique
e)	Stimulé(e)	1	2	3	4	5	6	7	Relaxé(e)
f)	Excité(e)	1	2	3	4	5	6	7	Calme
g)	Réveillé(e)	1	2	3	4	5	6	7	Endormi(e)
h)	Éveillé(e)	1	2	3	4	5	6	7	Non éveillé(e)

12. Pouvez-vous évaluer votre réaction vis-à-vis ce centre commercial?

	Fortement en désaccord						Fortement en accord
a) J'éviterais de revenir dans ce centre commercial.	1	2	3	4	5	6	7
b) Ce centre commercial est un endroit où je pourrais facilement parler à un vendeur.	1	2	3	4	5	6	7
c) Ce centre commercial est un endroit où j'éviterais de parler à un vendeur.	1	2	3	4	5	6	7
d) J'aime ce centre commercial.	1	2	3	4	5	6	7
e) Ceci est le type d'endroit où je pourrais dépenser plus d'argent que je n'avais prévu.	1	2	3	4	5	6	7

13. À vos yeux, les attributs suivants sont-ils importants?

	Fortement en désaccord						Fortement en accord
a) Ce centre commercial est proche de mon lieu de résidence.	1	2	3	4	5	6	7
b) Il est facile d'accéder à ce centre commercial.	1	2	3	4	5	6	7
c) Il est facile de stationner à proximité de ce centre commercial.	1	2	3	4	5	6	7
d) Ce centre commercial se situe à proximité de mon lieu de travail.	1	2	3	4	5	6	7
e) Je trouve facilement les produits que je cherche dans ce centre commercial.	1	2	3	4	5	6	7

14. La musique diffusée dans ce centre commercial rend le magasinage plaisant.

Tout-à-fait d'accord							Pas d'accord du tout
	1	2	3	4	5	6	7

15. La musique diffusée dans ce centre commercial me dérange.

Tout-à-fait d'accord							Pas d'accord du tout
	1	2	3	4	5	6	7

16. La musique diffusée dans ce centre commercial est appropriée.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

17. Les odeurs senties dans ce centre commercial rendent le magasinage plaisant.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

18. Les odeurs senties dans ce centre commercial me dérangent.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

19. Les odeurs senties dans ce centre commercial sont appropriées.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

20. Les décorations de ce centre commercial rendent le magasinage plaisant.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

21. Les décorations de ce centre commercial me dérangent.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

22. Les décorations de ce centre commercial sont appropriées.

Tout-à-fait d'accord	①	②	③	④	⑤	⑥	⑦	Pas d'accord du tout

23. De façon globale, votre évaluation du centre commercial est :

Nettement inférieure à mes attentes	①	②	③	④	⑤	⑥	⑦	Nettement supérieure à mes attentes

24. Sexe :

☐ Femme ☐ Homme

25. Âge :

☐ 18 à 24 ans ☐ 25 à 34 ans ☐ 35 à 44 ans
☐ 45 à 54 ans ☐ 55 à 64 ans ☐ 65 ans et plus

26. État matrimonial :

☐ Marié(e) ☐ Célibataire ☐ Autre

27. Nombre d'enfants habitant à la maison :

☐ Aucun (0) ☐ Un (1) ☐ Deux (2) ☐ Trois et plus (3 et +)

28. Quel est le dernier niveau d'étude que vous avez complété ?

☐ Primaire
☐ Secondaire
☐ Collégial
☐ Universitaire
☐ Ne sais pas / refus

29. Laquelle des situations suivantes correspond le mieux à votre occupation principale ?

☐ Au travail
☐ Aux études
☐ À la retraite
☐ Sans emploi / à la recherche d'un emploi
☐ À la maison

30. Dans laquelle des catégories suivantes se situe le revenu de votre famille avant impôt ?

☐ Moins de 15,000$
☐ De 15,000$ à 29,999$
☐ De 30,000$ à 39,999$
☐ De 40,000$ à 49,999$
☐ De 50,000$ à 59,999$
☐ De 60,000$ à 79,999$
☐ De 80,000$ à 99,999$
☐ 100,000$ et plus
☐ Ne sais pas / refus

31. Quel est votre code postal ?

☐☐☐ ☐☐☐

Nous vous remercions pour votre patience et votre collaboration.

Bonne journée!

Appendix K - Summary Table of Descriptive Statistics

Dependent Variables	Music	Scent	Gender	Mean	Std. Deviation
Perception of Merchandise Quality	No music	No scent	Female	5.570	1.1485
			Male	5.156	1.0830
			Total	5.376	1.1358
		Citrus scent	Female	5.534	1.0080
			Male	5.496	0.8751
			Total	5.520	0.9562
		Total	Female	5.560	1.1098
			Male	5.227	1.0504
			Total	5.411	1.0952
	Slow-tempo music	No scent	Female	5.260	1.0815
			Male	5.444	0.9694
			Total	5.314	1.0491
		Citrus scent	Female	5.613	1.1130
			Male	5.113	1.2789
			Total	5.451	1.1897
		Total	Female	5.487	1.1126
			Male	5.221	1.1923
			Total	5.404	1.1432
	Total	No scent	Female	5.474	1.1355
			Male	5.206	1.0675
			Total	5.360	1.1139
		Citrus scent	Female	5.587	1.0786
			Male	5.258	1.1542
			Total	5.475	1.1144
		Total	Female	5.525	1.1106
			Male	5.225	1.0985
			Total	5.408	1.1149

Dependent Variables	Music	Scent	Gender	Mean	Std. Deviation
Perception of Global Environment	No music	No scent	Female	5.224	1.1483
			Male	4.810	1.2865
			Total	5.030	1.2308
		Citrus scent	Female	5.092	1.4206
			Male	5.115	0.7374
			Total	5.101	1.2047
		Total	Female	5.188	1.2282
			Male	4.874	1.1981
			Total	5.048	1.2236
	Slow-tempo music	No scent	Female	5.012	1.1887
			Male	5.226	0.9368
			Total	5.075	1.1207
		Citrus scent	Female	5.268	1.1553
			Male	4.781	1.2622
			Total	5.111	1.2099
		Total	Female	5.177	1.1714
			Male	4.927	1.1802
			Total	5.098	1.1782
	Total	No scent	Female	5.159	1.1629
			Male	4.883	1.2409
			Total	5.042	1.2032
		Citrus scent	Female	5.211	1.2468
			Male	4.907	1.1023
			Total	5.107	1.2064
		Total	Female	5.182	1.2004
			Male	4.892	1.1905
			Total	5.069	1.2043

Dependent Variables	Music	Scent	Gender	Mean	Std. Deviation
Purchasing Behavior (In dollars spent)	No music	No scent	Female	49.464	59.7219
			Male	48.234	59.2592
			Total	48.888	59.4270
		Citrus scent	Female	49.487	64.3980
			Male	48.556	63.9984
			Total	49.135	63.9768
		Total	Female	49.470	60.9265
			Male	48.301	60.1239
			Total	48.948	60.5098
	Slow-tempo music	No scent	Female	57.744	76.1163
			Male	67.528	71.3352
			Total	60.631	74.5786
		Citrus scent	Female	33.427	34.1213
			Male	25.406	30.8650
			Total	30.835	33.2497
		Total	Female	42.105	54.1782
			Male	39.191	51.6355
			Total	41.192	53.3379
	Total	No scent	Female	52.007	65.1693
			Male	51.589	61.7761
			Total	51.830	63.6849
		Citrus scent	Female	38.617	46.5923
			Male	34.160	47.3676
			Total	37.093	46.8385
		Total	Female	45.983	57.8905
			Male	45.227	57.4822
			Total	45.688	57.6981

Table 37 - Summary table of descriptive statistics for the dependent variables

Dependent Variables	Music	Scent	Gender	Mean	Std. Deviation
Perception of Global Environment	No music	No scent	Female	5.224	1.1483
			Male	4.810	1.2865
			Total	5.030	1.2308
		Citrus scent	Female	5.092	1.4206
			Male	5.115	0.7374
			Total	5.101	1.2047
		Total	Female	5.188	1.2282
			Male	4.874	1.1981
			Total	5.048	1.2236
	Slow-tempo music	No scent	Female	5.012	1.1887
			Male	5.226	0.9368
			Total	5.075	1.1207
		Citrus scent	Female	5.268	1.1553
			Male	4.781	1.2622
			Total	5.111	1.2099
		Total	Female	5.177	1.1714
			Male	4.927	1.1802
			Total	5.098	1.1782
	Total	No scent	Female	5.159	1.1629
			Male	4.883	1.2409
			Total	5.042	1.2032
		Citrus scent	Female	5.211	1.2468
			Male	4.907	1.1023
			Total	5.107	1.2064
		Total	Female	5.182	1.2004
			Male	4.892	1.1905
			Total	5.069	1.2043

Dependent Variables	Music	Scent	Gender	Mean	Std. Deviation
Purchasing Behavior (In dollars spent)	No music	No scent	Female	49.464	59.7219
			Male	48.234	59.2592
			Total	48.888	59.4270
		Citrus scent	Female	49.487	64.3980
			Male	48.556	63.9984
			Total	49.135	63.9768
		Total	Female	49.470	60.9265
			Male	48.301	60.1239
			Total	48.948	60.5098
	Slow-tempo music	No scent	Female	57.744	76.1163
			Male	67.528	71.3352
			Total	60.631	74.5786
		Citrus scent	Female	33.427	34.1213
			Male	25.406	30.8650
			Total	30.835	33.2497
		Total	Female	42.105	54.1782
			Male	39.191	51.6355
			Total	41.192	53.3379
	Total	No scent	Female	52.007	65.1693
			Male	51.589	61.7761
			Total	51.830	63.6849
		Citrus scent	Female	38.617	46.5923
			Male	34.160	47.3676
			Total	37.093	46.8385
		Total	Female	45.983	57.8905
			Male	45.227	57.4822
			Total	45.688	57.6981

Table 36 - Summary table of descriptive statistics for the dependent variables

Appendix L - Mean Differences in Conditions

Experimental Conditions	N	Mean	Std. Deviation	Std. Error Mean
Control Condition	402	47.8532	57.8567	2.8856
Music * Scent	238	31.0346	33.1213	2.1469

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Purchasing Behavior (In dollars spent)	Equal variances assumed	36.418	0.000	4.103	638	0.000	16.8186	4.0987
	Equal variances not assumed			4.676	637.373	0.000	16.8186	3.5967

Appendix M - Mean Gender Differences in the Dependent Variables

CONTROL CONDITION					
Dependent Variables	**Gender**	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Perception of Merchandise Quality	Male	193	5.1088	1.1062	7.962E-02
	Female	235	5.5567	1.1152	7.275E-02
Perception of Global Environment	Male	190	4.8235	1.3159	9.547E-02
	Female	234	5.2025	1.1170	7.302E-02
Purchasing Behavior (In dollars spent)	Male	182	47.7418	58.6011	4.3448
	Female	208	48.4760	58.4709	4.0542

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Diff.**	**Std. Error Diff.**
Perception of Merchandise Quality	Equal variances assumed	0.019	0.890	-4.150	426	0.000	-0.4479	0.1079
	Equal variances not assumed			-4.153	411.219	0.000	-0.4479	0.1079
Perception of Global Environment	Equal variances assumed	3.380	0.067	-3.207	422	0.001	-0.3790	0.1182
	Equal variances not assumed			-3.153	371.650	0.002	-0.3790	0.1202
Purchasing Behavior (In dollars spent)	Equal variances assumed	0.008	0.930	-0.124	388	0.902	-0.7342	5.9410
	Equal variances not assumed			-0.124	380.934	0.902	-0.7342	5.9418

CONDITION 3					
Dependent Variables	**Gender**	**N**	**Mean**	**Std. Deviation**	**Std. Error Mean**
Perception of Merchandise Quality	Male	83	5.1727	1.2476	0.1369
	Female	169	5.5917	1.1250	8.653E-02
Perception of Global Environment	Male	83	4.8604	1.2740	0.1398
	Female	168	5.2509	1.1776	9.086E-02
Purchasing Behavior (In dollars spent)	Male	76	25.0659	30.5462	3.5039
	Female	159	33.6555	34.2083	2.7129

		Levene's Test for Equality of Variances		**t-test for Equality of Means**				
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Diff.**	**Std. Error Diff.**
Perception of Merchandise Quality	Equal variances assumed	1.628	0.203	-2.680	250	0.008	-0.4190	0.1564
	Equal variances not assumed			-2.587	148.966	0.011	-0.4190	0.1620
Perception of Global Environment	Equal variances assumed	0.224	0.636	-2.405	249	0.017	-0.3905	0.1624
	Equal variances not assumed			-2.342	152.492	0.020	-0.3905	0.1668
Purchasing Behavior (In dollars spent)	Equal variances assumed	1.564	0.212	-1.862	233	0.064	-8.5896	4.6122
	Equal variances not assumed			-1.938	163.912	0.054	-8.5896	4.4314

Table 39 - Independent samples test: Mean gender differences in the dependent variables within conditions