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Congruency of scent and music as a driver of in-store evaluations and behavior

Anna S. Mattila^a, Jochen Wirtz^{b,*}

^a*The School of Hotel, Restaurant and Recreation Management, The Pennsylvania State University, 201 Mather Building, University Park, PA 16802-1307, USA*

^b*The NUS Business School, National University of Singapore, 17 Law Link, Singapore 117591*

Abstract

Retailers have long understood the importance of store environment in enhancing the shopping experience, and past research has examined the main effects of many pleasant ambient stimuli such as music and scent. To further our theoretical understanding, we extend the notion of Gestalt to consumers' perceptions of retail environments and demonstrated that consumers perceive Servicescapes holistically. Specifically, we suggest that the arousing quality of ambient stimuli is one dimension along which holistic evaluations occur, and that pleasant ambient stimuli are perceived more positively when their arousing qualities match rather than mismatch.

We manipulated scent and music in a 3 (no music, pleasant low arousal and high arousal music) by 3 (no scent, pleasant low and high arousal scents) factorial design in a field setting. Our findings show that when ambient scent and music are congruent with each other in terms of their arousing qualities, consumers rate the environment significantly more positive, exhibit higher levels of approach and impulse buying behaviors, and experience enhanced satisfaction than when these environmental cues were at odds with each other. © 2001 by New York University. All rights reserved.

1. Introduction

The notion that atmospherics influence consumer behavior is widely accepted in the marketing literature, yet theory development is clearly limited in this area (Turley & Milliman, 2000). Past studies have examined the effects of individual pleasant stimuli such as music, color or scent on consumer behavior, but have failed to examine how these stimuli

* Corresponding author. Tel.: +1-814-863-5757; fax: +1-814-863-4257.

E-mail addresses: asm6@psu.edu (A.S. Mattila), fbawirtz@nus.edu.sg (J. Wirtz).

might interact. Consequently, little is known about the effects of global configurations of aspects of the environment (Wakefield & Baker, 1998). To further our theoretical understanding of atmospherics on consumer behavior, we extend the notion of Gestalt to consumers' perceptions of retail environments. We argue that consumers perceive Servicescapes holistically and that consumer responses to a physical environment depend on ensemble effects (configurations). Specifically, we suggest that the arousing quality of stimuli in a Servicescape is one dimension that effects this holistic evaluation. We test this proposition using two pleasant ambient cues: scent and music. We suggest that to maximize these holistic effects, consumers need to perceive the arousing qualities of music (fast or slow tempo) to be coherent with those of the scent (stimulating or relaxing) present in a Servicescape. Matching ambient stimuli might lead to higher evaluations of the store environment, more positive behavioral responses and higher satisfaction levels and than mismatching.

2. Conceptual background

The literature review will first provide a brief overview of environmental psychology with a focus on Mehrabian and Russell's (1974) work, gestalt evaluations, and Bitner's Servicescapes, followed by a summary of olfaction and music research.

2.1. *Environmental psychology, gestalt evaluations and servicescapes*

Mehrabian and Russell (1974) presented a theoretical model for studying the effects of the physical environment on human behavior. In this model, emotional states are posited as significant mediators between environmental stimuli and people's behavior. Applying the Mehrabian and Russell model to a retail environment, Donovan and Rossiter (1982) showed that two dimensions of affect, namely pleasure and arousal, could predict customer behavior in retail settings. The pleasure-displeasure dimension reflects the degree, to which a person feels happy, joyful, good or satisfied with the situation, whereas the arousal-nonarousal dimension taps the degree to which a person feels alert, excited, stimulated or active in the situation. Donovan et al. (1994) found that pleasant environments contributed to extra time and unplanned shopping. The results from Wakefield and Baker's (1998) field study of shopping malls indicate that environmental factors (design, music, mall layout and decor) are positively related to excitement and/or desire to stay at the mall.

Arousal intensity is an important dimension of Servicescapes. In Sherman et al.'s (1997) study both pleasure and arousal had a positive impact on money spent, whereas time spent in the store was solely influenced by the consumer's arousal level. Baker et al. (1992) also found that consumers stay longer in stores, which are high in arousing qualities probably as they are perceived as more interesting. In their study, music and lighting were combined as a single ambient factor, thus inhibiting an examination of the interaction effects between two ambient stimuli. Wirtz and Mattila (2000) showed that affective expectations might drive consumers' approach behaviors and satisfaction in a restaurant setting, again emphasizing the role of arousal in determining consumers' perceptions of Servicescapes.

Research in environmental psychology postulates that people respond to their environ-

ments holistically. That is, though individual persons perceive discrete stimuli, it is the total configuration of stimuli that determines their responses to the environment (e.g., Holahan, 1982). In consumer research, Bell et al. (1991) introduced the concept of esthetic complementary to advance our understanding of product evaluations. As noted by Holbrook (1986), an image possesses a cue configuration when components of the image interact in mutually reinforcing manner.

This concept of esthetic complementary is strikingly similar to the principle of unity-in-variety developed by philosophers of art (Beardsley, 1981) and extended by consumer researchers (e.g., Holbrook and Zirlin, 1985). Some consumer objects, furniture or clothing for example, are more likely to be paired, whereas other combinations are avoided by many consumers due to their lack of unity-in-variety. In their model of preferences for product styles, Bell et al. (1991) included an ensemble effect, which was intended to measure how the product styles hang together as a combination or configuration. Solomon (1983) postulates that consumers look to the total collection of cues in the environment to decode meanings and to structure their behavior accordingly. The findings of Green, Wind and Jain (1972) suggest that consumers expect certain patterns of products to go together. In other words, satisfaction with a given product is partly a function of its overall *goodness of fit*.

This holistic perspective is also embedded in Bitner's (Bitner, 1992) conceptualization of Servicescapes. If the environment is perceived as a whole, while specific arousing dimensions from environmental stimuli can be sensed by the individual, then different combinations of ambient cues might produce differential responses. In this study, we focused on the matching or mismatching of arousing qualities between pleasant ambient scent and background music. The olfaction literature will be discussed next.

2.2. Olfaction research

Researchers have generally differentiated scents along three different, although not necessarily independent dimensions (Spangenberg et al., 1996). They include the affective quality of the scent (e.g., how pleasant it is), its arousing nature (e.g., how likely it is to evoke a physiological response), and its intensity (e.g., how strong it is). Although scents can affect arousal levels (e.g., Lorig and Schwartz, 1988), to our knowledge, no prior research has investigated the arousing nature of a scent independent of its affective quality. Furthermore, prior studies have failed to explicitly measure scent presence effects on approach and avoidance behaviors (for a recent review on olfaction research see Bone & Ellen, 1999).

Ambient scent is to be distinguished from nonambient scent. Ambient scent refers to scent that does not originate from any particular object but is present in the environment. Research on ambient scent has been less common (Bone & Ellen, 1994; Gulas & Bloch, 1995), but may be of greater interest to retailers and other service providers than product-specific scents. Ambient scent could affect perceptions of the store and its products, including those products that are difficult to scent (e.g., office supplies and furniture, Gulas & Bloch, 1995).

Scholarly research on the effects of ambient scent has been limited. A notable exception is Spangenberg et al.'s 1996 study, which examined the impact of ambient scents in a simulated retail environment. The findings indicated that subjects had more positive evaluations and behaviors in the scented rather than the unscented environment. Unexpectedly, the

type of scent did not matter, as even effectively neutral scents were able to generate enhanced perceptions. Furthermore, the intensity of the scent (within a reasonable range) failed to have an impact on the results. Two other empirical studies have examined the effects of ambient scent in a consumer behavior context. In the first study, subjects spent more time on a catalog-shopping task in scented than in unscented rooms (Bone and Ellen, 1994). The second study found that gamblers spent more money on slot machines when the casino was pleasantly scented than when it was not (Hirsch, 1995).

Research on cue congruency, or whether a scent is perceived as appropriate in a particular context, has produced mixed results. Scents that are inconsistent with the product tend to have a negative effect on product or ad evaluations (Mitchell, Kahn & Knasko, 1995; Ellen & Bone, 1999). However, only Bone and Jantrania's (1992) study provides direct support for a positive impact of cue congruency. In their investigation, adding a consistent scent enhanced consumers' evaluations of household cleansers and suntan lotions.

Gulas and Bloch (1995) developed a conceptual model portraying ambient scent as an environmental cue that influences emotional responses and ultimately shopping behaviors. Similar to Mehrabian and Russell's framework, we posit in this model that scent influences consumer' perceptions of pleasure and arousal, which in turn affect behavioral responses to the environment. Following a better understanding of the effects of ambient scent on human responses and behaviors, we turn our attention to another environmental stimulus, music.

2.3. *Music research*

Aside from the obvious commercial issues, the role of music in consumer research is of considerable theoretical interest (North and Hargreaves, 1998). Music is capable of evoking complex affective and behavioral responses in consumers. Bruner (1990) suggests that any musical composition is composed of at least three primary dimensions: a physical dimension (volume, pitch, tempo, rhythm), an emotional tone, and a preferential dimension (the degree to which a shopper likes the music). Although the impact of music on consumer emotions and shopping behavior has attracted considerable attention among marketing researchers, empirical evidence of the impact of the physical characteristics of music is mixed (Herrington & Capella, 1994). The present brief review of music literature is limited to areas tangent to our research questions.

Prior research has shown that music can affect consumer behavior in retail environments (e.g., Milliman, 1982, 1986; Yalch & Spangenberg, 1990) and influence their desire to affiliate in buyer-seller interactions (Dubé et al., 1995). Milliman (1982, 1986) conducted two separate experiments where he manipulated music tempo, one in a supermarket and the other in a restaurant. In the first study (1982), shoppers spent more time and money in a slow tempo retail environment. In the second study (1986) customers in the slow music condition took more time to eat their meals compared to those in the fast-music condition. Beverage revenue was also higher in the slow-music condition.

Yalch and Spangenberg (1988) conducted research that builds on the Milliman studies. In a department store setting, they compared the effects of foreground music (Top 40), and background music (instrumental *easy-listening*), to a no music control group. In that study, younger shoppers (under 25) thought that they had spent more time shopping in the easy

listening condition, whereas older shoppers perceived that they had shopped longer when Top 40 music was being played. The authors concluded that encountering atypical environmental factors (e.g., unfamiliar music) might adversely influence consumers' time perceptions. In North and Hargreaves (1998) study, different musical styles (easy listening, classical, pop or silence) exhibited a significant influence on the students' perceptions of a school cafeteria.

Dubé et al.'s (Dubé, 1995) study investigated the effect of music-induced pleasure and arousal on consumers' affiliation behaviors in a banking context. Their results indicated that music-induced pleasure and arousal might have independent effects on consumers' desire to affiliate in a buyer-seller interaction, with more desire to affiliate associated with more pleasure and more arousal. As further evidence of arousal effects, Vanderark and Ely (1993) report that high tempo and high rhythmic content in the music led to an increase in physiological arousal among consumers.

To summarize, we find that many prior studies have examined store atmosphere on a global level (e.g., Baker et al. 1992; Sherman et al. 1997) and investigated single elements of the environments (e.g., Milliman, 1986; Spangenberg et al., 1996). However, previous work has failed to consider how different elements in the same store environment might interact to produce holistic perceptions of the entire Servicescape. The next logical step, advanced in the present study, is to examine the combined effects of various environmental cues on consumers' store-induced emotions, and behaviors.

3. Hypothesis development

Optimal arousal theory suggests that minor changes in the environment, such as adding a low level of scent or playing background music, increases the environment's perceived novelty and pleasantness (Berlyne, 1971; McClelland et al., 1953). Consequently, we expect that adding either a pleasant scent or pleasant background music to the retail environment should enhance the perceived positive state of the store environment, including the amount of pleasure associated with it. In the context of environmental psychology, the original response taxonomy employed by Mehrabian and Russell (1974), was approach-avoidance behaviors. However, in a service/retail experience, the response taxonomy includes satisfaction judgments (Wirtz & Bateson, 1999). Because impulse buying is an aspect of shopper behavior with potentially important managerial implications (e.g., Beatty & Ferrell, 1998), we included a measure for unplanned purchases in our battery of questions. Combining these evaluative and behavioral responses, we expect that the presence of pleasant ambient scent or background music will increase customer evaluations of the positive state of the store environment, impulse buying and approach behaviors, and customer satisfaction with the service encounter. Because these main or similar main effects have been reported in prior studies, our formal hypotheses are limited to the interaction effects of ambient scent and background music

Because incongruent environmental cues tend to result in lower perceived unity or less coherent ensemble effects (Bell et al., 1991), we suggest that mismatched environmental stimuli might lower customer perceptions of the entire shopping experience. More

specifically, we propose that when the arousal qualities of two ambient cues match [that is, high (low) arousal scent and high (low) arousal music], this stimulus congruency should lead to an enhanced perception of the Servicescape. Conversely, incongruence between the ambient factors [that is, high (low) arousal scent and low (high) arousal music] should have an adverse impact on consumer perceptions of the environment, including approach and impulse buying behaviors, and satisfaction. Consequently, we propose the following:

H₁: Matching arousing dimensions of scent and music (i.e., high/high or low/low arousal conditions) will lead to enhanced a) pleasure, b) approach, c) perceived positivity of the store environment, d) impulse buying and e) satisfaction, compared to mismatch conditions (i.e., high/low or low/high).

4. Research methodology

4.1. Research design and stimulus selection

A 3 (no scent/low arousal scent/high arousal scent) x 3 (no music/low arousal music/high arousal music) fractional, factorial design in a field setting was employed to test the hypotheses. A gift shop served as the context of the study.

Lacking theoretical guidance on scent selection in consumer behavior literature, we turned to essential oil reference books (e.g., Gill, 1996). The scents used in our study were selected based on two criteria: the mood effects and cautionary effects. Taking into account these factors, the two scents chosen for this study were Lavender and Grapefruit. Both these scents smell pleasant, are suitable for use in a retail store, possess mood effects while lacking side effects. Lavender is known to be a relaxing scent with calming properties, thus being considered as a low arousal scent (Butcher, 1998). Conversely, Grapefruit is known to be a stimulating scent, which can refresh, revive and improve mental clarity and alertness, and even enhance physical strength and energy. These characteristics of the Grapefruit scent are well suited for a high arousal manipulation employed in this study. In the remainder of the paper, Lavender will be referred to as a low arousal scent and Grapefruit as a high arousal scent.

As Bruner (1990) states, “music is not simply a generic sonic mass, but rather a complex chemistry of . . . elements” (p. 94). Music is composed of multiple time-, pitch- and texture-related variables (Dowling & Harwood, 1986). To reduce the confounding effects of musical style and musical preference, classical music was selected for this study. Two compact discs from the Tune Your Brain™ series by Elizabeth Miles, an ethnomusicologist, were chosen as stimuli for the music manipulations. The low arousal music used for the study was the *Relaxing* collection, featuring slow-tempo music, while the high arousal music consisted of the *Energizing* collection, featuring fast-tempo music. In the rest of the discussion, the two types of music will be referred to as either low or high arousal music.

4.2. *Experimental procedures*

The study was conducted in three shifts over fourteen consecutive days at the chosen retail outlet. The three shifts were morning shift 10.30 a.m. to 12.30 p.m., early afternoon shift from 2.00 p.m. to 4.00 p.m., and late afternoon shift from 5.00 p.m. to 7.00 p.m. The experimental conditions for a total of 42 shifts were randomized. Four ceramic diffusers were placed at strategic locations in the store: two near the entrance of the store, and the other two at each corner of the room opposite the entrance of the store. The store was scented for 15 min before three independent passersby were asked to enter the store and perform a smell check. The study proceeded only when the three *judges* found the scent to be of appropriate intensity. Music was played through the store's piped-in sound system using an auto-reverse CD player. The respondents were randomly selected from the customers leaving the store.

4.3. *Pretesting of questionnaire and measures*

A pilot survey was conducted on a sample of 30 respondents in the actual store environment. The results from the pilot test were used to adjust the scent intensity, and the music volume. In addition, feedback from the pretest sample was incorporated into the wording of the questions and the survey layout.

4.3.1. *Emotional and behavioral responses*

Mehrabian and Russell's (1974) twelve-item semantic differential scale was employed to measure emotional responses to the environment. Six item pairs measured the arousal dimension of emotions (e.g., stimulated –relaxed, calm –excited, dull –jittery), whereas the other six items tapped into the pleasure dimensions (e.g., unhappy –happy, despairing –hopeful, melancholic –contented, annoyed –pleased). An eight-item seven-point Likert-type scale was used to assess the approach-avoidance behavioral responses to the physical environment (see Donovan & Rossiter, 1982). The items measuring approach-avoidance behaviors tapped the following behaviors: enjoyment, return intention, propensity to talk to strangers, to spend more money than originally thought, to explore the store, and to avoid other people. In addition, we measured the extent of impulse buying using a single item, seven-point, Likert scale that is, I bought more than what I had planned to buy.

4.3.2. *Overall evaluations*

Fisher's (Fisher, 1974) environmental quality scale was adapted to measure the subjects' evaluation of the store environment. Pretesting of the instrument, however, indicated that six of the items were perceived as vague or not related to a retail context. Consequently, a seven-item scale was used to obtain the respondent's evaluation of the store environment (unattractive/attractive; uninteresting/interesting; bad/good; depressing/cheerful; dull/bright; uncomfortable/comfortable and pleasant/unpleasant).

Overall satisfaction with the shopping experience was measured with three 7-point Likert scale items (strongly disagree to strongly agree) taken from Westbrook and Oliver (1981). They were, *truly enjoyed coming to the store*, *satisfied with the store*, and *choice to come to the store was a good one*.

Table 1
Reliability Tests of all Multi-Item Measures (N = 247)

Construct	Indicator Variables and Treatment	Alpha (α)
Arousal	6-item scale from Mehrabian and Russell's (1974) semantic differential scale of emotional situations and environments (arousal).	0.83
Pleasure	6-item scale from Mehrabian and Russell's (1974) semantic differential scale of emotional situations and environments (pleasure).	0.89
Approach-Avoidance	8-item verbal measures of approach-avoidance from Donovan and Rossiter's (1982) adaptation of the original Mehrabian and Russell scale (1974).	0.78
Store environment	7-item environmental scale adapted from Fisher (1974)	0.92
Satisfaction	3-item satisfaction scale taken from Westbrook and Oliver (1981).	0.72

4.3.3. Manipulation checks

As a manipulation check, respondents rated the following statements on a 7-point Likert scale (1 to 7: strongly disagree/strongly agree): 1) the store smelled pleasant of grapefruit, 2) the store smelled pleasant of lavender, 3) the fast-tempo music played at the store was pleasant and 4) the slow-tempo music played at the store was pleasant. The checks were placed at the end of the questionnaire so as to avoid demand effects when answering questions related to the dependent measures.

5. Data analysis

5.1. Sample characteristics and scale reliabilities

A total of 343 customers were asked to participate in the survey. Of those approached, 270 agreed to be interviewed, yielding a response rate of 78.7%. Twenty-three questionnaires were rejected due to incomplete data, thus resulting in an effective response rate of 72.0%. Nearly 75% of the respondents were female, and close to 65% were young people less than 20 years old. Taken together, these sample characteristics closely match the retail store's primary target markets. Sixty two percentage of the respondents reported having purchased something during their visit to the store.

As indicated in Table 1, all measures used in this study displayed acceptable reliability of more than 0.70.

A χ^2 test was conducted to test for random assignment of respondents to the experimental conditions. χ^2 tests were performed on each of the demographic variables with the scent condition and the music condition to ensure that subject allocation to experimental conditions was indeed random. The results of the χ^2 tests for all the demographic variables across scent and music conditions showed that all measured demographic variables were independent of

Table 2
Means of Manipulation Check for Ambient Scent

Manipulation check question	Experimental condition		
	No Scent	Lavender (low arousal scent)	Grapefruit (high arousal scent)
The store smells pleasant of lavender (low arousal scent); (F = 50.37, p < .001)**.	4.1*	5.4	2.8
The store smells pleasant of grapefruit (high arousal scent); (F = 36.3, p < .001).	3.8	3.1	5.4

Note: *) strongly disagree; 7 = strongly agree; 'Don't know' responses were excluded from the analysis.

***) The F-values show the results of two two-factor ANOVAs for the scent and music manipulations; no other main or interaction effect reached significance.

the manipulations (none of the tests reached significance at $p < .05$). Hence, we can conclude that the subject allocation to the experimental conditions was random.

5.2. Manipulation checks

The mean scores of the experimental conditions for each of the four manipulation check questions are presented in Table 2 for scent and Table 3 for music. Only the scent main effect is significant for the scent related questions. Similarly, only the music main effect is observable for the music-related manipulation checks. Overall, the results from these manipulation checks indicate that the ambient conditions were perceived as intended.

To ensure that the subjects' self-reported arousal levels differed between the nine experimental conditions, a two-factor ANOVA was performed. As expected, the main effects for scent and music are significant. The interaction effect is insignificant. The cell means shown in Table 4 indicate that the no scent and no music conditions were perceived as less arousing

Table 3
Means of Manipulation Check for Background Music

Manipulation check question	Experimental condition		
	No Music	Slow (low arousal music)	Fast (high arousal music)
The slow-tempo music (low arousal music) played at the store was pleasant; (F = 94.3, p < .001)**.	3.7*	5.7	2.6
The fast-tempo music (high arousal music) played at the store was pleasant; (F = 58.6, p < 001).	3.6	2.9	5.5

*1 = strongly disagree; 7 = strongly agree; 'Don't know' responses were excluded from the analysis.

***) The F-values show the results of two two-factor ANOVAs for the scent and music manipulations; no other main or interaction effect reached significance.

Table 4
Cell Means for Arousal by Scent and by Music Experimental Conditions

Experimental Conditions	No Music	Low Arousal Music	High Arousal Music	Main Effect Means
No Scent	3.70	4.51	4.85	4.36
Low Arousal Scent	3.94	4.79	5.21	4.65
High Arousal Scent	4.27	4.85	5.45	4.86
Main Effect Means	3.97	4.72	5.17	4.62

Note: The two main effects are significant (music: $F = 4.46$, $p < .05$; scent: $F = 26.26$, $p < .01$). The interaction effect is insignificant.

than the experimentally manipulated environments. The planned contrasts between no scent and low arousal scent is marginally significant ($p = .07$), and the planned comparison between no scent and high arousal scent is significant ($p < .01$). Similarly, the planned contrasts for the no music and slow/fast tempo music are significant, $p < .001$ for both contrasts. These results suggest that the arousal manipulation was successful.

5.3. Hypothesis testing

The cell means on our dependent variables as a function of the scent and music manipulations are shown in Table 5, and are plotted in Fig. 1. As expected, the scent main effect is significant for approach behavior ($F=3.15$, $p < .05$), and store environment ($F=3.40$, $p < .05$), and marginally significant for pleasure ($F=2.37$, $p = .09$) and satisfaction ($F=2.91$, $p = .06$). For music, the main effect is significant for pleasure ($F=10.20$, $p < .001$), approach behavior ($F=10.29$, $p < .001$), positive state evaluation of the store environment ($F=8.69$, $p < .001$) and satisfaction ($F=7.95$, $p < .001$). However, neither of the main effects is significant for impulse buying ($F=1.05$, $p > .10$ for scent, and $F=0.76$, $p > .10$ for music). The insignificant results may have been due to an interaction effect discussed below.

The cell means plotted in Fig. 1 show that pleasure, approach behavior, consumer evaluations of the store environment, impulse buying, and satisfaction are influenced by the congruency between music and scent in terms of their arousal levels. The match conditions elicited more positive responses than the mismatch conditions, according to what was advanced in H_1 .

To test H_1 directly, we conducted a series of 2 (low and high arousal scent) x 2 (low and high arousal music) ANOVAs. The ANOVA results in Table 6 show that the music by scent interaction is significant for approach behavior, impulse buying and satisfaction. Matching the arousing qualities of the two ambient stimuli resulted in higher levels of approach behaviors, impulse buying and satisfaction, than the mismatch conditions. The interaction between music and scent is marginally significant for pleasure, and insignificant for store environment. However as shown in Fig. 1, the pattern of the cell means is similar to those observed for approach behaviors and satisfaction. In conclusion, the results largely support H_1 . Also, it is noteworthy that none of the scent and music main effects is significant at the 0.05 level, as both stimuli were manipulated to be pleasant. What mattered was the interaction between the two stimuli.

Table 5
Mean Cell Values by Dependent Variable

Dependent variables	Match/Mismatch Conditions				Single Stimulus Conditions				No Music— No Scent Condition
	Match		Mix		No Scent—		No Music—		
	High scent— High music	Low scent— Low music	Low scent— High Music	High scent— Low Music	Low Music	High Music	Low Scent	High Scent	
Pleasure	5.66	5.46	5.30	5.16	5.00	5.11	4.63	4.80	4.48
Approach	5.42	5.25	5.15	4.77	4.69	4.84	4.55	4.64	4.55
Store	6.23	5.99	6.11	5.75	5.72	5.60	5.57	5.40	5.33
Environment									
Impulse	4.38	5.53	2.67	3.00	3.50	3.62	3.44	2.65	4.45
Buying									
Satisfaction	5.82	5.67	5.30	5.17	5.11	5.06	4.75	4.95	4.62

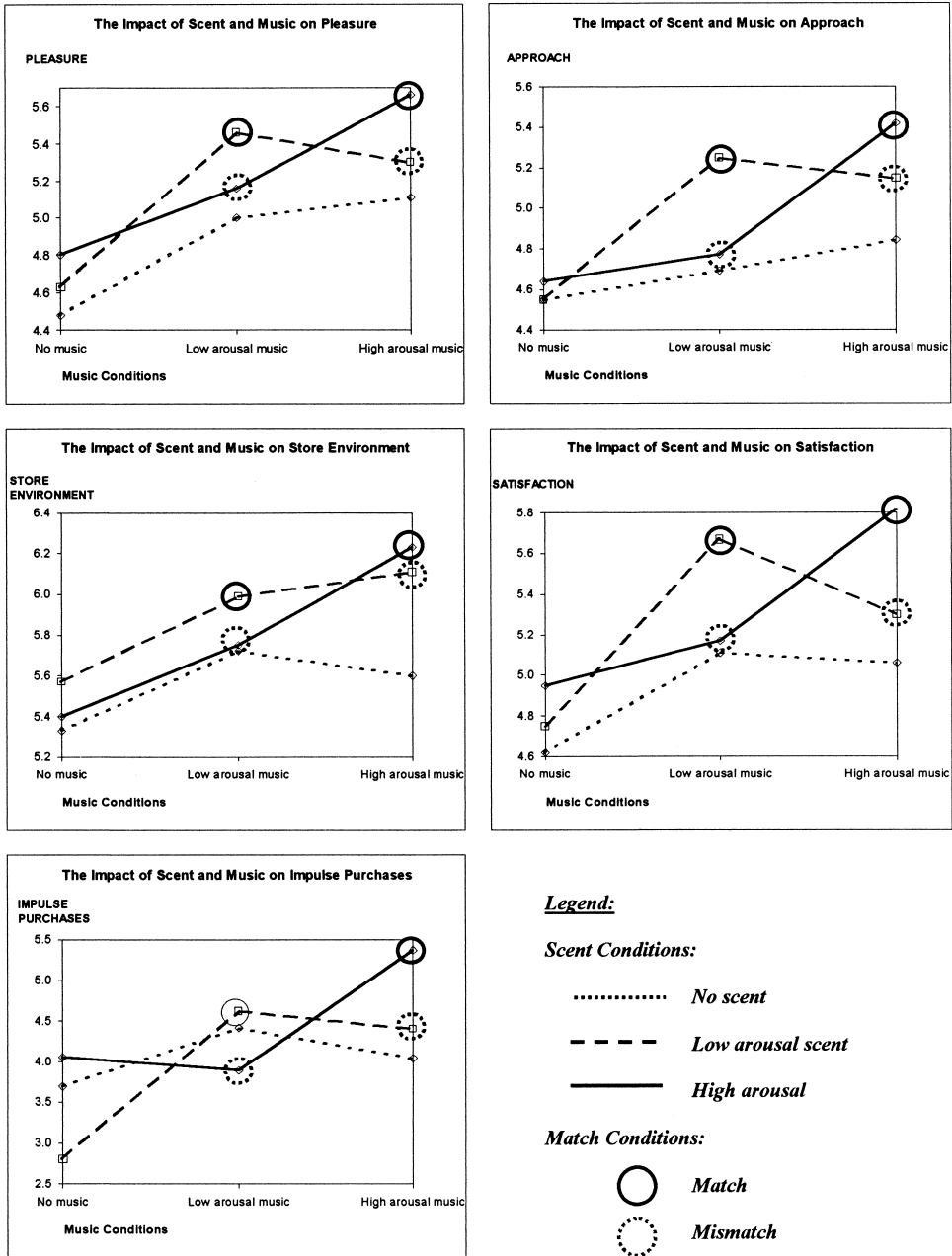


Fig. 1. The combined impact of scent and music.

6. Conclusions and theoretical implications

Consistent with past research, our findings show that adding pleasant environmental cues enhances the shopping experience. More importantly, we found that such environmental

Table 6
Summary ANOVA Results of Direct Testing of Hypotheses

Dependent variables	Scent Main Effect (low and high arousal scent conditions)			Music Main Effect (low and high arousal music conditions)			Scent x Music Interaction (match and mismatch conditions)		
	F	Sig.	Eta Square	F	Sig.	Eta Square	F	Sig.	Eta Square
Pleasure	0.02	>.10	0.00	0.87	>.10	0.00	3.15	0.08	0.03
Approach	0.45	>.10	0.00	3.37	0.07	0.03	6.32	0.01	0.06
Store Environment	0.15	>.10	0.00	3.53	0.06	0.03	1.25	>.10	0.01
Impulse Buying	1.82	>.10	0.01	0.00	>.10	0.00	4.79	0.03	0.03
Satisfaction	0.02	>.10	0.00	0.50	>.10	0.01	7.63	0.01	0.07

stimuli should not be considered in isolation, since it is the total configuration of cues that influence consumer responses. We also demonstrated that the arousing quality of pleasant stimuli is one dimension along which these holistic evaluations occur. The objectives of this study were to add to theory development on atmospherics effects on consumer behavior by using Gestalt perceptions as a framework for studying the congruency effects of environmental cues. Therefore, we will focus on these ensemble or cue congruency effects in the discussion of the results.

Research in environmental psychology postulates that people respond to their environments holistically. That is, though individuals perceive discrete stimuli, it is the total configuration of stimuli that determines their responses to the environment (e.g., Holahan, 1982). The notion of cue congruency is reflected in Bell et al.'s (1991) notion of ensemble effects, in Holbrook and Zirlin's (1985) principle of unity-in-variety, in Solomon's (1983) consumption constellations and in Green et al.'s (1972) discussion on overall goodness of fit of product cues. This holistic perspective is also included in Bitner's (1992) conceptualization of Servicescapes. If the environment is perceived holistically, but the individual can sense specific arousing dimensions from environmental stimuli, then different combinations of ambient cues might produce differential responses. To our knowledge, this is the first study that empirically demonstrates the Gestalt notion of consumer evaluations of the perceived Servicescape.

The results of this study showed that when the arousal levels of ambient scent and background music matched, consumers' evaluations of the shopping experience were enhanced. For instance, scenting the store with low arousal scent (Lavender) combined with slow tempo music led to higher evaluations than using that scent with high arousal music. Or playing fast tempo music had a more positive effect on approach behaviors when the store was scented with Grapefruit (high arousal scent) rather than with Lavender. In sum, our findings provide further empirical support for the intuitive belief that when the stimuli in the environment act together to provide a coherent *atmosphere*, the individual in the environment will react more positively. The importance of continuity and coherence in environmental design is among the guiding principles in designing services (e.g., Shostack, 1987).

6.1. *Limitations and future research*

The first limitation involves the use of a single retail store in the field experiment. The context of this study was a gift store, and hence, it can be argued that this type of a retail environment might be unique (e.g., less noisy and smaller, or requiring more cognitive effort than other retail outlets). Consequently, the extent to which our findings can be generalized across different types of service providers or retail stores needs to be established. The second limitation concerns the use of only two types of ambient cues. Combining other atmospherics, such as color schemes and spatial layout, with scent and background music might provide additional insight into how consumers perceive service environments. Finally, we only sampled two types of scents and two varieties of music tempos. Lacking theoretical guidance on scent selection, our choice on olfactory cues was largely based on literature on aromatherapy. Given the diverse characteristics of service environments, future research should aim at testing more varieties of ambient scent and background music.

6.2. *Managerial implications*

This study provides evidence that improving a store's ambient conditions enhances consumers' evaluations of and behaviors in the shopping experience. Strategically manipulating the environment's arousing qualities via scents and background music can help retailers to differentiate their stores from otherwise similar competitors. Moreover, appropriate aromas and music might encourage shoppers to engage in impulse buying. However, great care is needed to ensure that the effects of different environmental stimuli *match*. As this study has shown, consumers respond more positively towards the environment, when the stimuli match to provide a coherent ambience. Bookstores such as Barnes and Noble might induce people to linger by playing slow tempo, classical background music combined with a relaxing scent. Or to stimulate excitement, organizers of sports events might consider scenting the seating areas with highly arousing aromas and playing fast tempo music. Regardless, the particular scent or music style should be perceived as congruent for the retail store as a whole. Consequently, changes in the service environment should not be carried out in a piecemeal fashion but should be coordinated.

A word of caution is needed in interpreting our findings. Retail stores with relatively narrow target markets might reap higher benefits from environmental manipulations than stores aimed at multiple market segments (Turley & Milliman, 2000). Beauty lies in the eyes of the beholder, and how individuals or target segments respond to, for example, music may depend on individual response moderators (Bitner, 1992). Specialty stores aimed at teen-agers, for example, may use funky scents and rap music to attract clientele, whereas the manipulation of ambient cues in a department store needs to be subtler. Or consumers' consumption-related goals might influence the impact of environmental stimuli on their evaluations of the shopping experience (Machleit & Erologu, 2000; Wirtz & Mattila, 2000). Task-oriented shopping environments such as grocery stores might have a more difficult time in inducing positive feelings via environmental cues than stores that are patronized for more recreational purposes. Because the novelty and stimulation of a particular music and scent combination might wear off relatively fast,

retail stores that rely on heavy frequent-visit patterns might not be prime candidates for these types of environmental manipulations.

To conclude, due to the holistic perception of its many dimensions, designing Servicescapes is often considered an art. This research is only the beginning of understanding how *ensemble effects* influence consumer perceptions of retail environments and their shopping behaviors.

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References

- Baker, Julie, Michael Levy and Dhruv Grewal (1992). An experimental approach to making retail store environmental decisions. *Journal of Retailing*, 68(4), 445–460.
- Beardsley, M. C. (1981). *Esthetics: Problems in the Philosophy of Criticism*. Indianapolis, IN: Haskett.
- Beatty, Sharon and Elizabeth Ferrell (1998). Impulse buying: modeling its precursors. *Journal of Retailing*, 74(2), 169–191.
- Bell, Paul, Morris Holbrook and Michael Solomon (1991). “Combining Esthetic and Social Value to Explain Preferences for Product Styles with the Incorporation of Personality and Ensemble Effects,” *Journal of Social Behavior and Personality*, 6, 243–273.
- Berlyne, Daniel E. (1971). *Esthetics and Psychobiology*. New York: Meredith.
- Bitner, Mary J. (1992). “Servicescapes: The Impact of Physical Surroundings on Customers and Employees,” *Journal of Marketing*, 56 (April), 57–71.
- Bone, Paula F. and Swati Jantrania (1992). Olfaction as a cue for product quality. *Marketing Letters*, 3(3), 289–296.
- Bone, Paula F. and Pam S. Ellen (1994). “Olfaction and Marketing: Does it Make Sense to Use Scents?” unpublished working paper, Department of Marketing, West Virginia University.
- Bone, Paula F. and Pam S. Ellen (1999). Scents in the marketplace: explaining a fraction of olfaction, *Journal of Retailing*, 75(2), 243–262.
- Bruner, Gordon II (1990). Music, mood and marketing. *Journal of Marketing*, 54(4), 94–100.
- Butcher, Dana. (1998). Aromatherapy –its past and future. *Drug and Cosmetic Industry*, 162(3), 22–24.
- Dubé, Laurette, Jean-Charles Chebat and Sylvie Moris (1995). “The Effects of Background Music on Consumers’ Desire to Affiliate in Buyer-Seller Interactions,” *Psychology and Marketing*, 12 (July), 305–319.
- Donovan, Robert and John Rossiter (1982). “Store Atmosphere: An Environmental Psychology Approach,” *Journal of Retailing*, 58 (Spring) 34–57.
- Donovan, Robert, John Rossiter, Gilian Marcolynn and Andrew Nesdale (1994). “Store Atmosphere and Purchasing Behavior,” *Journal of Retailing*, 70(3), 283–294.
- Dowling, W.J. and Dane L. Harwood (1986). *Music Cognition*, Orlando, FL: Academic Press.
- Ellen, Pam S. and Paula F. Bone (1999). “Olfactory Stimuli as Advertising Executional Cues,” *Journal of Advertising*, 27(4), 29–39.
- Fisher, Jeffrey (1974). “Situation-Specific Variables as Determinants of Perceived Environmental Esthetic Quality and Perceived Crowdedness,” *Journal of Research in Personality*, 8(August), 177–88.

- Gill, Martin (1996). *Aromatherapy: An Introductory Guide to Professional and Home Use*. London: Vermillion.
- Green, Paul, W. Wind and A.K. Jain (1972). "Preference Measurement of Item Collections," *Journal of Marketing Research*, November.
- Gulas, Charles S. and Peter H. Bloch (1995). "Right Under Our Noses: Ambient Scent and Consumer Responses," *Journal of Business and Psychology*, 10 (Fall), 87–98.
- Herrington, Duncan and Louis Capella (1994). Practical applications of music in service settings. *Journal of Services Marketing*, 8(3), 50–56.
- Hirsch, Alan (1995). "Effects of Ambient Odors on Slot Machine Usage in a Las Vegas Casino," *Psychology and Marketing*, 12(7), 585–594.
- Holahan, Charles (1982). *Environmental Psychology*. New York: Random House, Inc.
- Holbrook, Morris and Robert Zirlin (1985). "Artistic Creation, Artworks, And Esthetic Appreciation: Some Philosophical Contributions to Nonprofit Marketing," In *Advances in Nonprofit Marketing*, Vol 1, Ed. R. Belk, 1–54.
- Lorig, Tyler S. and Gary E. Schwartz (1988). "Brain and Odor: Alteration of Human EEG by Odor Administration," *Psychobiology*, 16(3), 281–284.
- Machleit, Karen and Sevgin Erologu (2000). "Describing and Measuring Emotional Response to Shopping Experience," *Journal of Business Research*, 49, 101–111.
- McClelland, David C., John W. Atkinson, Russell A. Clark and Edgar L. Lowell (1953). *The Achievement Motive*. New York: Appleton-Century-Crofts.
- Mehrabian, Albert and James A. Russell (1974). *An Approach to Environmental Psychology*. Cambridge, MA: Massachusetts Institute of Technology.
- Milliman, Ronald E. (1982). Using background music to affect the behavior of supermarket shoppers. *Journal of Marketing*, 46(2), 86–91.
- Milliman, Ronald E. (1986). "The Influence of Background Music on the Behavior of Restaurant Patrons," *Journal of Consumer Research*, 13 (September), 286–289.
- Mitchell, Deborah J., Barbara E. Kahn and Susan C. Knasko (1995). "There's Something in the Air: Effects of Ambient Odor on Consumer Decision Making," *Journal of Consumer Research*, 22 (September), 229–238.
- North, Adrian and Hargreaves (1998). "The Effect of Music on Atmosphere and Purchase Intentions in a Cafeteria," *Journal of Applied Psychology*, 28(24), 2254–2273.
- Sherman, Elaine, Elaine Mathur and Ruth B. Smith (1997). "Consumer Satisfaction with Health-Care Services: The Influence of Involvement," *Psychology and Marketing*, 14 (May), 261–285.
- Shostack, Lynne (1987). Service positioning through structural change. *Journal of Marketing*, 51, 34–43.
- Solomon, Michael (1983). "The Role of Products as Social Stimuli: A Symbolic Interactionism Perspective," *Journal of Consumer Research*, 10 (December), 319–329.
- Spangenberg, Eric C., Ayn E. Crowley and Pamela W. Henderson (1996). "Improving the Store Environment: Do Olfactory Cues Affect Evaluations and Behaviors?" *Journal of Marketing*, 60(2), 67–80.
- Turley, L.W. and Ronald Milliman (2000). "Atmospheric Effects on Shopping Behavior: A Review of the Experimental Evidence," *Journal of Business Research*, 49, 193–211.
- Vanderark, S. D. and D. Ely (1993). "Cortisol, Biochemical, and Galvanic Skin Responses to Musical Stimuli of Different Preference Value by College Students in Biology and Music," *Perceptual Motor Skills*, 77, 227–34.
- Wakefield, Kirk and Julie Baker (1998). "Excitement at the Mall: Determinants and Effects on Shopping Response," *Journal of Retailing*, 74(4), 515–539.
- Westbrook, Robert A. and Richard L. Oliver (1981), "Developing Better Measures of Consumer Satisfaction: Some Preliminary Results," *Advances in Consumer Research*, Vol. 8, K.E. Monroe, ed. Provo, UT: Association for Consumer Research 94–99.
- Wirtz, Jochen and John E.G. Bateson (1999), "Consumer Satisfaction with Services: Integrating the Environmental Perspective in Services Marketing into the Traditional Disconfirmation Paradigm," *Journal of Business Research*, 44(1), 55–66.
- Wirtz, Jochen, Anna S. Mattila and L.P. Tan Rachel (2000). "The Mediating Role of Target-Arousal State on the

Impact of Affect on Satisfaction - An Examination in the Context of Service Experiences,” *Journal of Retailing*, Vol. 76(3), 347–365.

Yalch, Richard F. and Eric Spangenberg (1988). “An Environmental Psychological Study of Foreground and Background Music as Retail Atmospheric Factors,” in *AMA Educators’ Conference Proceedings*, A.W. Walle, ed. Chicago: American Marketing Association, 106–110.

Yalch, Richard F. and Eric Spangenberg (1990). “Effects of Store Music on Shopping Behavior,” *Journal of Consumer Marketing*, 7 (Spring), 55–63.