



In-store music and aroma influences on shopper behavior and satisfaction

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ABSTRACT

Retail markets are increasingly competitive and retailers continuously look to differentiate their retail offering. One way to differentiate is by providing a pleasant and exciting shopping ambience. This paper experimentally tests the effects of music (volume high or low) and aroma (vanilla scent present/absent) on young fashion shoppers in a real retail setting. Results show that volume of music and the presence of a vanilla aroma both have a significant impact on shoppers' emotions and satisfaction levels. Additional analysis reveals that the arousal induced by music and aroma results in increased pleasure levels, which in turn positively influences shopper behaviors, including time and money spend, approach behavior, and satisfaction with the shopping experience. Direct effects of arousal on behaviors as well as an interaction effect between music and aroma on pleasure and time spent in the store are also present. The paper contributes to the better understanding of shoppers' emotions and shopper behaviors in response to in-store atmospherics and offers retailers practical insights into how to create competitive advantage by customizing the atmosphere in their stores.

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1. Introduction

As retail markets become increasingly competitive, retailers are continuously looking to differentiate their retail offering. One way they can differentiate is by providing a shopping environment that is customized to meet customers' needs, not only in terms of merchandise, convenience and pricing but also in providing a pleasant and, possibly, exciting shopping atmosphere (Sherman and Smith, 1986; Dawson et al., 1990; Baker et al., 1992; Tai and Fung, 1997; Sherman et al., 1997). Despite the large number of studies on store atmospherics, limited empirical research exists that specifically explores the effects of music volume and the presence of aroma on consumers' emotions and behaviors (Turley and Milliman, 2000; Mattila and Wirtz, 2001; Morrin and Chebat, 2005). Further, a real need to broaden the knowledge base of retailing atmospherics by conducting real research *in situ* exists (Chebat and Dube, 2000). With this gap in mind, this paper tests the effects of two manifestations of these two environmental factors, music volume and presence of a vanilla aroma, on young female fashion shoppers as they shopped in a real retail setting.

2. Background and literature review

In a retail climate that is increasingly competitive, retailers are continuously looking for ways to differentiate their offerings. In doing so they increasingly seek to provide a unique "total experience" for their customers (Berry et al., 2002; Crosby and Johnson, 2003). One way in which retailers can create such an experience is by manipulating the in-store environment (Turley and Chebat, 2002; Varley, 2005). Store environmental factors such as music and sound, lighting and color, and aroma help create the sensory impressions that underlie these experiences (Pine and Gilmore, 1998). Therefore, finding a unique and effective atmospheric design is a primary concern for retailers wanting to create and maintain a competitive advantage.

A substantial literature on store atmospherics exists, dating back to the late 1960s (e.g. Smith and Curnow, 1966; Kotler, 1974). The dominant framework in this work is the Mehrabian and Russell (1974) model from Environmental Psychology, a stimulus-organism-response (S-O-R) framework to explain and predict the effects of environmental variables on people's emotional states and ultimately their behavior. Since then, an increased interest arose in exploring the role of shoppers' emotions to understand how store atmospherics influence their patterns of behavior. As such, many studies (e.g. Sherman and Smith, 1986; Dawson et al., 1990; Baker et al., 1992; Tai and Fung, 1997; Sherman et al., 1997) use the Mehrabian and Russell (1974) model as a base to examine the effects of store atmospherics.

The common theme among many of these studies is that sensory information from store atmospherics influences cognitive and/or affective states, which in turn can alter shopping behaviors (Grossbart

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et al., 1990). To better understand the way that in-store atmospherics influences shopper behavior, it is important to consider the mood and emotions that shoppers experience while shopping within a specific store. Mood states are present in virtually every shopping encounter and could have a significant effect on shopper behavior (Swinyard, 1993). A consumer's emotion or mood is considered a situational variable that affects his or her propensity to purchase (Belk, 1975), implying that the effect of store atmosphere on consumer behavior is mediated by the consumer's emotional state (Sherman et al., 1997). Recent studies show these effects tend to be moderated by the consumer's goal orientation (Kaltcheva and Weitz, 2006).

In-store music and aroma are two environmental factors that have been shown to influence consumers' emotions and shopping behaviors. Several studies have investigated their effects on variables such as dwell time, purchase or spend, and recommendation behavior. As Baker et al. (2002) observe, most of these studies have looked at only one factor at a time. Baker et al. (2002) cite various environmental elements that have been studied separately, in particular music (e.g., Areni and Kim, 1993; Hui et al., 1997; Milliman, 1982) and aroma (e.g., Spangenberg et al., 1996). Also, often these studies were undertaken in fairly artificial conditions.

Only a few studies were conducted in real-life settings among real shoppers. Spangenberg et al. (2006) test the effect of ambient scent on shopper evaluations and behaviors in a clothing store and demonstrate the favorable effects of congruence between gender and product based scent associations. Only two studies test the joint effects of music and aroma in a real-life setting. Mattila and Wirtz (2001) manipulated music tempo and presence and type of scent to induce different levels of arousal among gift shop customers. The customers in their study responded more positively if the arousing qualities of the music and aroma in the store were congruent. Morrin and Chebat (2005) intercepted shoppers in a mall in which the presence of scent (citrus) and music (at low tempo) were varied over time. Their findings suggest that music and scent cues enhance consumers' responses more when cues are congruent with the shopper's orientation (i.e., impulsive or contemplative).

The present study extends these previous works by focusing on the joint effects of music (volume) and aroma (presence/absence) in a real-life female fashion retail setting. The study aims to test if music volume and presence or absence of a vanilla aroma influence customers' arousal and pleasure levels and how these in turn affect approach-avoidance behaviors, time spent in store, expenditure levels, and finally, satisfaction. Effects are tested in a real-life but experimentally controlled setting and analyzed using Manova, followed by a path analysis to fully assess the relationships between the different variables.

3. Conceptual model and hypotheses

The conceptual model in Fig. 1 represents the framework for the hypotheses that this study tests. The following will discuss the various sections and formulate the hypotheses tested in this study.

3.1. Effects on emotional states

The research literature shows that music (Fulberg, 2003) and aroma (Gulas and Bloch, 1995; Chebat and Michon, 2003) have the ability to affect shoppers' emotional states. Milliman (1982, 1986) maintains that background music tends to be soothing, thus creating a pleasurable atmosphere. Loud music, if of a preferred genre, is expected to contribute positively to the emotional states of shoppers in the target group of the present study, young fashion shoppers. Similarly, when shoppers encounter a pleasant scent, they may experience some elevation in mood (Gulas and Bloch, 1995; Spangenberg et al., 2006). Vanilla aroma has been shown to be perceived as pleasant by both males and females (Spangenberg et al., 2006).

Regarding the joint effects of music and aroma only the studies by Mattila and Wirtz (2001) and Morrin and Chebat (2005) exist. Mattila and Wirtz (2001) demonstrated that the congruence between music and aroma can influence shopper evaluations and behaviors; however, for mood states their study found only mixed effects. Their manipulation checks for music and aroma-induced arousal showed main effects (as intended) and their measure for pleasure showed only a marginally significant interaction and no main effects (Table 6, p. 285), the latter possibly because of their selection of scents (lavender and grapefruit). Morrin and Chebat (2005) studied citrus scent and low tempo music in a mall setting but found no effects of the presence of these two atmospheric cues on mood states. These prior findings suggest no interactions between the effects of music volume and aroma presence on mood states.

The above discussion leads to the following hypotheses:

H1. The presence of high volume music will have a positive effect on customers' levels of (a) arousal and (b) pleasure.

H2. The presence of a vanilla aroma will have a positive effect on customers' levels of (a) arousal and (b) pleasure.

3.2. Effects on shopper behaviors

Previous studies have found that the volume of the music affects shopper behaviors, in particular time spent in store and perceived

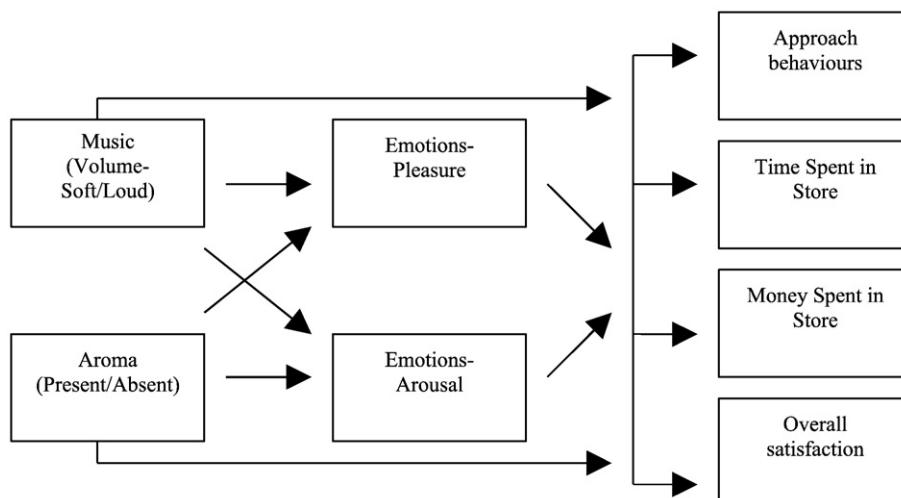


Fig. 1. Original conceptual model.

time spent in store. Smith and Curnow (1966) find that supermarket shoppers spend significantly less time in store when the music is loud. However, evidence from Kellaris and Altsech's (1992) lab study suggests that musical loudness increases perceived duration time. Yalch and Spangenberg (1990) find that in a condition with music, male shoppers spend more time than planned than in a condition without music. Finally, Kellaris et al. (1996) look at the impact of music loudness and internal states on time perceptions and also find that the duration of a time interval appears longer to participants exposed to loud music compared to soft music.

While previous research on aroma suggests that ambient scent can influence sales, processing time, variety seeking behavior and perceived time spent in store (Hirsch, 1995; Mitchell et al., 1995; Spangenberg et al., 1996) a more recent study demonstrates the effects of aroma-gender congruity on a range of behavioral measures (Spangenberg et al., 2006). In addition, the study by Mattila and Wirtz (2001) find interaction effects of type of aroma and type of music on shopper behaviors, supporting their hypothesis that arousal congruence positively affects behaviors including approach/avoidance, impulse purchasing and satisfaction. Morrin and Chebat (2005) also find interaction effects of scent and music tempo on dollar spend and find for both impulsive and contemplative shoppers that dollar spend was lowest when scent and slow tempo music were both present. Given these mixed findings no attempt is made to specify which behavioral interactions may occur in the present study context, which varies music volume and aroma presence and includes only female customers.

Consequently, it is hypothesized that:

H3. The presence of high volume music will have a positive effect on (a) customers' approach behaviors, (b) time spent in store, (c) money spent in store and (d) customers' overall satisfaction with their shopping experience.

H4. The presence of a vanilla aroma will have a positive effect on (a) customers' approach behaviors, (b) time spent in store, (c) money spent in store and (d) customers' overall satisfaction with their shopping experience.

3.3. Emotions as mediators

Shoppers' emotional states have been found to display a significant impact on shopper behaviors (e.g. Donovan and Rossiter, 1982; Dawson et al., 1990; Swinyard, 1993). Pleasure and arousal are positively related to willingness to buy (Baker et al., 1992). Gorn (1982) proposes that consumers transfer their feelings to how they evaluate their satisfaction with the store and/or its products. Shoppers in a good mood evaluated their shopping experience more favorably than when in a bad mood (Swinyard, 1993). Higher levels of arousal are associated with increased rates of activity (Smith and Curnow, 1966). Arousal increases purchasing intentions, money spent in store and time spent in store, while greater levels of pleasure tend to be associated with higher amounts of money spent in store (Sherman et al., 1997). Further, while the field study by Morrin and Chebat (2005) does not find any effect of atmospheric cues on shoppers' mood states, other studies suggest that pleasure and arousal can both influence spending levels, time spent in store and willingness to return (Donovan and Rossiter, 1982; Kaltcheva and Weitz, 2006).

These findings lead to the following hypotheses:

H5. Customers' levels of pleasure will have a significant and positive effect on (a) their approach behaviors, (b) time spent in store, (c) money spent in store and (d) their overall satisfaction with the shopping experience.

H6. Customers' levels of arousal will have a significant and positive effect on (a) their approach behaviors, (b) time spent in store, (c) money spent in store and (d) their overall satisfaction with the shopping experience.

The influence of music volume on shopper behaviors may emerge (to some extent) from the arousal the music volume induces. Arousal has been correlated positively with perceived activity (Holbrook and Anand, 1990) and was experimentally shown to affect shopping behaviors (Mattila and Wirtz, 2001; Kaltcheva and Weitz, 2006). Arousal is expected to mediate the effect of musical loudness on shopper behaviors. Regarding aroma, Spangenberg et al. (1996) find that the presence of ambient scent in a store can increase the arousing nature of the environment, thereby increasing how interesting and pleasing the environment is. Evaluations of the store environment can be expected to improve in the presence of aroma.

Based on these findings it is hypothesized that:

H7. Customers' emotional states (levels of pleasure and arousal) will act as mediators for the effects of the presence of high volume music on (a) approach behaviors, (b) time spent in store, (c) money spent in store and (d) overall satisfaction with the shopping experience.

H8. Customers' emotional states (levels of pleasure and arousal) will act as mediators for the effects of the presence of aroma on (a) approach behaviors, (b) time spent in store, (c) money spent in store and (d) overall satisfaction with the shopping experience.

4. Method

The goal of the present project was to investigate each of the hypotheses in a fashion retail setting using real consumers. Achieving this goal requires control or elimination of any competing explanations for the effects that are being sought to measure. To this end, a 2 × 2 field experiment was implemented with the cooperation of a local fashion retailer who is targeting the 14 to 25 year old female shopper. The study was restricted to respondents over the age of 18 for ethical reasons. The retail store used in the study is located in one of the prime shopping districts in a major metropolitan area in Australia.

Brief interviews with members of the target response group in the weeks prior to the main data collection helped to gain an insight into the customer market, assisted in constructing the experimental design (such as when to collect data) and also helped establish the manipulation levels of the independent variables.

4.1. Experimental design

Shoppers entered the store for one of the conditions of the 2 × 2 design. The four conditions were randomly allocated across the twelve days that had been selected to conduct the data collection. These days were spread over four weeks, and comprised all Sundays, Mondays and Fridays in the selected weeks, using only the 12–3pm time period. Monday was selected to represent the 'normal' weekday, Friday as the busier weekday, and Sunday as representing the weekend. A blocking design determined the allocation of the experimental conditions to days of the week.

Each of the two independent variables (music and aroma) is manipulated separately and orthogonally throughout the experiment. The music was from a playlist that the store already used as part of their atmospheric control. This music was an upbeat, dance music compilation played on repeat over the three hours of the data collection period at either a high volume (foreground music) or a low volume (background music). Each experimental treatment used the same music compilation over the entire four week period.

Aroma specifically had to be carefully controlled to ensure that the aroma was either uniformly distributed throughout the store or completely absent from the store prior to collecting the data. The retailer uses an aroma generator that links into their air conditioning system and pumps a vanilla scent throughout the store. The store chose to use vanilla based on consultations with the supplier of the aroma system, and they were unwilling to try alternate aromas. Vanilla is

perceived as a more feminine smell (Spangenberg et al., 2006) and previous research has shown that people, in particular females, tend to focus on the pleasant childhood memories associated with the smell of vanilla – warm and comforting (Caplan, 2006).

4.2. Dependent variables

Dependent variables were collected using a store exit survey. Each person age 18 or older who exited the store during the experimental period was asked to complete a questionnaire. The instrument comprised four major sections: scales assessing the emotional state while in the store, scales measuring the customer's overall satisfaction with the shopping experience, scales for approach-avoidance constructs, and two items measuring time in store and money spent in store during this visit. Each of these sections and their associated scales are detailed below.

The pleasure and arousal scales were adopted from Kaltcheva and Weitz (2006), who adapted them from the original Mehrabian and Russell (1974) study. The overall satisfaction scale was adapted from Mattila and Wirtz's (2001) study, who had adapted the scale from Westbrook and Oliver (1981). The approach behaviors scale was adapted from the study by Tai and Fung (1997) who used a scale that also originated from Mehrabian and Russell (1974). All of these scales were changed to a seven point format for consistency.

Two additional items are also measured: time spent in store and money spent in store. The item measuring time spent in store gave five options of ten-minute intervals for the respondents to select when asked how much time they had spent in the store. The second item provided seven options of twenty-dollar intervals for the respondent to select when asked how much money they had spent in the store.

Manipulation checks in the questionnaire measured perceived music volume and aroma. The music manipulation check required the respondents to indicate on a seven-point scale how loud they thought the music was from 'very soft' (1) to 'very loud' (7). The item measuring the aroma manipulation required respondents to indicate what aroma they could smell in the store out of three choices (cinnamon, vanilla and no specific aroma; cinnamon was included as a distracter and to test for false positives). A number of potential covariates and socio-demographics are also measured. These included whether the customers were shopping alone or in a group, time since the respondent last visited the store, and age of the customer.

5. Results

5.1. Sample and manipulation checks

Across all conditions a total of 263 customers participated in the exit survey, which is a response rate of 60% when compared to the total number of customers counted during the observed store hours. Of these, 5 cases were dropped due to incomplete data, resulting in a final sample of 258 cases. The majority of respondents were between 18 and 35 (85.9%); 54.6% of the sample was in the target 18 to 25 year age group. Most of the participants had visited the store within the past 3 months (75.3%); 33.1% of the sample had visited the store in the past two weeks. The experimental treatments are summarized in Table 1 below.

Prior to analyzing, the data were first checked for effects due to day of week, age, shopping on own v with a group, and time since last visit. Post-hoc tests to assess the effects of each of these on the dependent variables found that states of pleasure were significantly higher on Sunday as compared to either Monday or Friday. Dummies for Sundays were therefore included in the main analysis as covariates where relevant.

Manipulation checks for the two experimental factors demonstrated the manipulations had been successful. The perceived loudness measures were significantly different (means loud = 5.3, soft = 3.2, $F(1,263) = 282.0, p < 0.001$). For the aroma present condition 83.3% of

Table 1
Overview of experimental conditions.

Condition number	Day	Music manipulation	Aroma manipulation	N participants
1	Friday	Soft	Absent	20
2	Sunday	Loud	Absent	22
3	Monday	Soft	Present	11
4	Friday	Loud	Present	26
5	Sunday	Loud	Present	23
6	Monday	Soft	Absent	25
7	Friday	Soft	Present	30
8	Sunday	Soft	Present	23
9	Monday	Loud	Present	31
10	Friday	Loud	Absent	18
11	Sunday	Soft	Absent	17
12	Monday	Loud	Absent	17

respondent correctly identified vanilla as the aroma while in the aroma absent condition 87.4% correctly indicated they had not perceived any aroma ($\text{Chi-sq}(2) = 133.2, p < .001$). Subsequent analyses use these perceptual measures of both aroma and music as indicators of the level of independent variable.

5.2. Main analysis

The main analysis included a MANOVA to test for differences in means of the dependent variables (arousal, pleasure, satisfaction, approach behaviors, time spent in store and money spent), additional regression analyses to test for mediation and finally a path analysis, used in an exploratory fashion, to assess a more complex pattern of mediation. The MANOVA model included Day of the week (Sunday v weekday) as a control factor and also included the interaction of Music volume and Aroma. All factors in the multivariate model, including this interaction, were significant (Wilk's Lambda values all < 0.95 , p -values all $< .05$). The next section presents the findings for each of the hypotheses.

5.3. Effects on emotional states

Table 2 shows the results for the separate ANOVA's of music and aroma on arousal and pleasure. They reveal that music and aroma significantly affected both arousal and pleasure; however, whereas for arousal only the main effects are significant, for pleasure a significant interaction is revealed ($F(1,254) = 6.92, p < .01$). This result was unexpected and led to using the path analysis discussed later.

The effects for both dependent variables are plotted in Figs. 2 and 3. Fig. 2 shows that the interaction for pleasure means pleasure is only enhanced if both the music is loud and aroma is present. No difference is noted between the other three store conditions. No such effect is observed for arousal. Fig. 3 shows that the effect on arousal is larger for music than for aroma in the store and these effects are independent of each other. Therefore, hypotheses 1a and 2a are confirmed but hypotheses 1b and 2b are only partly confirmed, as an unexpected interaction for pleasure appears.

5.4. Effects on shopper behavior

The next analysis involved conducting ANOVAs directly for each of the main dependent variables. Music and aroma had significant effects on satisfaction but not on any of the remaining variables. The effects of satisfaction include a significant main effect ($F(1, 259) = 8.34, p < .01$) for music and a marginally significant effect for aroma ($F(1,259) = 3.35, p = .07$), which, given the directional nature of the hypothesis provides support for the hypothesized effect of aroma on satisfaction. Satisfaction levels are significantly higher in the loud music than in the soft music condition (means: loud 5.5 v soft 5.1) and they are higher for the aroma present than the aroma absent condition (means: present 5.4 v

Table 2
ANOVA results for effect of aroma and music on pleasure and arousal, with time of week as covariate.

Source	Dependent variable	df	Mean square	F	Sig.
Intercept	Pleasure	1	6941.283	6102.795	.000
	Arousal	1	3611.643	3737.457	.000
Sunday	Pleasure	1	9.194	8.084	.005
	Arousal	1	.497	.515	.474
Music volume	Pleasure	1	12.465	10.960	.001
	Arousal	1	80.163	82.956	.000
Aroma	Pleasure	1	5.266	4.630	.032
	Arousal	1	7.793	8.064	.005
Music volume * aroma	Pleasure	1	7.868	6.918	.009
	Arousal	1	1.378	1.426	.234
Error	Pleasure	254	1.137		
	Arousal	254	.966		

absent 5.1). Therefore only H3d and H4d are supported; the remaining elements of H3 and H4 go unsupported in this analysis; however the path analysis reported hereafter reveals significant relationships between the atmospheric factors and all behavioral dependent variables.

5.5. Emotions as mediators

The hypothesized mediating roles of mood states are now tested. Because of the unexpected interaction between music volume and aroma presence a path analysis is applied (Fig. 4) to not only test the hypothesized mediation effects but also explore the direct and indirect effects of the atmospheric factors and their interaction on behaviors. Using a path analysis instead of the conventional direct mediation test as in Baron and Kenny (1986) allows exploring these relations as well as test for more complex mediation patterns.

The path analysis includes main effects for perceived music volume and perceived aroma as well as the interaction between them. A dummy factor for Sundays is also included. Tests of a number of different mediating structures resulted in a structure corresponding with Kaltcheva and Weitz's (2006) model as both most logical and having the best fit. The result is a cascading of mediation effects, starting with arousal, through pleasure to approach and satisfaction. The model also includes direct effects of arousal on approach and satisfaction. The model furthermore includes money and time spent in

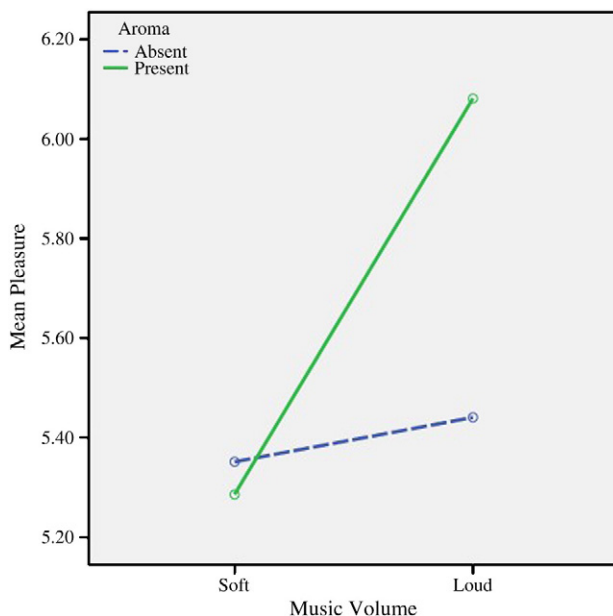


Fig. 2. Effects of music volume and aroma on pleasure.

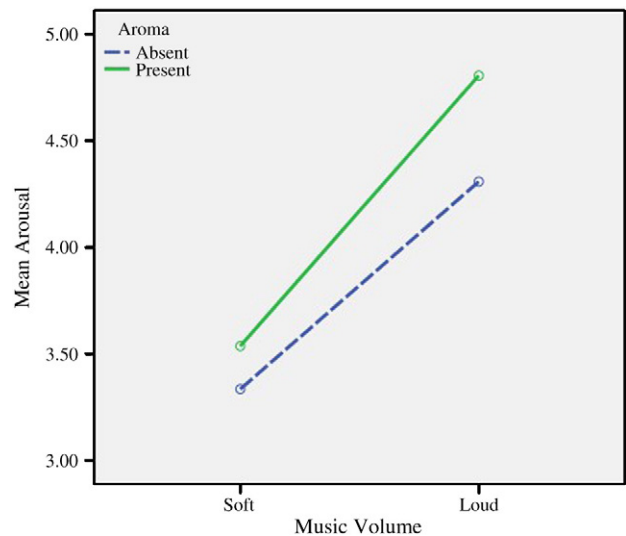


Fig. 3. Effects of music volume and aroma on arousal.

the store, allowing for the fact that higher levels of money spend should correspond with longer stay times (see Fig. 4).

To account for the use of a specification search, a bootstrap was conducted using the Bollen–Stine approach and 1000 samples. The results support the model as a good representation of the data ($p = 0.42$). Table 3 shows that arousal and pleasure have significant effects on approach and satisfaction, confirming hypotheses H5a, H5d, H6a and H6d. Pleasure directly affects time and money spent in the store (H5b and H5c confirmed) while arousal affects these outcomes only via pleasure, providing support for H6b and H6c.

The model analysis showed no indication that direct links between the atmospheric factors and behavioral outcome variables should be included, except for one. The interaction between aroma and music not only affects pleasure, and via pleasure the four behavioral variables, but also has a direct effect on time spent in the store. Table 4 provides goodness of fit statistics of the path analysis.

6. Discussion

6.1. Conclusions

The main goal of this paper was to investigate how music (volume) and aroma (presence) affect shopper emotional states and subsequently influence real shopper behaviors in a real retail setting. This study showed that the arousal induced by music and aroma results in increased pleasure levels, which in turn positively influence shopper behaviors, including time and money spend, approach behavior, and satisfaction with the shopping experience. These findings suggest a structure of mediating relationships similar to the model by Kaltcheva and Weitz (2006) but in addition suggest direct effects of arousal on behaviors as well as an interaction, or congruence, effect between music and aroma on pleasure and time spent in the store.

Mehrabian-Russell's (1974) conceptualisation predicts that in a retail fashion store focusing on the female youth market loud music and a pleasant (vanilla) aroma will significantly and independently impact shoppers' pleasure and arousal. Instead the results revealed an unexpected interaction where the combination of aroma presence and loud music resulted in a significantly higher level of reported pleasure than observed in the other three conditions.

Using path analysis the impact was analyzed of the interaction between aroma presence and music volume on behaviors and satisfaction levels. The model results firstly revealed that a combination of high volume music and the presence of a vanilla aroma results in an enhancement of pleasure levels, suggesting a congruency effect

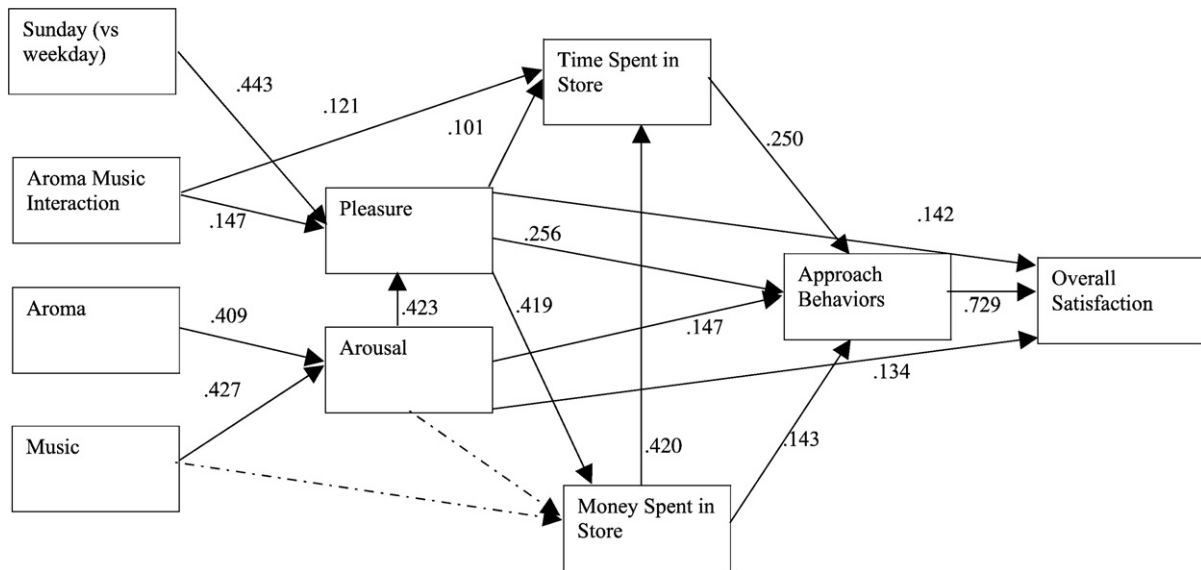


Fig. 4. Path model.

similar as observed by Mattila and Wirtz (2001). This congruency, in turn, results in higher levels of pleasure, and consequently of money and time spent, as well as approach behavior and satisfaction levels for this atmospheric condition. Note that no such effect is found for arousal, each of the two factors influence arousal independently.

The results in addition revealed a positive direct congruency effect on time spent in the store, independent of pleasure. Apparently having the right mix of music and aroma not only enhances pleasure but also makes customers stay extra long in the store independent from the level of arousal and pleasure, thereby further increasing the positive effects of having the proper mix of atmospheric factors.

6.2. Managerial implications

As retail markets become more competitive, one way in which retailers can differentiate their offer is by creating a unique and satisfying shopping experience. The results of this study provide retailers with valuable information to help them to develop strategies to create unique in-store environments that enhance the shopping experience and result in more satisfied shoppers. The volume of music and the presence of a vanilla aroma were found to both have a significant impact on shoppers' emotions and satisfaction levels but in particular ways.

On the one hand, the results confirm that aroma and music alone can be used independently to vary arousal levels. However, the findings also indicate that having the right mix of aroma and music is an important additional contributor to pleasure levels and consequently to key outcome variables such as spend and satisfaction. In addition the results suggest that an aroma with loud music facilitates longer stay times independent of mood states. The findings therefore offer retailers practical insights into

Table 3 ANOVA of music and aroma on satisfaction, with arousal and pleasure as covariates.

Source	df	Mean square	F	Sig.
Intercept	1	20.960	24.770	.000
Pleasure	1	57.955	68.491	.000
Arousal	1	14.820	17.514	.000
Music volume	1	.411	.485	.487
Aroma	1	.063	.074	.786
Music volume*aroma	1	.008	.009	.924
Error	253	.846		

how to create competitive advantage by customizing the atmosphere in their stores.

6.3. Limitations and future research

This study demonstrated the positive effects of aroma and music on mood states and satisfaction levels and assessed their effects on time and money spent. This study however only observed reported time and money spend; future research should complement such data with more objective measures. The present study also did not test a model with latent constructs but relied on a path analysis only.

A third limitation was sample size. A larger or more homogeneous sample could help to better test our relationships in future studies. Having said that, we did analyze several covariates and did study a fairly homogeneous setting, with only young female customers in the fairly specialized category of young female fashion (cf. Spangenberg et al., 2006 who studied a mixed gender clothing store). We did not measure and test for shopping orientation and the possibility remains that, in our context, a recreational versus task orientation moderated the effects of aroma and music, as demonstrated by Kaltcheva and Weitz (2006) for a more artificial setting.

Table 4 Goodness of fit statistics for path analysis.

CMIN					
Model	NPAR	CMIN	DF	P	CMIN/DF
Default model	41	25.366	24	.386	1.057
Saturated model	65	.000	0		
Independence model	20	960.006	45	.000	21.333
Baseline comparisons					
Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	.974	.950	.999	.997	.999
Saturated model	1.000		1.000		1.000
Independence model	.000	.000	.000	.000	.000
RMSEA					
Model	RMSEA	LO 90	HI 90	PCLOSE	
Default model	.015	.000	.054	.925	
Independence model	.281	.266	.297	.000	

The present study also did not test for effects of different types or styles of music or different types of aroma, as done by Mattila and Wirtz (2001). The intention was to avoid any confounding of the experimental treatments with such additional variables, so as to be able to draw stronger conclusions about a more limited set of aroma conditions. Another constraint was that the retailer was reluctant to vary more factors in the experiment—for example, they strongly believe that vanilla is the most suitable aroma for their store (which is supported by Spangenberg et al.'s (2006) pretest findings that vanilla is both pleasant and feminine).

Several other limitations should be addressed in future research. Among these are, first, that data were only collected within one retail store. Therefore, the ability to generalize is limited. Future research needs to investigate the use of in-store music and aroma within several different retail environments. For example, data need to be collected at different size stores in different locations. Second, future studies could better separate the effects for repeat versus first time visitors and the role of expectations. First time visitors may be pleasantly surprised, which can be argued is a form of arousal, by an environment as offered in the present store. In contrast, repeat visitors will become used to the ambience, which therefore would generate fewer effects as the novelty wears off, suggesting that the use of atmospheric factors is not sufficient alone to continue generating interest, instead requiring continuous freshening up of the store ambience to sustain its image.

This brings a third possible extension, to study the role of the store brand image as an additional factor. As the present study was conducted in only one store it was not possible to test for such effects but it can be surmised that brand image and, consequently, brand communications are a determining factor of how shoppers respond to atmospheric factors as studied here. Future work should look into these effects and also take into account the fit between this brand image and the actual type or content of the atmospheric stimulus, whether music genre or aroma type.

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