It's Beginning to Smell (and Sound) a Lot Like Christmas:

The Interactive Effects of Ambient Scent and Music in a Retail Setting

Eric R. Spangenberg
Washington State University

Bianca Grohmann
Concordia University

David E. Sprott
Washington State University

Contact information for correspondence:

Eric R. Spangenberg
Professor of Marketing
College of Business and Economics
Washington State University
P.O. Box 99164-4730
Pullman, WA 99164, USA
Phone: (509) 335-3596
Fax: (509) 335-6896
E-mail: ers@wsu.edu

Revision Submitted to: Journal of Business Research

December 2003

Abstract

While extant research suggests that olfactory and musical stimuli can influence individuals' perceptions and behaviors, the combined, or interactive effects of these environmental cues is not well understood. Using stimuli associated with the Christmas holiday season, this research explores the joint effects of ambient scent and music on consumers' evaluations of a store, its environment, and offered merchandise. A 2 (no scent versus Christmas scent) × 2 (non-Christmas music versus Christmas music) experimental design was implemented in a mock retail store. Results indicate that the effects of adding an ambient Christmas scent are moderated by the nature of the background music. In particular, consumers' evaluations are more favorable when the Christmas scent is in the presence of Christmas music. The presence of the Christmas scent with non-Christmas music, however, lowers evaluations. Results and implications of the findings are discussed with regard to retail practice and environmental psychology.

It's Beginning to Smell (and Sound) a Lot Like Christmas:

The Interactive Effects of Ambient Scent and Music in a Retail Setting

> "And suddenly there appeared with the angel a multitude of the heavenly host praising God, and singing, 'Glory to God in the highest, and on earth peace among men with whom He is pleased.' " (Luke 2:13-14)
> "And they [magi from the east] came into the house and saw the Child with Mary His mother; and they fell down and worshiped Him; and opening their treasures they presented to Him gifts of gold and frankincense and myrrh." (Matthew 2:11) New American Standard Version

In the beginning, Christmas was connected to music and scent. The more things have changed, the more they have in some ways stayed the same over the last two millennia with modern-day Christmas being associated with distinct sounds and smells. The scents of pine, cinnamon, and mulled cider join with the sounds of carolers, traditional hymns and pop holiday tunes to create the Christmas holiday season in the minds of many. In attempts to attract Christmas shoppers to their stores, retailers often implement such mainstay environmental cues to create pleasant and enticing atmospheres that evoke the spirit of the holiday season.

The use of environmental stimuli during the holiday season is a wise choice for retailers. Such a strategy is judicious given research indicating that favorable results can accrue to retailers creating pleasant store environments (e.g., Milliman, 1982; 1986; Spangenberg, Crowley, and Henderson, 1996) and the fact that many retailers' annual profitability depends on strong holiday sales. Although environmental stimuli have been found to influence shopping behavior, empirical knowledge of how these variables interact to affect shopper perceptions and actions is lacking. The current work begins to address this gap and reports results of a laboratory experiment examining the joint effects of ambient scent and music in a Christmas shopping context.

Retail Atmospherics

Published work on the effects of environmental stimuli in retail settings found its genesis in Kotler's (1973) "atmospherics" work, introducing the view that retail environments create atmospheres

that affect shopping behavior. Subsequent research has used various environmental factors (such as crowding, music, color, and olfactory cues) to create said atmospheres and has been conducted primarily in the tradition of environmental psychology. Donovan and Rossiter (1982) suggested that Mehrabian and Russell's (1974) Pleasure-Arousal-Dominance (PAD) framework could be productively used to research store environments. Their suggestion was well received with the PAD model continuing to be frequently used in marketing to capture various emotions experienced by shoppers (e.g., Machleit and Eroglu, 2000; Morrin and Ratneshwar, 2000). Within this framework, scholars have demonstrated that shopping behaviors are significantly related to emotional states and time spent in the store, propensity to make a purchase, and satisfaction with the experience (Dawson, Bloch, and Ridgway, 1990; Kellaris and Kent, 1993; Yalch and Spangenberg, 1993; Sherman, Mathur, and Smith, 1997). A variety of environmental stimuli have been investigated in prior research; the current study focuses on the interactive effects for two of these stimuli, namely ambient scent and music.

Ambient Scent

The use of ambient scents in retail environments has been addressed by a number of studies from the perspective of both practitioners (e.g., Miller, 1991; Pacelle, 1992) and academics (e.g., Bone and Ellen, 1999; Spangenberg et al., 1996). While specialty stores often rely on the inherent scents of their product lines to attract customers (e.g., bath shops and candy stores), many retailers have begun to rely on ambient scents not associated with any particular product to attract customers and influence them once in the store environment.

Extant literature supports the notion that pleasantly scented environments elicit approach behaviors while unpleasant environments elicit avoidance behaviors (Bone and Ellen, 1999). Pleasantness, however, may not be enough to predict approach or avoidance in a retail setting (cf. Spangenberg et al., 1996). As demonstrated by Spangenberg, Sprott, Grohmann and Tracy (2003), pleasant ambient scents can fail to have the desired effect if they are incongruent with consumers' expectations or preferences regarding a retail store and its merchandise. While retailers obviously do not want to risk inclusion of

unpleasant environmental cues, these authors' findings suggest that "appropriateness" (or congruence; cf., MacInnis and Park, 1991) of the scent is a critical consideration when retailers are implementing environmental stimuli. That is, to be successful, olfactory cues should be pleasant and also ought to "fit" with other components of the environment into which they are diffused. When an olfactory cue is incongruent, or fails to "fit" the context within which it is encountered, consumer cognition is perhaps taxed to the point of inhibiting attitude formation (Pomerantz, 1981). Thus, an odor may be objectively judged as pleasant, if it is not contextually congruent, however, counterproductive consumer evaluations (from the standpoint of the retailer) may result.

Music

Music is another environmental cue demonstrated to affect consumer behavior. Several studies have demonstrated that music can affect mood (e.g., Yalch and Spangenberg, 1988; 1990; 2000), perceptions of time (e.g., Kellaris and Altsech, 1992; Kellaris and Kent, 1992), sales in food services (e.g., North and Hargreaves, 1998), interactions between buyers and sellers (e.g., Dubé, Chebat and Morin, 1995), product selection (e.g., North, Hargreaves and McKendrick, 1999) as well as actual shopping times and associated purchase quantities (e.g., Milliman, 1982; 1986). Together, these findings suggest that musical stimuli are a powerful means of influencing consumers' affective responses in retail environments, thereby influencing evaluations of, and behaviors within retail settings.

As with olfaction, extant research suggests that the effect of musical stimuli on consumer perceptions is moderated by congruency between the music and marketing stimuli (North et al. 1999; Kellaris and Powell Mantel, 1996; Hung, 2000). For example, North et al. (1999) demonstrated that French wines sold better when paired with congruent (i.e., French) music than with incongruent (i.e., German) music; a similar pattern held for German wines. What remains unknown is how music interacts with other easily manipulated environmental variables like olfactory stimuli, an issue to which we now turn.

Interaction of Ambient Scent and Music

The interaction of environmental cues is a normatively important and theoretically interesting area of research that has received little scholarly attention. In an effort to close our knowledge gap in this area, the current experiment investigates the interaction between the retail atmospheric factors of ambient scent and music.

As noted above, olfaction research has stressed the positive consequences of consistency between olfactory cues and other variables important to marketers. We know specifically that scents are effective in influencing consumers' perceptions and decisions (1) when they are appropriate for, or congruent with the product per se (Bone and Jantrania, 1992), (2) when they are used as ambient scents that are congruent with a product class in a decision making context (Mitchell, Kahn, and Knasko, 1995), or (3) when they are congruent with the consumer's gender (Spangenberg, et al. 2000). Similarly, with regard to music, we know that (1) congruency between a musical selection and a product affects purchase behavior (North et al. 1999), (2) arousal states and approach behaviors are moderated by congruity between musical cues and other marketing stimuli (e.g., Kellaris and Powell Mantel, 1996; Yalch and Spangenberg, 1990), and (3) derived meaning is effected by congruency between musical and visual elements of marketing stimuli (Hung, 2000). Thus, following these published effects we expect that consistency between ambient scent and music in a retail setting will affect consumer perceptions and evaluations therein. As discussed earlier, extant literature focusing on single environmental cues suggests that both olfactory cues and music can elicit affective responses resulting in approach (or avoidance) behaviors. An accessibility-diagnosticity perspective regarding the effects of olfactory cues (Bone and Ellen 1999) suggests that the effect of ambient scent on consumer responses is likely to be enhanced by the presence of congruent music for the following reasons: First, the presence of congruent music will facilitate consumers' identification of the ambient scent and result in greater accessibility of scent-related feelings, thoughts, and experiences (Mitchell, Kahn, and Knasko 1995). In the case of familiar and pleasant ambient scents, this will result in more positive affect and stronger approach behavior. Second, when ambient scent is congruent with other environmental cues such as music, it is more likely to be perceived as diagnostic

information of the retail environment, as they are part of atmospherics (Bone and Ellen, 1999). Ambient scent is therefore given more weight in the evaluation of the retail environment, as well as the merchandise (at least to some extent). The presentation of ambient scents incongruent with music cues, on the other hand, could lead to cognitive interference (Mitchell, Kahn, and Knasko, 1995)

We therefore predict an interaction between scent and music such that the addition of an ambient scent to a retail environment will have positive effects on consumer evaluations (of the store, the store environment, and the merchandise offered) when in the presence of congruent musical stimuli. Conversely, consumer evaluations will be affected negatively when the addition of an ambient scent occurs in the presence of incongruent musical stimuli.[1] To test this hypothesis, we used the context of a Christmas retail environment where incongruence between these two environmental cues may occur due to a lack of retailer diligence.

Method

Design and Sample

A 2 (no scent versus Christmas scent) × 2 (non-Christmas music versus Christmas music) full factorial design was implemented to test the hypothesis. The study was conducted in a lab environment, where olfactory and musical stimuli, as well as the participants' exposure to images related to a retail environment, could be controlled.

The sample for the experiment consisted of 140 undergraduate students who participated in the study for course credit. The participants were of North American birth who currently exchange gifts during the Christmas holiday season. Participants ranged in age from 20 to 55 (M = 21.4 years) and were equally distributed across the genders (50.7% female). Due to incomplete responses, 10 participants were not included in the analyses. This resulted in a final sample of 130.

Independent Variables

Olfactory Stimuli. A pretest was conducted to determine a pleasant ambient scent that would remind participants of the Christmas holidays. Twenty-three undergraduate students evaluated a series of nine scents. The scents were commercially available room sprays, including: Apple Spice Cinnamon, Autumn Blend, Enchanted Christmas, Grecian Pear, Mulberry, Refreshing Citrus, Sensual Rose, Solace, and Vanilla.

For the pretest, three splashes of each scent were applied to two cotton balls, which were then placed in sealed, plastic vials. The vials were colored and numbered to prevent the subjects from being able to distinguish the scents on the basis of their color or name. Subjects were asked to open in random order one vial at a time and to evaluate each scent. While the method of exposure (vial versus diffusion) in pretest and main study differed, we were nevertheless followed the Spangenberg et al. (1996) procedure in order to identify scents that were familiar to consumers and strongly associated with Christmas.

Participants rated each scent in terms of pleasantness ("bad/good," "unfavorable/favorable," "negative/positive"; Cronbach's $\alpha = .97$), intensity ("very weak/very strong"), and familiarity ("very unfamiliar/very familiar"). Individuals also indicated to what extent a particular scent reminded them of Christmas using a four-item, Likert-type scale developed for this pretest ("It is likely that I would encounter this scent in a store at Christmas time," "This scent reminds me of the holiday season," "When I smell this scent, I think about Christmas and the holidays, " and "This scent captures the spirit of Christmas;" Cronbach's $\alpha = .97$). All questions were measured with seven-point scales.

A repeated measures MANOVA indicated significant differences regarding the strength of association between a particular scent and the Christmas holidays, multivariate F (8, 11) = 13.37, $p < .01$. Based on these results, two scents were selected for additional consideration. These scents were strongly associated with Christmas and included Apple Spice Cinnamon ($M = 5.91$, $SD = 1.76$) and Enchanted Christmas ($M = 5.53$, $SD = 2.08$), t (22) = .35, $p > .72$. Additional measures collected in the pretest (scent pleasantness, familiarity, and intensity) then were analyzed to determine if any differences existed between these scents. There were no differences on familiarity and intensity ($p > .18$). Differences

emerged for pleasantness, however, such that Apple Spice Cinnamon ($\underline{M}$ = 5.99) was a scale-point more pleasant than Enchanted Christmas ($\underline{M}$ = 4.99), $\underline{p} < .01$. We selected Enchanted Christmas as our focal scent.

In the main experiment, the ambient scent factor consisted of two levels: no scent and Christmas scent. In the no scent condition, no olfactory stimuli were employed. The Christmas scent condition was created using the room spray Enchanted Christmas (produced by Greenleaf). About five minutes before the subjects entered the lab where the experiment was held, three sprays of this Christmas scent were introduced into the room, such that there was enough time for the scent to diffuse throughout the room before the experiment started. The lab facilities required that each odor condition be collected during one entire day, the lab was thoroughly ventilated and cleaned between conditions (a commercial scent neutralizer was also used).

Music Stimuli. The music factor in our experiment was comprised of two levels: non-Christmas music and Christmas music. In order to reduce error variance in the experiment, the music stimuli included two different CDs by the same artist. In the non-Christmas condition, the music included Amy Grant's "Heart in Motion" (1991; Tracks 1 thru 8). For the Christmas music condition, Amy Grant's "Home for Christmas" (1992; Tracks 7 thru 12) was selected. In both conditions, the music was started before participants entered the lab facilities, so that individuals were not alerted to the role of music in the experiment. The order in which the music manipulations were executed was rotated within each day of data collection.

Procedure

Data collection took place over two days between the Halloween and Thanksgiving holidays. Individuals participated in the experiment in groups of 5 to 20. Before individuals entered the lab, the experimenter implemented the appropriate olfactory and music manipulations. Research participants, upon arrival, were provided with an instruction sheet that was read aloud by the experimenter. The

instructions included a cover story indicating that the purpose of the study was to provide feedback to an unidentified retail chain considering opening a new department store. More specifically, the supposed purpose of the study was to determine whether there was a market for this chain in the local area and how consumers would feel about the store and its merchandise.

After reading the instructions, subjects were shown a series of 80 slides (for three seconds each) depicting a wide variety of merchandise offered by a typical department store. These slides were of a store located in a shopping mall approximately 100 miles from the study's location. To further prevent recognition of the photographed store, clues as to the identity of the store (e.g., signage or store brands) were carefully avoided. After the slide presentation, subjects were given a questionnaire containing dependent measures, manipulation checks, demographics, and a check for hypothesis guessing.

Dependent Variables

The focal dependent variables, broadly categorized, included participants' evaluations of (1) the retail environment, and (2) the store and its merchandise. All measures (detailed below) were based on prior research and included the summed averages of the items for each scale. Unless otherwise noted, all items employed nine-point scales.

Evaluations of the environment included Mehrabian and Russells' (1974) PAD measure and Fisher's (1974) environmental quality scale. The PAD measure comprises three separate dimensions, namely pleasure (Cronbach's $\alpha = .95$), arousal (Cronbach's $\alpha = .76$), and dominance (Cronbach's $\alpha = .83$). Each of these dimensions was assessed using six semantic differential items (e.g., "unhappy/happy" and "unsatisfied/satisfied" for pleasure, "calm/excited" and "relaxed/stimulated" for arousal, and "guided/autonomous" for dominance). Environmental quality (Cronbach's $\alpha = .97$) was assessed with Fisher's (1974) thirteen semantic differential items (e.g., "unattractive/attractive," "negative/positive," "dull/bright") and the additional item ("unpleasant/pleasant") used by Spangenberg et al. (1996).

Evaluations of the store and its merchandise included measures of attitude toward the store (Cronbach's $\alpha = .97$), attitude toward the merchandise (Cronbach's $\alpha = .97$), and a single-item measure of

intentions to visit the store. Attitude toward the store was measured on a five-item, semantic differential scale with the anchors "bad/good," "unfavorable/favorable," "negative/positive," "dislike/like" and "outdated/modern" (Spangenberg, et al., 1996). Merchandise evaluation was assessed on a five-item, semantic differential scale anchored "bad/good," "unfavorable/favorable," "negative/positive," "unpleasant/pleasant," "low quality/high quality," and "unattractive/attractive" (Spangenberg et al., 1996). The measure of intentions to visit the store consisted of a question asking: "How likely is it that you would visit the store?" anchored with "very unlikely/very likely."

Manipulation Checks

The manipulation check for ambient scent consisted of two parts. First, research participants were asked to indicate whether they noticed a scent in the room where the experimental session was held. As expected, individuals in the Christmas scent condition were more likely to have noticed a scent than those in the no scent condition, $X^2 = 68.01$, $p < .01$. Participants in the Christmas scent condition then completed a three-item scale measuring the association of the ambient scent with the Christmas holiday season ("It is likely that I would encounter this scent in a store at Christmas time," "This scent reminds me of the holiday season, " and "When I smell this scent, I think about Christmas and the holidays," on nine-point scales; Cronbach's $\alpha = .90$). For individuals in the scented environment, the mean value on this scale was 6.92 ($SD = 1.79$), which was significantly different than the scale midpoint, $t(56) = 8.10$, $p < .00$. Overall, the manipulation of ambient scent was considered successful.

A second manipulation check was administered to evaluate the success of the music manipulation. For both the non-Christmas and Christmas conditions, subjects completed a three-item scale measuring the strength of the association between the music and the Christmas holidays ("It is likely that I would encounter this music in a store at Christmas time," "This music reminds me of the holiday season," and "When I hear this music, I think about Christmas and the holidays," on nine-point scales; Cronbach's $\alpha = .96$). The mean score on this scale was higher in the Christmas music condition ($M = 7.80$,

SD = 1.94) than in the non-Christmas condition (M = 2.82, SD = 1.79), t (134) = 15.53, p < .01. Thus, the experimental music manipulation also was successful.

Results

The effects of scent and music on the focal dependent variables were assessed using a MANOVA model. The analysis indicated no significant multivariate or univariate main effects of scent (all p's > .16) or music (all p's > .21). The multivariate interaction effect of scent and music, however, was significant, multivariate F (7, 120) = 3.01, p < .01. The univariate analyses indicated that the interaction of ambient scent and music had significant effects on all dependent measures (all p < .05). The results of these analyses and descriptive statistics for the study are summarized in the Table.

[Insert Table about here]

The overall pattern of means for the dependent variables indicate that the addition of the ambient Christmas scent led to more favorable evaluations when Christmas music was being played, and had no effect or, in some cases, led to less favorable evaluations when non-Christmas music was being played. Follow-up univariate contrasts support this interpretation.

In particular, an ambient Christmas scent in the presence of Christmas music (as compared to no scent and Christmas music) led to more favorable store attitudes, F (1,62) = 5.22, p < .05, stronger intention to visit the store, F (1,62) = 4.18, p < .05, greater pleasure, F (1,62) = 7.04, p < .02, greater arousal, F (1,62) = 3.50, p < .08, greater dominance, F (1,62) = 7.64, p < .02, and a more favorable evaluation of the environment, F (1,62) = 4.42, p < .05. There was no effect with regard to attitudes toward the merchandise, F (1,62) = .70, p > .40. In contrast, an ambient Christmas scent in the presence of non-Christmas music (as compared to no scent and non-Christmas music) had no effect on individuals' pleasure, F (1,64) = 1.82, p > .17, arousal, F (1,64) = 1.53, p > .21, or perceptions of the environment, F (1,64) = 1.83, p > .17. Indeed, the addition of a Christmas odor in the non-Christmas music condition

led to less favorable store attitudes, F (1,64) = 4.19, $p < .05$, lower attitudes towards the store's merchandise, F (1,64) = 6.72, $p < .02$, weaker intention to visit the store, F (1,64) = 5.44, $p < .03$, and less dominance, F (1,64) = 8.66, $p < .02$.

Discussion

The results of this experiment indicate that consistency between an ambient scent and music in a retail setting leads to more favorable evaluations of the store, its merchandise, and the store environment. Behavioral intentions to visit the store are also positively affected by consistency between ambient scent and music. When inconsistency exists between the ambient scent and music, however, evaluations and behavioral intentions are not affected and in some instances are negatively affected.

Perhaps the most important practical recommendation arising from the current work concerns the importance of congruency between music and scent when incorporated as environmental stimuli in retail settings. For retailers, it seems crucial to select combinations of scents and music that are congruent in the minds of their customers—like the above combination of Christmas music with a Christmas scent. Such environmental cues are likely to lead to more favorable outcomes for retailers using such stimuli in their stores. Retailers need to be aware that not all combinations of music and scent positively affect shoppers. Non-congruent combinations are unlikely to elicit favorable outcomes. Retailers might be better advised to use a single environmental cue rather than introduce incongruent combinations of music and scent. Our findings suggest, for example, that the use of music without a scent may be as beneficial as the use of congruent combinations of music and scents in producing favorable consumer responses.

Implications for environmental psychology also arise from our study. The results presented herein are consistent with earlier work concerning the positive effects of scent and music congruity with regard to other marketer-controlled variables (e.g., Bone and Jantrania, 1992; Kellaris and Powell Mantel, 1996; North et al., 1999; Spangenberg, et al., 2000). The current experiment contributes to this literature by establishing that cue congruency is also important with respect to combinations of ambient scents and music. Additional research could explore the interactions of environmental stimuli beyond the realms of

scent and sound. For example, during the Christmas season environmental stimuli like lighting, color, and other ornamentation can offer practically important options for retailers and theoretically interesting factors for scholars to explore. More generally, an empirical understanding of the interactive effects of environmental stimuli, in addition to established main effects, would lend enormous practical and theoretical benefit to the science and practice of environmental psychology.

An interesting aspect of the current study is the absence of main effects for scent and music in the presence of significant interaction effects. This finding does not corroborate main effects reported in studies focusing on single environmental cues (e.g., Mitchell, Kahn, and Knasko 1995; Milliman 1982; 1986). While it is possible that the design of the study, which did not include an ambient scent condition that excluded music, disallowed a more rigorous test for a main effect of scent, the significant interactions highlight the importance of investigating the joint effect of multiple atmospheric cues.

Future research could explore further the nature of the effects reported in this paper. In the current experiment, a congruent combination of Christmas scent and Christmas music improved consumers' evaluations of a retailer, its environment and merchandise. A potential limitation of the current study is that it was conducted in a strictly controlled laboratory setting. An exploration of the magnitude of the observed effects in a field setting would certainly bolster the generalizability of the findings.

The findings may also be restricted seasonally in that the current experiment was conducted during the Christmas holiday shopping season. As such, two issues regarding the generalizability of these findings come to the fore: First, would the use of seasonally congruent scent and music have the same effect if employed at a time of year other than the holiday season in which the current study was conducted? Basic consistency theory would predict that a congruent combination of scent and music, incongruent with the time of year, would yield negative consumer responses. From a practical perspective this line of inquiry could help to address the issue of how early retailers should start decorating for Christmas—or any other holiday for that matter. A second question asks whether similar interactive effects of environmental stimuli hold for other holidays: Are the smells of hot dogs, apple pie and the playing of God Bless America on the Fourth of July of benefit to retailers? To extend the

findings of the current study, which contrasts a holiday-congruent scent with no scent in the presence of congruent and incongruent music, future studies should examine the interactions involving holiday-congruent scents versus holiday-incongruent scents.

In sum, modern-day retailers might do well to pay heed to Biblical wisdom drawn from the first Christmas. In heralding the birth of Jesus, angels sang and wise men provided fragrant gifts to the Child, thereby setting the stage for what would eventually constitute modern Christmas ambience. Our results suggest that wise retailers can act upon this lesson by blessing their customers with synchronized sound systems and scent diffusers, and in turn receive the blessing of strong holiday sales.

References

Bone Paula Fitzgerald Ellen Pam Scholder. Scents in the marketplace: Explaining a fraction of olfaction. Journal of Retailing 1999; 75 (2): 243-262.

Bone Paula Fitzgerald Jantrania Swati. Olfaction as cue for product quality. Marketing Letters 1992; 3 (3): 289-296.

Dawson S. Bloch Peter H. Ridgway N. M. Shopping motives, emotional states, and retail outcomes. Journal of Retailing 1990; 66 (4): 408-427.

Donovan Robert J. Rossiter John R. Store atmosphere: An environmental psychology approach. Journal of Retailing 1982; 58 (1): 34-57.

Dubé Laurette Chebat Jean-Charles Morin Sylvie. The effects of background music on consumers' desire to affiliate in buyer/seller interactions. Psychology and Marketing 1995; 12 (4): 305-319.

Fisher J. D. Situation-specific variables as determinants of perceived environmental aesthetic quality and perceived crowdedness. Journal of Research in Personality 1974; 8: 177-188.

Hung Kineta. Narrative music in congruent and incongruent TV advertising. Journal of Advertising 2000; 29 (1): 25-34.

Kellaris James J. Altsech Moses B. The experience of time as a function of musical loudness and gender of listener. In: Sherry John F. Jr. Sternthal Brian, editors. Advances in Consumer Research, vol. 19. Provo, UT: Association for Consumer Research 1992: pp. 725-729.

Kellaris James J. Kent Robert J. The influence of music on consumers' perceptions: Does time fly when you're having fun? Journal of Consumer Psychology 1992; 1 (4): 365-376.

Kellaris James J. Kent Robert J. An exploratory investigation of responses elicited by music varying in tempo, tonality, and texture. Journal of Consumer Psychology 1993; 2 (4): 381-401.

Kellaris James J. Powell Mantel Susan. Shaping time perceptions with background music: The effect of congruity and arousal on estimates of ad duration. Psychology and Marketing 1996; 13 (5): 501-515.

Kotler Philip. Atmosphere as a marketing tool. Journal of Retailing 1973; 49 (4): 48-63.

Machleit Karen A. Eroglu Sevgin A. Describing and measuring emotional response to shopping experience. Journal of Business Research 2000; 49 (2): 101-111.

MacInnis Deborah J. Park C. Whan. The differential role of characteristics of music on high- and low-involvement consumers' processing of ads. Journal of Consumer Research 1991; 18 (3): 161-173.

Mehrabian Albert Russell James. An approach to environmental psychology. Cambridge, MA: MIT Press, 1994.

Miller C. Research reveals how marketers can win by a nose. Marketing News 1991; 25 (February 4): 1-2.

Milliman Ronald. The effects of background music upon the shopping behavior of supermarket patrons. Journal of Marketing, 1982; 46 (3): 86-91.

Milliman Ronald. The influence of background music on the behavior of restaurant patrons. Journal of Consumer Research 1986; 13 (2): 286-289.

Mitchell Deborah J. Kahn Barbara E. Knasko Susan. There's something in the air: Effects of congruent or incongruent ambient odor on consumer decision making. Journal of Consumer Research 1995; 22 (3): 229-238.

Morrin Maureen Ratneshwar S. The impact of ambient scent on evaluation, attention, and memory for familiar and unfamiliar brands. Journal of Business Research 2000; 49 (2): 157-165.

North Adrian C. Hargreaves David J. The effect of music on atmosphere and purchase intentions in a cafeteria. Journal of Applied Social Psychology 1998; 28 (24): 2254-2273.

North Adrian C. Hargreaves David J. McKendrick Jennifer. The influence of in-store music on wine selections. Journal of Applied Pyschology 1999; 84 (2): 271-276.

Pacelle Mitchell. Many people refuse to check in if a hotel has odors in the lobby. Wall Street Journal 1992; July 28: 1.

Pomerantz Jeffrey. Perceptual organization in information processing. In: Kubovy Michael Pomerantz Jeffrey, editors. Perceptual Organization. Hillsdale, NJ: Erlbaum, 1981, pp. 141-180.

Sherman Elaine Mathur Anil Smith Ruth Belk. Store environment and consumer purchase behavior: Mediating role of consumer emotions. Psychology and Marketing 1997; 14 (4): 361-378.

Spangenberg Eric R. Crowley Ayn E. Henderson Pamela W. Improving the store environment: Do olfactory cues affect evaluations and behaviors? Journal of Marketing 1996; 60 (2): 67-80.

Spangenberg Eric R. Sprott David E. Grohmann Bianca Tracy Daniel L. Effects of gender-congruent ambient scent on approach and avoidance behaviors in a retail store. Unpublished manuscript 2003.

Yalch Richard F. Spangenberg Eric R. An environmental psychological study of foreground and background music as retail atmospheric factors. In: Walle A. W., editor. AMA Educators' Conference Proceedings. Chicago, IL: American Marketing Association, 1988. pp. 106-110.

Yalch Richard F. Spangenberg Eric R. Effects of store music on behavior. Journal of Consumer Marketing 1990; 7 (2): 55-63.

Yalch Richard F. Spangenberg Eric R. Using store music for retail zoning: A field experiment. In: McAlister Leigh Rothschild Michael, editors. Advances in Consumer Research, vol. 10. Provo, UT: Association for Consumer Research, 1993. pp. 632-636.

Yalch Richard F. Spangenberg Eric R. The effects of music in a retail setting on real and perceived shopping times. Journal of Business Research 2000; 49 (2): 139-147.

Table. Means and (standard deviations) for Experiment

Dependent Variable	Environmental Stimuli				Univariate Interactions[a]
	Non-Christmas Music		Christmas Music		
	No Scent (n=40)	Christmas Scent (n=26)	No Scent (n=15)	Christmas Scent (n=49)	
Reactions to the Retailer and Merchandise					
Store Attitudes	6.59 (1.55)	5.76 (1.70)	5.27 (2.17)	6.46 (1.64)	F (1,126) = 9.52
Merchandise	6.69 (1.44)	5.69 (1.68)	6.06 (4.21)	6.65 (1.53)	F (1,126) = 4.18
Likely to Visit	6.85 (1.86)	5.69 (2.13)	5.40 (2.44)	6.63 (1.91)	F (1,126) = 9.42
Reactions to the Environment					
Pleasure	5.55 (1.49)	5.12 (0.76)	4.50 (1.46)	5.68 (1.53)	F (1,126) = 8.93
Arousal	4.61 (1.41)	4.21 (1.13)	4.16 (1.70)	4.93 (1.30)	F (1,126) = 5.05
Dominance	5.43 (0.85)	4.88 (0.55)	4.41 (1.61)	5.41 (1.08)	F (1,126) = 15.69
Environment	5.74 (1.62)	5.24 (1.16)	4.70 (1.98)	5.79 (1.71)	F (1,126) = 6.44

a. There were no significant main effects for scents or music. All interactions are significant, $p < .05$.

Footnotes

[1] While we hypothesize that the effects of an ambient scent are moderated by music, the alternate relationship (i.e., the effects of music are moderated by ambient scent) is also plausible. We believe that research equally supports both of these moderated relationships, thus one relationship is not more appropriate than the other. For the sake of presentational clarity, however, we have chosen to hypothesize and test for the interaction that music moderates the effects of ambient scent on consumer evaluations. Future research is required to better explicate the nature of this relationship.