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Mall atmospherics: the interaction effects of the mall environment on shopping behavior

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Abstract

The authors investigate the moderating effects of ambient odors on shoppers' emotions, perceptions of the retail environment, and perceptions of product quality under various levels of retail density. The context for the experiment is a real-life field location—in a community shopping mall. The pleasing ambient scents are hypothesized to positively moderate shoppers' perceptions of their environment. A multigroup invariant structural equation model that accounts for different retail density levels shows that the relationship between ambient odors and mall perception adopts an inverted U shape. Ambient odors positively influence shoppers' perceptions only under the medium retail density condition. Incongruity theory informs the interaction effect between the two atmospheric variables. A moderate incongruity level is more likely to trigger a favorable evaluation of the situation (the shopping experience), object (the products sold), or the person (the salesclerks).
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1. Introduction

The ability to modify in-store behavior through the creation of an atmosphere is recognized by many retail executives and retail organizations. In a recent review of 60 experiments that manipulated portions of a store's complex atmosphere, Turley and Milliman (2000) note that each of these studies found some statistically significant relationship between atmospherics and shopping behavior. Based on this review they conclude that the effect of the retail environment on consumer behavior is both strong and robust, and that it can be shaped to increase the likelihood of eliciting particular behaviors from shoppers. They also note that the research in this area includes a variety and diversity in both independent and dependent variables.

Turley and Milliman's (2000) review highlights a variety of shopping behaviors that retailers can influence and the diversity of retail formats in which these studies have taken place. Varying music styles and tempos influence sales in supermarkets (Gulas and Schewe, 1994; Herrington and Capella, 1996; Milliman, 1982), impulse purchasing in department stores (Yalch and Spangenberg, 1990), emotional responses to waiting in banks (Hui et al., 1997), sales in wine shops (Areni and Kim, 1993; North et al., 1999), and sales in a restaurant (Milliman, 1986). Further examples of consumer responses induced by changes in atmospheric variables include increased sales due to effective exterior store windows (Edwards and Shackley, 1992), the effect of lighting on the number of items handled by shoppers (Areni and Kim, 1995), store layout on price perceptions (Smith and Burns, 1996), and merchandise arrangement on purchase intentions in a wine store (Areni et al., 1999).

In addition to in-store behaviors, the retail environment has an impact on an array of consumer emotions and attitudes: the effect of crowding on shopper satisfaction (Machleit et al., 1994), the mediating effect of the environment on the affective reactions of department store shoppers (Sherman et al., 1997), the influence of color on furniture store displays (Babin et al., 2003; Bellizzi et al., 1983; Bellizzi and Hite, 1992), the impact of the general environment on store image of a card and gift store (Baker et al., 1994), and environment redesign on service satisfaction in a

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dental office (Andrus, 1986). Babin and Darden (1995) also observe that the effect of a store atmosphere might be mediated by a consumer's general shopping style, thus producing various reactions from different segments of consumers.

The idea of looking at a "basket" of environmental cues rather than a single cue at a time is fairly recent and is clearly under-researched (Wakefield and Baker, 1998). Research issues explain in part why global retail configurations have not been the objects of many studies. Baker (1998) mentions the difficulty and the expense of manipulating elements of the environment in a real store setting. Laboratory experiments become more affordable but certainly less realistic alternatives.

1.1. *Ambient odors as part of the retail atmospheric*

Ambient odor is one of the elements of a retail atmosphere that has not received the interest from researchers that it probably deserves (Turley and Milliman, 2000). The perception and interpretation of odors is a complex phenomenon that involves a mixture of biological responses, psychology, and memory (Wilkie, 1995). Of the five senses, smell is considered to be the most closely attached to emotional reactions because the olfactory bulb is directly connected to the limbic system in the brain, which is the seat for immediate emotion in humans (Wilkie, 1995). This makes ambient odors in a retail environment an important atmospheric variable to study because fragrances have an increased likelihood of producing an emotional reaction from consumers.

However, in a recent review of studies on olfaction, Bone and Ellen (1989) contend that there is little evidence to support the notion that an odor is likely to affect a retail behavior. At present, using odor as a strategic atmospheric variable is risky because odor effects are difficult to predict. In this review, they include studies that "assessed the effects of scent presence, scent pleasantness, or scent fit on mood, elaboration, affective and evaluative response, intent and behavior (i.e., time spent, information search, and choice)."

Few studies explored the presence of odors in actual retail settings. Most have been performed in a simulated environment (Morrin and Ratneshwar, 2000; Fiore et al., 2000; Spangenberg et al., 1996; Mitchell et al., 1995). Even fewer studies have been undertaken in actual marketing environments (Chebat and Michon, in press; Hirsch, 1995; Knasko, 1993; Knasko, 1989). As a whole, these studies indicate that odor can impact consumer shopping behavior, even if some of the findings have been considered mixed or inconsistent (Fiore et al., 2000). For example, Spangenberg et al. (1996) show that product type mediates the effect of odor on purchase intentions. Morrin and Ratneshwar (2000) also illustrate that ambient scents improve evaluations of products that are unfamiliar or not well liked.

To be effective, odors should be consistent with whatever product is presently under evaluation by the consumer (Fiore et al., 2000; Mitchell et al., 1995). However, the ability to match specific scents with products is much easier for single-line or limited-line specialty stores than it is in other retailing contexts such as department stores, discount stores, or malls where product selections are broader and deeper and therefore less related.

Fiore et al. (2000) also report that the effect of ambient scents might be mediated by other atmospheric elements. They realized that adding a pleasant fragrance to a product display results in higher levels of attitude toward the product, purchase intentions, and willingness to pay higher prices. In a similar manner, retail density may also interact with ambient scents and influence consumer perceptions of the shopping experience (Eroglu and Machleit, 1990).

1.2. *Crowding and retail density*

Crowding is generally perceived as an unpleasant experience in shopping situations (Bateson and Hui, 1987). It can lead to reduced satisfaction (Eroglu and Machleit, 1990; Machleit et al., 2000). Research on crowding clearly distinguishes between perceived crowding and human density (Machleit et al., 2000; Hui and Bateson, 1991), spatial density (Machleit et al., 2000), functional density (Eroglu and Harrell, 1986), and perceived control and choice (Hui and Bateson, 1991). Consumer density emerges as the most important component of crowding. Harrell et al. (1980) report a correlation coefficient of .58 between physical density and crowding.

The effect of crowding on consumer perceptions, emotions, and satisfaction varies depending on shoppers' motivations or personal goals (Eroglu and Harrell, 1986) and types of stores (Hui and Bateson, 1991; Machleit et al., 2000). Crowding is likely to create some psychological stress and increased arousal on consumers who feel a loss of personal space (Stokols, 1972) and a limitation in freedom (Brehm, 1966). Of course, consumers' perception of human density is relative to their expectations, past experiences, and personality traits. Shoppers certainly anticipate stores to be more crowded on Saturday afternoons than on Monday mornings.

The effect of perceived crowding on cognition has been explained by Milgram's (1970) system overload theory. Under high human-density conditions, shoppers are exposed to too many stimuli. For example, they have less time to process atmospheric cues (Harrellet al., 1980). The impact of retail crowding on consumers' emotions has been studied by Machleit et al. (2000). The authors found that human and spatial crowding is negatively correlated with Mehrabian and Russell's (1974) pleasure dimension and positively correlated with Izard's (1997) "hostility triad" (anger, disgust, and contempt).

The mediating effect of human density and perceived crowding on perceptions and emotions also influence shopping behavior. Consumers adjust to higher retail densities by reducing shopping time, deviating from their shopping

plans, buying less to enter express checkout lanes, postponing purchases, relying more on shopping lists, reducing interpersonal communications, and refraining from exploratory behaviors (Eroglu and Harrell, 1986; Harrell et al., 1980).

2. Research hypotheses and methodology

This paper contributes to three aspects of store atmospherics. First, there are very few published studies examining consumers' responses to manipulations of individual elements in a mall environment. Second, there is no known research considering the interaction effects between the mall atmospheric components. Third, consumer density is likely to interfere with ambient scents. High density increases the mall ambient temperature and is likely to modify the effects of ambient odors. High density also enhances consumers' arousal, which mediates the effects of scents.

The study explores the interplay between retail density and mall atmospheric manipulations. The combined moderating effects of ambient scent and retail density are measured on shoppers' positive affect and on their perception of the mall environment. Previous research shows that ambient odors influence shoppers' perceptions, affect, and behavior (Bone and Ellen, 1989; Chebat and Michon, in press; Morrin and Ratneshwar, 2000; Spangenberg et al., 1996). In their work on crowding, Machleit et al. (2000) observe that human and spatial densities are negatively correlated with Mehrabian and Russell's (1974) pleasure scale and Izard's (1997) positive emotions. They also report negative correlation coefficients between shoppers' satisfaction and perception of crowding under high human density conditions.

Based on these studies and on the environmental psychology models (Mehrabian and Russell, 1974; Donovan and Rossiter, 1982), we posit that ambient scent and retail density moderate shoppers' positive affect and perception of the mall environment. The latter mediate the perception of product quality.

H1: A light and pleasing ambient scent positively influences shoppers' mood and shoppers' perception of the mall environment.

H2: Positive affect and perception of the mall atmosphere intervene with the perception of product quality.

2.1. The factorial design

The proposed model was tested during a mall intercept in a northeastern community urban shopping center with a three-by-three factorial structure (three levels of retail density, and three levels of ambient scent).

Data were collected in three separate waves (for ambient scent) evenly spaced over different weekdays and day parts to capture retail density. The nine cells of the factorial design are made up of 31 participants each, for a total sample size of 279. Cells with excess participants were randomly scaled down to ensure a well-balanced frequency distribution. Retail density levels were defined from normal traffic during the retail business hours.

The three ambient odor experiments were conducted during the months of February, March, and April. Each wave took about 1 week. The mall director cancelled all promotions by retailers for the duration of the experiments. In the control wave, the shopping mall ambient olfactory atmosphere was not modified. There were no noticeable odors released from stores like food outlets or fragrance boutiques. Ambient scents (lavender and citrus) were diffused during separate weeks in the mall main corridor located between two major retailers. Some 10 diffusers released the fragrances for 3 s every 6 min for stable scent intensity. Graduate marketing students, briefed not to wear perfume, administered the questionnaires. Sampled individuals were not told or made aware of the research objectives. Survey questions measuring the appropriateness of environmental factors showed that participants were not conscious of ambient odors.

Scent selection was based on Spangenberg et al.'s (1996) experimentation. They tested a series of 26 nonoffensive odors on the affective and activation (arousal) scales originally developed by Fisher (1974), and used by Crowley (1983) in environmental research. The affective dimension includes five items (positive, attractive, relaxed, comfortable, and good). The activation scale (i.e., arousal) is also

Table 1
Scale items with alpha coefficients and exploratory factor loadings (oblimin rotation)

Factors	Items	Pleasure (positive affect)	Mall perception	Perception of product quality
Product quality (α=.87) (Bellizi et al., 1983)	Outdated/Up to date (style)	0.20	0.53	0.91
	Inadequate/Adequate (selection)	0.10	0.45	0.89
	Low/High quality (availability)	0.19	0.46	0.86
Mall environment (α=.88) (Fisher, 1974)	Boring/Stimulating	0.18	0.91	0.52
	Unlively/Lively	0.19	0.89	0.44
	Uninteresting/Interesting	0.23	0.89	0.49
Positive affect—pleasure (α=.94) (Mehrabian and Russell, 1974)	Melancholic/Contended	0.95	0.24	0.15
	Unsatisfied/Satisfied	0.94	0.20	0.19
	Unhappy/Happy	0.94	0.19	0.18

The alpha coefficients and factor loadings refer to the selected indicators entered in the model. The exploratory factor analysis was performed using an oblique rotation. The perception of the mall environment and that of product quality are not orthogonal dimensions.

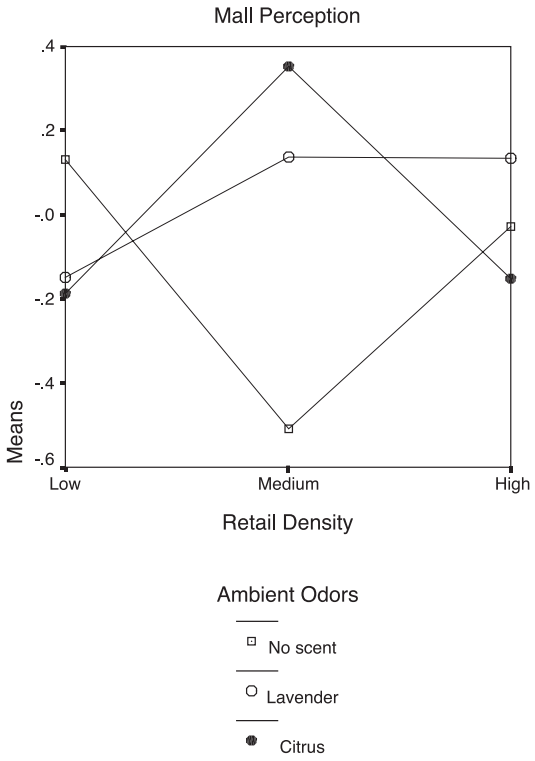


Fig. 1. The interaction effects of ambient scent and retail density on the perception of the mall environment. Exploratory analysis shows interaction effects between ambient odors and retail density.

made up of five attributes (stimulating, lively, bright, motivating, and interesting). Lavender is identified as affectively neutral, while citrus is found to be affectively pleasing.

Subjects and controls were probed on their perceptions of product quality using a three-item scale developed by Bellizi et al. (1983). The product quality scale has a Cronbach's alpha coefficient of .87 (see Table 1). Perception of the mall environment is captured with a selection from Fisher's semantic differentials (α=.88). Mehrabian and Russell's (1974) pleasure items measure positive affect (α=.94).

2.2. Model building

Structural equation modeling (SEM) was chosen because it can support simultaneously latent variables with multiple indicators, interrelated dependent variables (see H1), mediating effects (see H2), and causality hypotheses. Structural equations can measure independent variable errors while regression analysis and ANOVA cannot (Bollen, 1989, pp. 72–73). Exploratory data analysis showed a strong interaction effect between ambient scent and retail density (Fig. 1). Despite its bulkiness, a three-density group invariant structure model is more likely than a dummy variable approach to capture the interaction effects between ambient scents and retail density on shoppers' mood and perception. Bagozzi and Yi (1989) suggest that a multiple-group approach has the ability to test for homogeneity. They posit that structural equation model analyses can provide more powerful tests of mean differences.

The multigroup structure model handles the three retail density levels. Taking into consideration the presence of the odor categorical variable, the model is estimated with Yuan and Bentler's (2002) corrected AGLS chi-square statistics, an asymptotically distribution free (ADF) statistic available in more recent EQS versions. The error variance of the

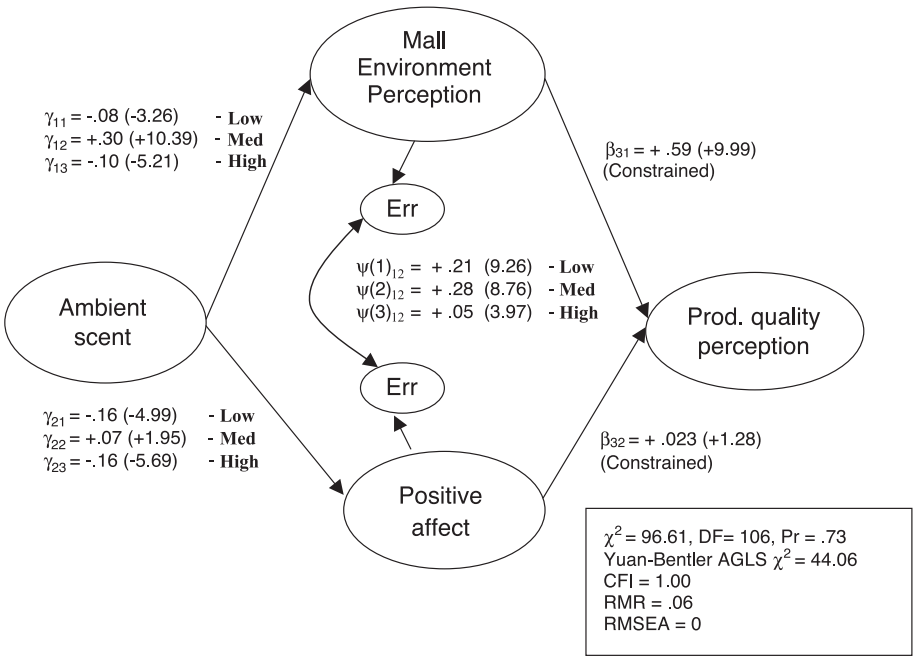


Fig. 2. Multigroup–retail density conditions. Construct equations with test statistics.

ambient scent categorical factor is set to zero (Bagozzi, 1994).

In the hypothesized model, no causality path occurs between shoppers' positive affect and perception of the mall atmosphere (Fig. 2). Instead, there are correlated error terms between both constructs. The direction of the path is debatable. One may argue that a favorable perception of the mall environment boosts shoppers' mood. One may also assume that shoppers in a good mood would have a more favorable perception of their environment. The model also wants to test perceptual and emotional paths to the perception of product quality. The error terms between pleasure and mall perception are correlated and constrained for all three retail density conditions. All latent variable indicators and endogenous paths originating from mall perception and from positive affect toward the perception of product quality are also constrained for all density levels. Only the paths from the exogenous ambient odor variable are allowed to vary as density conditions change.

3. Research findings

Fig. 2 introduces research findings with the three-group invariant structure. The tested model looks more than acceptable ($\chi^2 = 96.05$, $df = 106$; Pr=.73; RMR=.06). The Lagrange multiplier (LM) test accepts all constraints except one: the error covariance between the perception of the mall atmosphere and shoppers' positive affect. The error covariance constraint has been released to satisfy the LM requirement under high retail density.

The positive effect of ambient scent on shoppers' perception of the mall atmosphere is observed only at the medium retail density level (γ_{12}=.30, $t = 10.39$). At low or high density levels, the moderating effect becomes negative ($\gamma_{11} = -.078$, $t = -3.26$; $\gamma_{13} = -.100$, $t = 5.21$), indicating that no ambient scent treatment might be better than a light and pleasing odor such as citrus. The moderating effect of ambient scent on shoppers' emotions follows an identical direction ($\gamma_{21} = -.16$, $t = -4.99$; γ_{22}=.07, $t = 1.95$; $\gamma_{23} = -.16$, $t = -5.69$). The positive effect of ambient scent on shoppers' mood at medium density level is only marginally significant. H1 may be accepted under the medium retail density condition only, and must be rejected for high or low retail densities. H2 is rejected in part. A favorable perception of the retail environment influences the perception of product quality. However, shoppers' mood has little direct effect on the perception of product quality.

The error covariance coefficient between positive effect and mall perception reaches its maximum level at medium density (ψ_2=.28, $t = 8.76$) and is relatively strong at low density (ψ_1=.21, $t = 9.26$). This coefficient drops significantly under high retail density (ψ_3=.05, $t = 3.97$). Despite changes in retail density, the paths from mall perception and from shoppers' mood to the perception of product quality remain unchanged. Yet, only the path from mall perception to product quality is significant (β_{31}=.59, $t = 9.99$). The path coefficient between shoppers' mood and product quality can probably be dropped (β_{23}=.02, $t = 1.28$).

4. Discussion

4.1. Retail atmospheric interplay

Most studies on retail atmospherics involve a single manipulation. Very few experiments combine more than one treatment and their interaction effect. In an earlier study by Chebat and Michon (in press), the positive mediating effect of ambient scent on shoppers' perception and emotion was clearly underscored. But, when taking another variable into consideration, earlier conclusions must be revised. Interaction effects, whether they involve odors or any other retail variables, may produce surprising and counterintuitive findings. Babin et al. (2003), for example, discovered that colors that seem counterproductive in a retail environment, such as orange, might produce favorable results in conjunction with other atmospheric parameters (such as lighting). Consumers do process atmospheric characteristics holistically more than piecemeal (Babin et al., 2003; Ward et al., 1992). Obviously, managers should not concentrate their efforts on one or two atmospheric characteristics and neglect the others. Retail atmospheric interactions and cofactors can play tricks on managers trying to boost mall and store perceptions.

4.2. The processing of ambient scent

When positively processed, as under the medium density condition, ambient odors are more likely to moderate consumers' cognition (i.e., the perception of the mall environment) rather than emotions. The effect of ambient odors on shoppers' mood is barely significant. Bone and Ellen (1989) found only a small percentage (16.1%) of tests showing the effect of scent on mood dimensions. Spangenberg et al. (1996), who studied the influence of ambient scent on store and product evaluations, observe no main or interactive effects regarding scent on mood. Chebat and Michon (in press), in support of Lazarus' (1991) cognitive theory of emotion, found that ambient scent directly affects shoppers' perceptions.

Product quality is related to the perception of the mall environment (β_{31}=+.59, $t = +9.99$). Shoppers' positive affect has no significant effect on the perception of product quality (β_{32}=+.02, $t = +1.28$). The only way positive affect can indirectly influence shoppers' response is by the insertion of a path between shoppers' emotions and mall perception, rather than an error covariance. Under the high retail density condition, the relationship between positive affect and mall perception deteriorates (ψ_3=.05, $t = 3.97$). High retail density is likely to remove the pleasure out of shopping. The

maximum correlation between pleasure and mall perception is attained at medium retail density (ψ_2=.28, t=8.76).

The environmental psychology literature positions consumers' mood as a mediating factor between environmental cues and behavior (Mehrabian and Russell, 1974, Donovan and Rossiter, 1982). Much of the research on store atmospherics presumes a mediating effect of mood on consumers' cognition and behavior (Spies et al., 1997). Here, ambient scent influences the perception of product quality through the perception of the mall atmosphere. The findings are convergent with those of Spangenberg et al. (1996) and Morrin and Ratneshwar (2000), who found no main or interactive effects regarding scent on mood. Similarly, Chebat et al. (2001) showed that store music background has strong cognitive effects in terms of both cognitive response and information processing. They suggest that background music stimulates (or cancel) cognitive processing. Odors may produce the same results.

4.3. Retail density

At first glance, retail density seems to be the cause of many disturbances in this research. The concept of crowding is both complex and central to retail atmospherics. It is seldom taken into consideration as a cofactor in other studies on store or mall environment. Apart from the effects of retail and spatial density, other moderating factors such as shoppers' characteristics and motivations should also be considered.

Shoppers' profile during low, medium, and high retail density periods present significant differences. One-way ANOVAs show that age (Sig.=.01), education level (Sig.=.02), and occupational status (Sig.=.01) vary along shopping hours . During low retail density periods, shoppers are older (mean=40 years old vs. 36 during high-density periods), have less formal education (mean=11 years against 12 during peak hours), and are less likely to work full time. Busy people may not have time to shop during more quiet retail hours. Demographic factors are linearly associated with retail density levels. They do not account for the inverted U-shape effect of retail density on shoppers' mood and perception.

The medium retail density condition looks like a sweet spot for ambient odor manipulations. Yet, at low-density levels, there are no clear reasons why ambient scent would not positively moderate shoppers' perceptions and affect. Shoppers in low traffic hours are somewhat older and more likely without a full-time job. They are also more likely to have stronger hedonistic motivations and pay attention to their environment. Eroglu and Harrell (1986) note that task-oriented and recreational shoppers do not process retail density cues identically. Maybe non-task-oriented shoppers during low traffic hours hope for more stimulating activities. In high retail density situations, shoppers may be exposed to too much stimulation. Shoppers allocate less time to environmental atmospheric inputs (Harrel et al., 1980). An empty store may be just as detrimental to shoppers' perceptions as an overcrowded one. The effect of density may not be linear but somewhat more similar to an inverted U shape.

4.4. Further research

The combination effect of environmental cues is referred to in the literature as cue congruence, fitness, or appropriateness (e.g., Baker, 1998; Gulas and Bloch, 1995; MacInnis and Park, 1991; Mitchell et al., 1995; Spangenberg et al., 1996). Maximum retail effectiveness would be achieved when all environmental cues—ambient, design, and social—are congruent with the retailer's overall image (Baker, 1998). However, atmospheric cues interact with each other to produce unexpected effects.Kahn (1997) reports, for example, that an overstimulated (e.g., too many cues) environment may force consumers to simplify their purchase behavior and choose less variety.

The focus of the incongruity theory is on features that have a similarity–dissimilarity relationship: this theory, for example, has been used extensively in the analysis of humor where resemblances and oppositions are what elicit laughter (Chapman and Foot, 1976). It is suggested that consumers exposed to moderately incongruent environmental cues process information more intensively. Applying arousal theory to humor, Berlyne (1960) maintained that for an individual to find humor in a situation, the incongruity must induce arousal, but not to an uncomfortable degree. The key point of the incongruity theory as applied here is that *moderate* incongruity triggers more reactions than extreme incongruity. Under the mildly incongruent situation, the novelty element increases arousal, thus leading to favorable evaluations of the situation (the shopping experience), object (the products sold), or person (the salesclerks).

Following the incongruity theory, a *moderate* level of incongruity may trigger more favorable perceptual schemes. We hypothesize that, beyond a certain threshold, shoppers spend less time deliberating, process less information, and disregard more of the decision-related attributes, which is indicative of superficial processing of available information (Mano, 1992).

4.5. Limitations

This experiment was conducted in a community mall. Research findings are not generalizable to larger types of shopping centers. Regional or super-regional malls are likely to attract higher proportions of hedonic or recreational shoppers paying more attention to the retail environment and looking for some entertainment. Community malls draw relatively more convenience shoppers. Task-oriented shoppers may be more sensitive to retail crowding and density cues than non-task-oriented shoppers (Eroglu and Harrell, 1986).

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