

The Power of Scent:
Empirical Field Studies of Olfactory Cues on Purchase Behavior

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The President:

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To Aladdin

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Processing Fluency and the Effects of Olfactory Cues on Sales:

The Power of Scent Simplicity

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ABSTRACT

Although ambient scents within retail stores have been demonstrated to influence shoppers, extant research has not convincingly demonstrated real-world effects of scents or adequately provided theoretical explanation for observed effects. The current research addresses these open questions through exploration of processing fluency with regard to the effects of olfactory cues. Across four field experiments, and in support of a processing fluency explanation, we demonstrate that the complexity of a scent impacts shoppers' responses to olfactory cues. In comparison to a control condition, simple (i.e., more fluent) ambient scents diffused by a retailer led to increased customer spending, while more complex scents had no such effect on shoppers. In a final field study, observed effects of scent complexity in the retail setting were replicated in a different context using "scratch-and-sniff" advertisements. Results of our studies indicate that affective responses to scent mediate observed effects. Implications for theory and practice are provided.

INTRODUCTION

What is the most salient cue when entering a store? Is it the product offerings, the clerks or perhaps atmospheric cues? Whether consumers are aware of atmospheric cues or not, retailers invest huge sums of money to create an environment that will increase consumers' interest, and ultimately influence purchases. Realizing that competitors often provide offerings that are not differentiable in terms of price and/or quality, firms often differentiate themselves in the marketplace by diffusing or applying scents. While retailers have been increasingly using scents to market products (including scents associated with advertisements, products, and the retail environment itself), extant research provides an incomplete understanding regarding the impact of these olfactory cues.

The effects of sensory cues on consumers have long been explored in the context of marketing (Peck and Childers 2008). While music has historically been the most commonly studied cue (e.g., Milliman 1982; North and Hargreaves 1998), more recent work has focused on the effects of olfactory stimuli on consumers and their responses to those cues (e.g. Bosmans 2006; Mitchell, Kahn, and Knasko 1995; Morrin and Ratneshwar 2003; Spangenberg, Crowley, and Henderson 1996). One sees little empirical evidence, however, beyond effects of olfactory cues on proximal dependent variables. With few exceptions (Hirsch 1995; Schifferstein and Blok 2002; Spangenberg, Sprott, Grohmann, and Tracy 2006), researchers typically report effects of olfactory cues on measured attitudes and intentions, rather than actual purchase behavior. Thus, a major contribution of the current work is to address the absence of practical application in prior research with four field studies wherein the effects of olfactory cues are demonstrated with regard to actual retail sales.

Of equal or perhaps greater importance, is the fact that a cohesive theoretical explanation for demonstrated effects of olfactory cues on consumer behavior is lacking. Much published research regarding the effects of olfaction on consumer behavior relies on the stimulus-organism-response paradigm (Mehrabian and Russell 1974), the core of which suggests that a pleasant scent triggers a positive affective state in the consumer, which in turn evokes approach behaviors (for a review see Spangenberg, Crowley and Henderson 1996). Pluralistic theoretical explanations for observed effects have also been suggested, but little empirical support in the form of

process evidence confirms postulations emerging from earlier research (Bone and Ellen 1999; Chebat and Michon 2003). Thus, while we know that olfactory cues can be used to impact consumer reactions to various stimuli (e.g., products, advertisements and the retail environment), we do not have a clear understanding as to why such effects occur.

Therefore, in addition to demonstrating the effects of scent in multiple real world settings, a further contribution of the current research is to begin bridging the gap in our theoretical understanding regarding the effects of scent in the marketplace. In particular, we apply the metacognitive construct of processing fluency (Schwarz, 2004) to the context of scent cues (as yet untested), with the expectation that this construct holds promise for explaining many of the observed effects within this domain. Processing fluency is defined as the experienced ease of processing a stimulus (Schwarz 2004). This paradigm suggests that people monitor the cognitive effort spent processing a stimulus and that corresponding feelings of ease or difficulty elicit affect which in turn influences associated behaviors (Reber, Schwarz and Winkielman 2004). Consistent with this theory, we propose (as with visual stimuli) that scents elicit differential affective and behavioral responses depending upon the ease of cognitive processing associated with a particular olfactory cue (Reber, Schwarz, and Winkielman 2004; Winkielman and Cacioppo 2001). By adopting a fluency-based approach, we initially take a step back to focus on the physical characteristics of the scent itself. This approach has been infrequently employed in the marketing literature wherein prior research has focused predominantly on scent characteristics in relation to products and/or retailers associated with the scent (e.g., effects of scent congruity, Bone and Ellen 1999).

Herein, we empirically examine the effect of scent complexity on affect and customer buying behavior in a variety of real-world settings. We begin with an in-depth discussion of processing fluency and how this explanation can be applied to the context of olfaction. This discussion is followed by a summary of relevant marketing-related olfaction research reviewed from a perspective theoretically consistent with fluency. Proposed hypotheses are empirically tested in a series of four field studies. A discussion of our empirical findings and implications of these findings for theory and practice are provided.

BACKGROUND

Although the effects of olfactory stimuli on consumers have been the subject of much research in marketing over the last two decades, there is a general lack of theoretical specification as to how scents influence actual behavior and why some scents show an impact on consumer behavior and others do not. In the current research, we propose that the effects of scent on consumers can be usefully interpreted from a fluency perspective, such that easier to process (or more fluent) olfactory stimuli will lead to favorable marketing outcomes. Given that fluency research has not explored olfactory effects, further development of this basic idea is warranted.

Fluency

Processing fluency refers to the metacognitive experience surrounding the ease of performing a mental action. The core assumption of this theory is that people internally monitor the effort expended on performing a mental process and that this subjectively perceived ease of processing manifests itself as an accessible feeling (Schwarz 2004). This feeling can then have an effect on subsequent judgmental tasks either in an indirect fashion (i.e., mediated by deliberate attribution processes) or in a more direct fashion based on elicited affect (Oppenheimer 2008; Winkielman and Cacioppo 2001). While subjective feelings of processing ease can be elicited in a variety of ways (e.g., retrieval of stored memories, construction of attitudes or preferences), the focus of the current research is on the perception and processing of an encountered external stimulus (Schwarz 2004), in particular an olfactory cue.

Ease of processing an external stimulus is referred to as processing fluency and can be influenced by perceptual stimulus characteristics such as simplicity, symmetry, figure-ground-contrast or clarity (Reber, Schwarz, and Winkielman 2004; Reber and Schwarz 2006). One major assumption in the corresponding literature is that increased processing fluency associated with a given stimulus will increase liking of the stimulus and positively impact subsequent evaluations as well as choice behaviors (Lee and Labroo 2004; Schwarz 2004). This relationship can be explained from an evolutionary point of view: fluency signals familiarity and safety which

have highly positive associations in our early ancestors' environments (Halberstadt and Rhodes 2003). Thus, the mere feeling of fluent processing elicits positive affect because it signals a generally positive state of affairs; this is referred to as the hedonic fluency model (Reber, Schwarz, and Winkielman 2004; Winkielman and Cacioppo 2001) with evidence of this relationship being provided in the literature. For example, in a series of studies Winkielman and Cacioppo (2001) demonstrated a direct link between processing fluency and positive affect by employing facial electromyography that directly captured elicited affect.

The hedonic fluency model has far-reaching consequences for marketing (as well as other fields) when combined with the feeling-as-information account - a theory which proposes that experienced affect is used in heuristic fashion to not only result in a judgment of liking, but also to positively impact other judgmental dimensions (Schwarz and Clore 1983; 1988). Thus, easy to process stimuli are expected to be more liked. Experienced positive affect will also likely trigger a need to attribute the feeling to a likely source which might be the stimulus itself (c.f., feeling-as-information; Schwarz and Clore 1983; 1988), or more salient objects present in the same context or the context itself (e.g., other products in a shop or the general shopping environment respectively).

Processing fluency is indeed proving to be empirically relevant in marketing contexts. For example, Labroo, Dhar, and Schwarz (2007; experiment 1) were able to show that when people are confronted with the task of choosing between two bottles of wine, they were more likely to select the bottle which was perceptually more fluent, due to a semantic priming procedure experienced prior to choice. Further, in an analysis of actual market data, Landwehr, Labroo, and Herrmann (2009) provided evidence that auto manufactures whose model designs were easier to process (due to consistency with a mental prototype) experienced stronger sales. In addition to these examples, the basic principles of processing fluency have been usefully applied to the design of brand logos (Janiszewski and Meyvis 2001), advertisements (Labroo and Lee 2006; Lee and Labroo 2004) and processes in choice-set situations (Novemsky, Dhar, Schwarz, and Simonson 2007).

While the above referenced work has primarily focused upon fluency elicited by visual properties of a stimulus, there is recent work applying the principles of fluency to other sensory systems including sounds (Repp 1997) and tastes (Lévy, MacRae, and Köster 2006). While predicted from a feeling-as-information account, no published work to date explores the effects of fluency in the domain of scent or cross-modal effects (Oppenheimer 2008; Reber, Schwarz, and Winkielman 2004). Cross-modal effects refer to inducing fluency (e.g., using a scent) and witnessing its effects on the evaluation of the same or another (e.g., predominately visual) stimulus.

Olfaction and Perceptual Fluency

Researchers since the mid 1990's have demonstrated that olfactory stimuli can influence consumer cognitions (e.g., Bone and Jantrania 1992), affect (e.g., Bosmans 2006), attention (Morrin and Ratneshwar 2003), product evaluations (Spangenberg et al. 2006), and even purchase behavior (Spangenberg et al. 2006). Further, various contextual factors influencing the impact of scents on consumers have been identified, such as the appropriateness or congruity of the scent associated with products (Bosmans 2006; Mitchell, Kahn, and Knasko 1995) and store environments (Spangenberg et al. 2006), salience of the scent (Bosmans 2006) and brand familiarity (Morrin and Ratneshwar 2000; 2003). Support for proposed theoretical explanations of observed effects, however, has been equivocal, especially regarding the role of affective responses. Indeed, theory tests with process evidence for proposed affective and cognitive explanations are restricted and sometimes inconsistent with expectations. Other than work showing that pleasant scents lead to more favorable consumer response (Spangenberg, Crowley, and Henderson 1996), research in the field has not examined how and which characteristics of the scent itself are more (or less) likely to alter behavior in ways that are meaningful to marketing professionals. As a result, herein we step back and look at the basic genesis of olfactory cue effects - namely, the physical structure of the scent itself and what effects are associated therewith. We propose that scent complexity (a common fluency manipulation) is likely to influence effectiveness of an olfactory cue.

As with other types of stimuli, an olfactory cue should be more or less easy to process depending upon the complexity of the cue itself. Perceptual fluency would

hold, therefore, that the ease of processing an olfactory cue will generate affect, which in turn will influence associated behaviors. We contend that the affect associated with the ease of processing a scent will likely be misattributed to the retail environment and/or products associated with the scent, since scents are peripheral perceptual cues that are likely to be encountered with less focal attention than visual cues. In support of this position, it is well established in the literature that odors require little, if any, cognitive effort to be experienced (Ehrlichman and Halpern 1988) and basic behavioral responses can occur without conscious attention. Furthermore, olfactory cues are processed in a more primitive portion of the brain, rather than in higher-level centers as occur with other sensory cues (Herz and Engen 1996).

Existing marketing literature on olfaction is consistent with the notion of fluency as a plausible theoretical explanation for much of what has been reported. One consistent finding reported in the literature is that scents congruent with product offerings and/or the retail environment lead to greater liking and increased time dedicated to processing (e.g., Mitchell, Kahn and Knasko 1995), as well as more holistic processing and increased satisfaction (Mattila and Wirtz 2001). Such results are interpretable through a fluency lens, since congruent scents should also be more fluent scents for consumers to process. Further support is provided by research showing that fluency can be indirectly mediated by positive affect or can directly determine the processing style a person adopts (Bless, Bohner, Schwarz, and Strack 1990; Oppenheimer 2008; Schwarz 2004). Positive affect, for example, has been shown to foster holistic processing and can therefore be expected to be a consequence of fluent processing (Labroo and Patrick 2008).

Further evidence supportive of our postulations is found in a recent field study by Spangenberg et al. (2006), who found that gender-specific scents resulted in more favorable customer responses in a retail store when those scents were congruent with the shopper's gender. In addition to congruency, the scents which were consistent with shopper gender were also more fluent, since a feminine scent should be easier for a female shopper to process than a male shopper, and vice versa. Similarly, results reported by Mitchell, Kahn and Knasko (1995) can also be viewed from a fluency perspective. In particular, incongruent scents may have interfered with cog-

nitive processing of relevant information such that the task became cognitively more difficult for the consumer, thus inhibiting attitudinal judgments. In contrast, when the cue or odor was congruent with the product class, judgments may have been facilitated by ease of processing

Work by DeBono (1992) can also be interpreted using perceptual fluency as a framework; he found that the presence of a scent was related to heuristic processing while more systematic processing was associated with evaluations in the absence of a scent. Relatedly in the fluency literature, Oppenheimer (2008) showed that fluency clearly plays a role in a person's reasoning by influencing the adoption of processing strategies. Further, Alter, Oppenheimer, Epley, and Eyre (2007) showed disfluency (i.e., the opposite of fluency) increased people's reliance on systematic processing cues when evaluating a persuasive communication. From this perspective, it could simply be that the presence of scent increased the ease of processing in DeBono's (1992) study, while processing fluency was not elicited in the no scent or disfluent condition where participants would rely more heavily on a systematic, rather than heuristic, cue.

HYPOTHESES

Research has demonstrated that positive affect can directly influence behavior (e.g., Cohen and Areni 1991; Hirschman and Stern 1999) and that ambient scents can similarly influence how consumers behave. Based on the theoretical predictions derived from the fluency literature, one can reasonably predict that triggering consumers' implicit affect with a fluent olfactory cue should lead to more favorable customer responses to the retail environment and products associated with that scent. As with other successful manipulations of experienced fluency, scent fluency can be manipulated by means of creating stimuli with differing degrees of simplicity or, in other words, differing amounts of information to be processed (e.g., Garner 1974; Nicki, Lee, and Moss 1981; Reber, Schwarz, and Winkielman 2004). Thus, a scent with only a single dimension (e.g., the scent of lemon) should be more fluent and easy to process than a scent containing multiple dimensions (e.g., a blended scent of lemon and basil). Analogously, Lévy, MacRae, and Köster (2006) manipulated food

complexity by creating flavors that contained different numbers of ingredients with the idea that the additional flavor ingredients are more complex and thus more difficult to process. Given the close affiliation between flavor and scent, we approached scent complexity in a similar manner in our studies. In particular, the amount of information a scent contains was used as our ease of processing manipulation. Given that simple scents should be more readily processed than those that are complex, we hypothesize that:

H1: A fluent or simple scent, as compared to a disfluent or complex scent, will lead to an increase in actual customer spending.

Given that a complex scent does not lend itself to increased processing fluency, such a scent should not increase spending as compared to a no scent (control) condition. Thus, the following is hypothesized:

H2: A fluent or simple ambient scent will lead to an increase in actual customer spending, as compared to a disfluent or complex ambient scent or to no scent at all.

The positive feelings elicited by the ease of processing a simple or fluent scent are expected to serve as the mediating mental construct of customer behavior. Thus, with regard to process, and assuming that simple scents are more likely to elicit positive affect (as compared to no scent at all or a complex scent), we hypothesize:

H3: The impact of scent fluency on sales is mediated by affective responses elicited by a fluent or simple scent, as compared to a disfluent or complex scent or no scent at all.

PRETESTS

Scent Development

Development of scents used in the field studies and procedures for pretesting these scents were adapted from prior research focused on determining the complexity of non-olfactory stimuli (Lévy, MacRae, and Köster 2006). While fluency can be operationalized in a variety of ways, research suggests that variation in stimulus complexity serves as an important determinant of processing ease or fluency (Reber, Schwarz and Winkielman 2004). Thus, for this research, scent fluency was operationalized by developing scents varying in terms of complexity with the rationale being that more complex olfactory stimuli will contain more information to be processed and will thereby decrease the ease of processing, as compared to simple, single scents. Complexity, as a manipulation of fluency, is a stimulus characteristic generally independent of individual experience with that stimulus (i.e., as compared to prototypicality), and it can be measured and/or manipulated in objective terms.

Two pretests were conducted to select appropriate ambient scents for use in the main field studies. The goal was to determine a collection of ambient scents that varied in terms of complexity or fluency, but did not differ along other theoretically relevant dimensions. Following Lévy, MacRae, and Köster (2006), we started with a single scent and developed complex variations by adding very small quantities of different scents. Such an approach served to develop stimuli that objectively varied regarding complexity. All scents belonged to the fruit scent family and special care was taken to modify only scent complexity while minimizing any changes to the fundamental nature of the scent itself (Lévy, MacRae, and Köster 2006). Scent development was done in cooperation with a commercial aroma supplier who prepared scent compositions using scents that were currently applied in stores.

Pretest 1

Pretest participants included 208 customers intercepted at two retail stores in the same stores where the main studies were conducted, thus insuring pretest scent ratings matched later customers' scent perceptions. Pretesting followed Spangenberg, Crowley, and Henderson (1996) with participants each evaluating one scent on several seven-point semantic differential scales. To avoid possible measurement ef-

fects, participants randomly choose 1 of 10 possible vials which were opaque and labeled with random numbers. Scents originated from a cotton ball contained within the vial that had been applied with 20 to 25 drops of an essential oil. Participants were allowed to sniff the vial as many times as they wanted while responding to questions about the scent's pleasantness, familiarity, congruity with the store, and complexity.

To increase the generalizability of the empirical field work, two different sets of simple and complex scents were selected from this pretest. In particular, the two simple or fluent scents included "lemon" and "orange" essential oils, while the two complex or disfluent scents included combined oils of "basil-lemon" and "basil-orange with green tea". Results of the pretest regarding these four scents are provided in Table 1.

TABLE 1
Descriptive Statistics for Pretest 1

Dependent Measures	Means and Standard Deviations for Selected Scents			
	Orange (<i>n</i> = 22)	Lemon (<i>n</i> = 20)	Basil-Lemon (<i>n</i> = 20)	Basil-Orange Green Tea (<i>n</i> = 20)
Pleasantness	5.33 _a (1.05)	5.58 _a (0.82)	5.62 _a (1.50)	5.10 _a (1.03)
Congruency	4.88 _a (1.36)	4.47 _a (1.81)	4.50 _a (.46)	4.75 _a (1.86)
Complexity	2.95 _a (1.43)	2.82 _a (1.18)	4.62 _b (0.96)	4.77 _b (0.97)
Familiarity	3.50 _a (1.26)	3.64 _a (1.15)	3.15 _a (1.69)	3.60 _a (0.82)

Note. Standard deviations in parentheses. Based on *N* = 82. The possible range of scores for listed variables is 1 to 7, with higher values indicating more positive responses. For each dependent variable, means not sharing a common subscript differ at $p < .001$.

Hedonic properties of the pretested scents were assessed using items from Fisher's (1974) environmental quality scale. All four scents were perceived as equally pleasurable (positive/negative, pleasurable/unpleasurable, like/dislike, attrac-

tive/unattractive; $\alpha = .92$) on seven-point scales. Also, the four scents selected for the main studies did not differ ($p > .69$) according to perceived familiarity on a seven-point scale ranging from “not at all familiar” (1) to “highly familiar” (7).

Prior research has shown that congruency of a scent with a particular environment can be a potential moderator. Thus, we asked participants to rate the appropriateness of each scent for the store (Spangenberg et al. 2006) using a seven-point scale ranging from “not at all appropriate” (1) to “highly appropriate” (7). Scents chosen for the main field study were perceived as appropriate (ratings were significantly above the scale midpoint; all $ps < .01$) and did not differ from one another according to an ANOVA model including the four scents as one factor ($p > .91$).

To validate the scent complexity manipulation, participants rated the perceived complexity of the scents using items adapted from Lévy, Mac Rae and Köster (2006). The items were measured on seven-point scales including measures of complexity (simple/complex), heterogeneity (homogeneous/heterogeneous) and elaborateness (pure/differentiated) of the scents ($\alpha = .88$). Results indicated that the two simple scents did not differ from one another in terms of complexity ($p < .73$), nor did the two complex scents differ from each other ($p < .62$). As expected, each of the complex scents differed from each of the simple scents ($p < .001$). Given the results of the pretest, the simple scents and complex scents were respectively aggregated (for analytic and reporting purposes) in the main field studies.

Pretest 2

The complexity of the scents selected after the first pretest was further tested in a real-world setting by applying the ambient scents in a retail store. In particular, the simple scents (orange; lemon) and complex scents (basil-lemon; basil-orange with green tea) were diffused in a small decoration store over a period of 2 weeks. Shoppers ($N = 156$) were randomly stopped while shopping and asked to fill out a short questionnaire using the measures reported in the first pretest. Consistent with the first pretest and as reported in Table 2, the scents did not differ in terms of pleasantness, familiarity, or congruency. Again consistent with pretest 1, the scents did differ in terms of complexity, such that the two simple scents differed from the two complex scents ($p < .01$) and the two simple scents did not differ from one another,

nor did the two complex ambient scents differ from each other. These results provide further support for collapsing the scents within complexity manipulations for the main field experiments.

TABLE 2
Descriptive Statistics for Pretest 2

Dependent Measures	Means and Standard Deviations for Ambient Scents			
	Orange (<i>n</i> = 42)	Lemon (<i>n</i> = 36)	Basil-Lemon (<i>n</i> = 38)	Basil-Orange Green Tea (<i>n</i> = 40)
Pleasantness	5.02 _a (1.58)	4.94 _a (1.55)	4.76 _a (1.38)	4.73 _a (1.60)
Congruency	5.55 _a (1.36)	5.50 _a (1.23)	5.11 _a (1.25)	5.40 _a (1.34)
Complexity	3.71 _a (1.78)	3.69 _a (1.88)	4.63 _b (1.50)	4.75 _b (1.72)
Familiarity	4.60 _a (1.40)	4.39 _a (1.40)	4.47 _a (1.41)	4.33 _a (1.47)

Note. Standard deviations in parentheses. Based on *N* = 156. The possible range of scores for the listed variables is 1 to 7, with higher values indicating more positive responses. For each dependent variable, means not sharing a common subscript differ at $p < .01$.

STUDY 1

A field experiment was conducted to assess the effect of scent complexity on customer behavior within an actual retail store. Ambient scents were manipulated within the store, customers who made purchases within the store served as research participants, and actual sales served as the primary dependent variable of interest. Procedures largely followed prior research in the marketing literature with regard to store and scent selection, as well as use of a commercial diffusion system, insurance of absence of “other” scents competing with our manipulations and so forth (Spangenberg, Crowley, and Henderson 1996). Scent complexity was varied by the nature of the ambient scent. Based on pretesting, a single scent represented the simple

scent condition and a combination of different scents constituted the complex scent condition.

Method

Design, Participants, and Procedure. Study 1 used a between-participants design: simple scent (orange; lemon) X complex scent (basil-lemon; basil-orange with green tea). Conditions were randomly assigned to days of the week over the 15-day period in which the study was conducted. Participants consisted of 126 customers who made purchases in the store during the time of the field experiment and who were willing to complete the survey; these included 69 customers who were exposed to the simple scent condition and 57 exposed to the complex scent condition. Data were not collected from shoppers who did not buy anything. The amount of time in the store was unobtrusively monitored to ensure that customers had sufficient opportunity to be impacted by the ambient scent. Data were collected only from shoppers who spent at least five minutes in the store; time was monitored by the interviewer and double checked with the customer once they had completed the survey. Data collection took place from 10am to 7pm on weekdays and Saturday from 10am to 5pm. Data were not collected for at least one day after changing scents in order to allow the previous scent to dissipate and the new scent to completely diffuse throughout the store.

Upon making a purchase at the store, customers at the cash register were contacted by a trained interviewer blind to the study's hypotheses and asked to fill out a short, self-administered questionnaire about the store. There was no reference to ambient scent and no customers mentioned scent in the open-ended question included with the survey. In exchange for participation, customers were entered in a lottery for a coupon at the store and were debriefed and thanked afterwards.

The field experiment took place in a typical decoration store that offered all kinds of in-home products (e.g., plates, candles, baskets, curtains, etc.). Scents were diffused throughout the entire store at a moderate intensity level using a commercial, retail scent diffuser. The intensity and concentration of the ambient scent was continuously monitored to ensure that it would be perceived by shoppers, but not be so intense as to be bothersome. Additionally, the trained interviewers left the store every hour

in order to prevent them from undergoing sensory adaption (see Goldstein, 1996 for an introduction to the adaption and habituation of olfactory stimuli). This procedure allowed the interviewers to perceive changes in the scent's intensity level and to make any required adjustments in order to ensure that the intensity was kept at moderate levels throughout the entire store and throughout the day. There were no aggressive, exogenous odors in the retail store and all efforts were made to reduce the effect of any extraneous odors during the study (e.g., interviewers were instructed not to wear perfume, aftershave, or other scents). During the data collection period, the retailer ensured consistent advertising, pricing, and product availability in order to reduce potential sources of variation unrelated to experimental treatment.

As noted in pretests, the two simple scents (orange; lemon) were combined into a single simple scent condition and the two complex scents (basil-lemon; basil-orange with green tea) were combined into a single complex condition for analytic purposes. Additional analyses of study 1 data further support collapsing the data in this fashion. In particular, there were no significant differences between the two simple scents regarding the focal dependent variables ($p > .38$), nor did any differences emerge between the two complex scent conditions ($p > .42$). Further, the type of scent did not interact with the complexity manipulation ($p > .93$).

Measures. In-store sales served as the primary dependent variable. The survey instrument included an open-ended question that asked participants how much money they had spent in the store during the shopping trip. Accuracy of shoppers' self-reported expenditures were checked against sales receipts. The sales variable was highly dispersed and non-normally distributed, thus a logarithmic transformation was used to achieve a normal distribution (Fox 2008). The survey also asked customers' about the characteristics of the ambient scent including: scent complexity (simple/complex; Lévy, MacRae, and Köster 2006), scent familiarity (unfamiliar/familiar Morrin and Ratneshwar 2003), scent-store congruity (incongruent/congruent Spangenberg et al. 2006), and scent pleasantness (pleasant/unpleasant Spangenberg, Crowley, and Henderson 1996).

Results

Manipulation Check. The complex ambient scent condition ($M = 3.94$) was perceived to be more complex than the simple ambient scent condition ($M = 5.04$), $t(124) = 3.77, p < .001$. The simple scent condition did not differ from the complex scent condition in terms of familiarity, $t(124) = 1.10, p = .28$, congruity, $t(124) = .16, p = .88$, or pleasantness, $t(124) = 1.16, p = .25$. Thus, the manipulation was deemed successful.

Sales. An ANOVA model was estimated, including the 2 scent conditions (simple vs. complex); log-transformed sales served as the dependent variable. As proposed, shoppers in the presence of a simple ambient scent ($M = 2.43$) spent significantly more money than those shopping in the presence of a complex ambient scent ($M = 1.85$), $F(1, 124) = 10.21, p < .01, \eta^2 = .076$ (a medium effect according to Cohen 1988).

Discussion

The results of this field study demonstrate the superiority of simple (versus complex) ambient scents in impacting customer behavior in a retail store. In particular, shoppers spent more in the presence of simple ambient scents, than complex scents. This effect was medium-sized, which lends pragmatic support to the importance of ambient scent to marketers. The finding that the presence of a simple ambient scent (compared to a complex one) increased customers' actual purchases in a retail store is certainly of practical interest. It is important to note that the only perceived difference between these scents was complexity and that the scents did not differ in terms of familiarity, congruity, or pleasantness. This research is also the first to provide empirical evidence that fluency can be applied to the context of olfactory stimuli. Overall, these findings provide support for H1. While the design of study 1 allows a relative assessment regarding the effectiveness of simple versus complex scents, it does not provide a comparison against a control condition. This issue is addressed in next field study.

STUDY 2

The second field experiment assessed H2, therefore an unscented control condition was included in order to provide a baseline comparison for the effect of simple and complex scents.

Method

Design, Participants, and Procedure. The study utilized a between-participants design with three conditions: simple scent (orange; lemon); complex scent (basil-lemon; basil-orange with green tea); and a control condition (no ambient scent). The sample included customers ($N = 185$) shopping at an interior decor store. The store was similar to the establishment used in study 1 with regard to location, product offerings, and target market. Conditions were randomly assigned to weekdays ($N = 73$, simple; $N = 75$, complex; $N = 37$, control). Beyond adding a control condition, all stimuli, procedures and methods of this study were identical to those described for study 1. Analyses again supported aggregating the data within the simple and complex scent conditions given that there were no significant differences between the two simple scents regarding the dependent variable ($p > .55$), nor any differences between the two complex scent conditions ($p = .53$). Type of scent did not interact with the complexity manipulation ($p > .38$).

Measures. Sales data were log transformed to achieve a normal distribution; the same manipulation checks were collected as in study 1.

Results

Manipulation Check. As in study 1, the complexity manipulation was successful. In particular, the complex ambient scent condition ($M = 4.57$) was perceived as being more complex than the simple scent condition ($M = 3.45$), $t(144) = 4.37$, $p < .001$. The simple scent condition did not differ from the complex scent condition in terms of familiarity, $t(144) = .42$, $p = .68$, congruity, $t(146) = 1.30$, $p = .20$, or pleasantness, $t(146) = .79$, $p > .43$.

Sales. An ANOVA model indicated a significant impact of ambient scent on sales, $F(2, 182) = 8.08$, $p < .01$; $\eta^2 = .082$ (medium effect; per Cohen 1988). Shoppers spent more money when exposed to a simple ambient scent ($M = 3.95$) as compared

to a complex ambient scent ($M = 3.50$), $t(146) = 3.21$, $p < .01$, Cohen's $d = .53$ or no scent at all ($M = 3.37$), $t(108) = 3.84$, $p < .001$, Cohen's $d = .80$. Sales between the complex and no scent conditions did not differ, $t(110) = .75$, $p > .45$.

Discussion

Results of study 2 support H2 by demonstrating that a simple or fluent ambient scent lead to increased sales for shoppers in the presence of such a scent, as compared to a complex ambient scent or a non-scented retail setting. As expected, the complex ambient scent did not enhance shoppers' purchases as compared to the control condition. Identifying a no-scent baseline in this study allows more definitive evaluation regarding the nature of the sales results in study 1 and how scent complexity is implicated. As anticipated, a simple ambient scent yielded increased sales, as compared to both the complex scent and the non-scented control condition. To understand the postulated underlying processes of fluency, we explore in study 3 the psychological process underlying the observed effects of our first two studies.

A third field experiment was conducted in order to extend the findings described thus far, and to test for the underlying affective mechanism expected to be occurring as predicted by our fluency explanation. As proposed in H3, we expect that consumers' affective responses will mediate the effect of a fluent scent on spending.

STUDY 3

Method

Design, Participants, and Procedure. This study utilized the same between-participants design used in study 2 and included three conditions: simple scent (orange; lemon); complex scent (basil-lemon; basil-orange with green tea); and a no-scent control. The study took place in a different, but comparable, store to those used in the first two field studies, with similar location, size, product offerings, and target market. The sample consisted of 220 shoppers; 77 customers were exposed to the simple scent, 90 customers to the complex scent and 53 customers shopped in the control condition where no ambient scent was present.

Measures. Customer expenditures and perceptions of the stores were collected, as in the first two studies. The pattern of the distribution of spending was the same as in studies 1 and 2, thus the same transformation to sales data was applied. In addition, shoppers were also asked to provide affective responses and reactions toward the store as measures of process. This mediator was assessed on a 4-item scale (unpleasant/pleasant; negative/positive; unattractive/attractive; ugly/beautiful (Crowley 1993; Fisher 1974; Spangenberg, Crowley, and Henderson 1996) measured on seven-point scales ($\alpha = .91$).

Results

Manipulation Check. The complexity manipulation was successful, such that the complex ambient scent condition ($M = 4.88$) was perceived as being more complex than the simple scent condition ($M = 4.30$), $t(163) = 2.41, p < .03$. The simple scent condition did not differ from the complex scent condition in terms of familiarity, $t(163) = 1.53, p = .13$, congruity, $t(163) = 1.32, p > .18$, or pleasantness, $t(162) = 1.42, p > .15$.

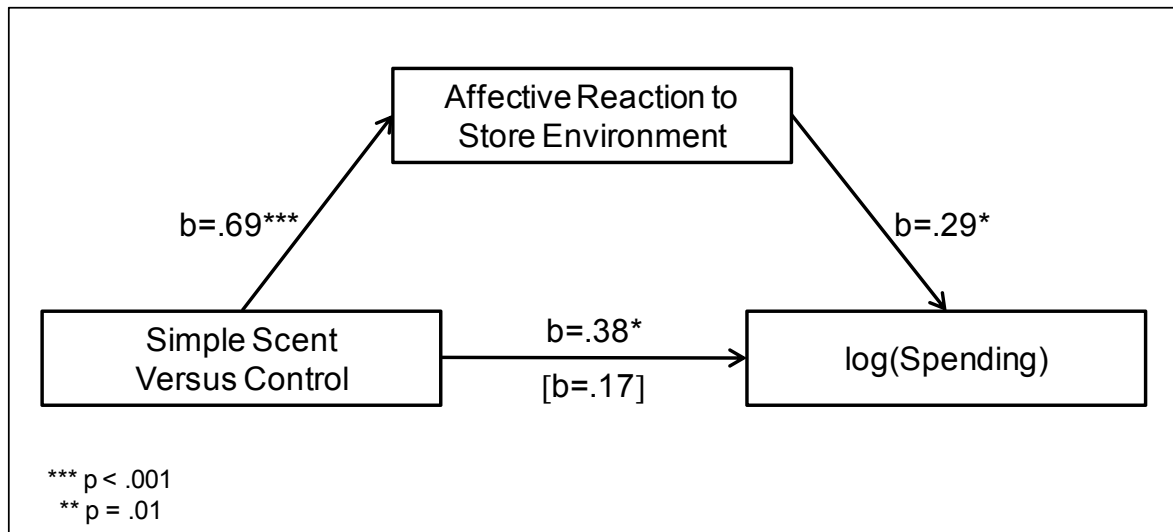
Sales. An ANOVA model found a significant effect of ambient scent on sales, $F(2, 198) = 3.86, p < .05; \eta^2 = .038$ (a small to medium effect per Cohen 1988). Shoppers spent more money when exposed to a simple ambient scent ($M = 3.63$), as compared to a complex ambient scent ($M = 3.24$), $t(149) = 2.74, p < .01$, Cohen's $d = .53$, or no scent at all ($M = 3.25$), $t(117) = 2.15, p < .05$, Cohen's $d = .80$. Sales between the complex and no scent conditions did not differ, $t(130) = .04, p > .96$.

Affective Mediation. Prior research has shown that fluently processed stimuli are hedonically marked and thereby elicit a positive affective response which may be transferred to associated surroundings (Winkielman, Schwarz, Fazendeiro, and Reber 2003). If affect either partially or fully mediates observed effects of scent on sales, the inclusion of affect as an additional independent variable should reduce the main effect of the simple ambient scent. Given that the complex scent should produce a comparable affective state as the control condition, we expect to find the same mediational pattern when comparing the simple scent condition to the control condition or when comparing the two scent conditions. No mediational effects are expected when comparing the complex and control conditions. The mediating role

of affective reaction in the preceding effects was tested via OLS regression (Baron and Kenny 1986).

As shown in Figure 1, results reveal that the conditions for mediation are met when comparing the simple scent condition to the control condition, such that: (1) the independent variable (simple ambient scent vs. no scent control) had a statistically significant effect on the mediator (affective response) ($b = .69, p < .001$); (2) the mediator (affective response) had a statistically significant effect on the dependent variable (spending), controlling for the effects of the independent variable ($b = .29, p = .01$); and (3) the direct effect of the simple ambient scent on spending ($b = .38; p = .03$) was significantly mediated by consumers affective responses, such that when consumers' affective reactions are included in the model, the relationship between scent and sales weakens and becomes non significant ($b = .17, p > .35$) (Baron and Kenny 1986). The Sobel test reached statistical significance ($p = .03$). Additional analyses regarding the simple scent and the complex scent condition did not support the expected mediation. In particular, the independent variable had a significant effect on affective response, and on spending (all $ps < .001$), but the direct effect of simple scent was not weakened when affective reactions were included in the model. Finally, mediational models were conducted for the complex scent in comparison to the control condition and, as expected, no significant effects emerged among the variables included in the model.

FIGURE 1
Study 3 Results: Mediation Model



Discussion

Results of study 3 provide additional evidence that fluent ambient scents can influence purchase behavior, as well as process evidence regarding how these effects emerge. Replicating the results of studies 1 and 2, the presence of a simple scent, substantially increased customers expenditures as compared to a complex scent or a non-scented control. The results of study 3 also provide partial support for H3 by demonstrating that the effect of a simple scent on customer spending (as compared to the control condition) was fully mediated by shoppers' affective reactions to the retail environment. These results suggest that simple ambient scents increase processing fluency, thereby causing customers to process a given environmental stimulus with ease resulting in positive affect and increased expenditures. The results did not show, however, that affective reactions to the environment mediated the effect of scent on sales, when comparing the simple scent condition to the complex scent condition. One explanation for this result may be that customers were generally unaware of the ambient scent, as suggested by responses to a survey question regarding awareness of the scent (none of the customers noted that they were aware of any odor). From a fluency perspective, a more controlled environment that makes scent and processing thereof more salient should allow this effect to emerge. Thus, in study 4 we used scented product advertisements with the goal of providing

a more controlled manipulation of scent, as compared to the first three studies. In addition, this final field study allows us to establish the generalizability of observed effects to a new context.

STUDY 4

In advertising research, inducing a positive mood in viewers or generating a positive affective response has been found to increase attitude toward the ad (Brown, Homer, and Inman 1998) and also shown to influence behavior directly (Isen 1987). We suggest that a similar affective-based process will occur for a scented print advertisement, such that a positive affective response to the ad will lead to more positive behavioral responses toward the advertised product (although at least one study has reported null effects of a scented advertisement on attitudes; Ellen and Bone 1999). In study 4, we explore whether consumers exposed to a scented print ad will respond similarly to exposure to simple ambient scent, with the expectation that an ad infused with a simple scent will lead to increased sales (as compared to a complex scent or control condition) and that the effect of scent on sales will be mediated by an affective-based response to the ad. The focal product in study 4 was a shower gel.

Pretest

Similar to the previous field studies, a pretest for scent attributes (Spangenberg, Crowley, and Henderson 1996) and perceived scent complexity (Lévy, MacRae, and Köster 2006) was conducted. Additionally, liking of the product (the shower gel) to be featured in the ad was assessed. A sample of undergraduates ($N = 210$) began by reporting their liking on a seven-point semantic differential scale (dislike/like) of two shower gels (orange; yellow) which were presented in random order as photographs. Pictures had a white package and differed only by colored circles (orange; yellow) appearing on the middle of the package (brightness, contrast and color intensity were held constant). Next, each participant evaluated a single scent (randomly selecting one scent of eleven) regarding its appropriateness for the product category and general scent characteristics. Using measures from earlier reported pretests, customers evaluated each scent in terms of hedonic properties (al-

pha = .95), perceived familiarity, congruency and complexity (alpha = .90). All measures used seven-point semantic differential scales. Participants were allowed to sniff the vial as many times as they wanted while responding to questions about the scent.

Results associated with the selected scents are provided in Table 3. The pretest confirmed similar levels of liking for the two products ($M_{\text{yellow}} = 4.35$ and $M_{\text{orange}} = 4.16$, $t(72) = 0.72$, $p > .47$). In addition, two simple scents (“lemon” and “orange”) and two complex or disfluent scents (“lemon and seabreeze” and “orange and pacific blue”) were selected for the main study. A one-way ANOVA using four levels of scent as a fixed factor was performed revealing that participants rated the scents as equally pleasant ($F(74) = 0.21$, $p > .89$) and familiar ($F(74) = 0.20$, $p > .89$). As expected, customers rated both orange scents congruent with the orange product ($t(33) = 0.15$, $p > .88$) and both lemon scents as congruent with the yellow product ($t(37) = 0.10$, $p > .91$). Scents chosen for the main field study were perceived to be appropriate, as pleasantness ratings were significantly above the scale midpoint (all $ps < .05$). As expected, the scents varied in terms of complexity ($F(74) = 13.17$, $p < .001$), such that the simple scents were significantly different than their complex counterparts. As expected, the two simple scents did not differ from one another, $t(36) = 0.50$, $p > .62$, nor did the two complex scents differ from each other, $t(38) = 0.60$, $p > .55$. Given this pattern of pretest results, the simple scents and complex scents were respectively aggregated for analytic and reporting purposes.

TABLE 3
Descriptive Statistics for Pretest Study 4

Dependent Measures	Means and Standard Deviations for Selected Scents			
	Lemon (<i>n</i> = 21)	Lemon and Seabreeze (<i>n</i> = 21)	Orange (<i>n</i> = 17)	Orange and Pacific Blue (<i>n</i> = 19)
Pleasantness	4.37 _a (1.73)	4.20 _a (1.63)	4.35 _a (1.56)	4.57 _a (1.04)
Congruency				
Yellow Product	5.63 _a (1.42)	5.58 _a (1.58)	3.14 _b (1.87)	3.33 _b (2.08)
Orange Product	3.10 _b (1.82)	2.47 _b (1.66)	5.21 _a (1.37)	5.17 _a (1.29)
Complexity	2.85 _a (1.25)	4.46 _b (1.12)	2.64 _a (1.32)	4.70 _b (1.43)
Familiarity	4.10 _a (1.84)	4.38 _a (1.28)	4.35 _a (1.73)	4.42 _a (1.02)

Note. Standard deviations in parentheses. Based on *N* = 78. The possible range of scores for the listed variables is 1 to 7, with higher values indicating more positive responses. For each dependent variable, means not sharing a common subscript differ at $p < .001$.

Method

Design, Participants, and Procedure. Study 4 used a between-participants design with three conditions manipulated via the advertisement: simple scent (orange; lemon); complex scent (lemon and seabreeze; orange and pacific blue); and a control (no scent) condition. Participants were randomly assigned to the scent conditions.

The focal product was a shower gel advertised on a scented (or unscented) sheet of card stock. Two versions of the shower gel advertisement were created with the aid of a professional advertising agency; beyond scent, the ads varied only in terms of product color (either orange or yellow). The ad reflected a typical advertisement used by the store wherein the study was conducted, featuring one of the store's own brands. A scratch-and-sniff panel was applied over the entire card in the scent conditions and included a note to scratch and sniff. Commercial scents were applied by

a leading firm specializing in printing scented materials of this type. In particular, experimental scents were packed into microscopic capsules and hermetically sealed; through mechanical means such as rubbing, pressing, cutting or scratching the scented content of the capsules is released.

The study was conducted in a local supermarket providing food and cosmetics. The sample ($N = 493$) included actual supermarket shoppers who were given a coffee coupon and a key chain for participation. Trained interviewers were placed in the cosmetics section of the store, but the actual target product was out of the participants' sight. Interviewers were blind to individual treatment conditions. Customers were told that the purpose of the study was to solicit consumer opinions of an advertisement for a shower gel available in the store. People observed the ad and were asked to scratch and sniff the card in order to release the scent. After observing the ad, customers completed a short, self-administered questionnaire.

Measures. The primary dependent variable in the study included a binary choice measure asking participants if they would buy the shower gel for a given price, with the interviewer suggesting that the product was for sale. After completing the questionnaire, customers were asked if they wanted to purchase the product and a simulated purchase transaction was initialized. In reality, given the experimental scent manipulations, it was not possible to provide all options of the real product to shoppers. Thus, before the purchase could be made, customers were debriefed about the study and the actual purchase was not allowed. Similar to study 3 affective reactions (in this case, to the advertisement) were collected for use as a process variable (unappealing/appealing; unpleasant/pleasant; unattractive/attractive; ugly/beautiful; $\alpha = .87$).

Results

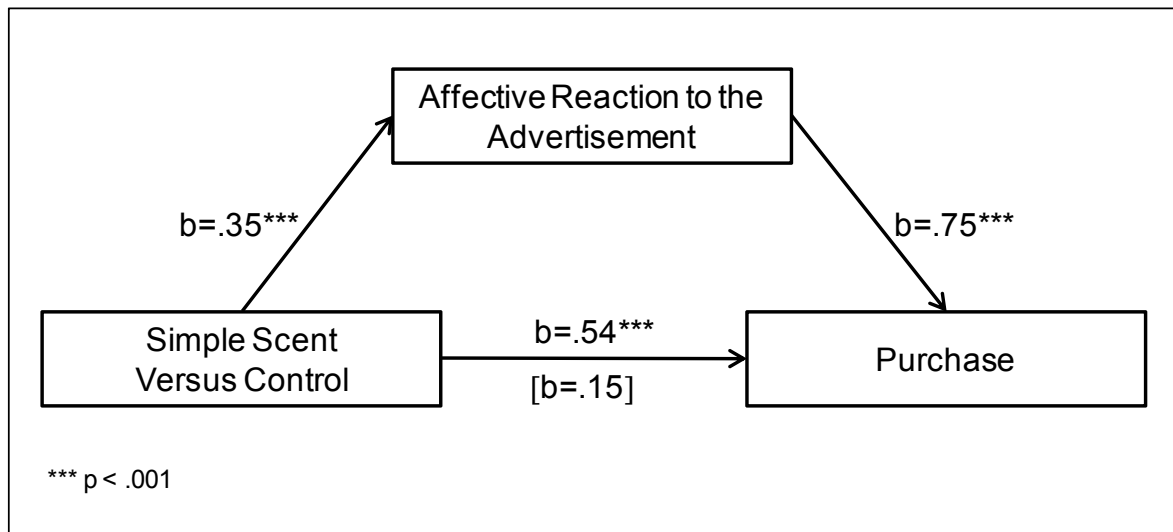
Fluency Results. The scent manipulation in the advertisement had a significant effect on sales ($\chi^2(2, N = 493) = 11.29, p < .01$). In support of H2, customers viewing an advertisement with a simple scent were more likely to purchase the product (46.5%), as compared to customers who were exposed to an advertisement with a complex scent (30.2%) $\chi^2(1, N = 493) = 23.05, p < .001$, or no scent at all (34.9%), $\chi^2(1, N = 493) = 10.46, p < .01$. As expected, customers exposed to an advertise-

ment with a complex scent did not differ from those in the control condition in their purchase behavior $\chi^2 (1, N = 493) = 2.17, p > .14$

Affective Mediation: As proposed in H3, customers' affective responses to the advertisement will mediate the effect of scent complexity on purchase. As detailed in study 3, we expected affective responses to mediate the effect of scent on sales when comparing the simple scent to the control condition, as well as the complex scent condition, but no mediation when comparing the complex scent to the control condition. To test the mediating role of affective reaction in the preceding effects, we ran an appropriate series of multinomial regression and linear regression analyses (Baron and Kenny 1986).

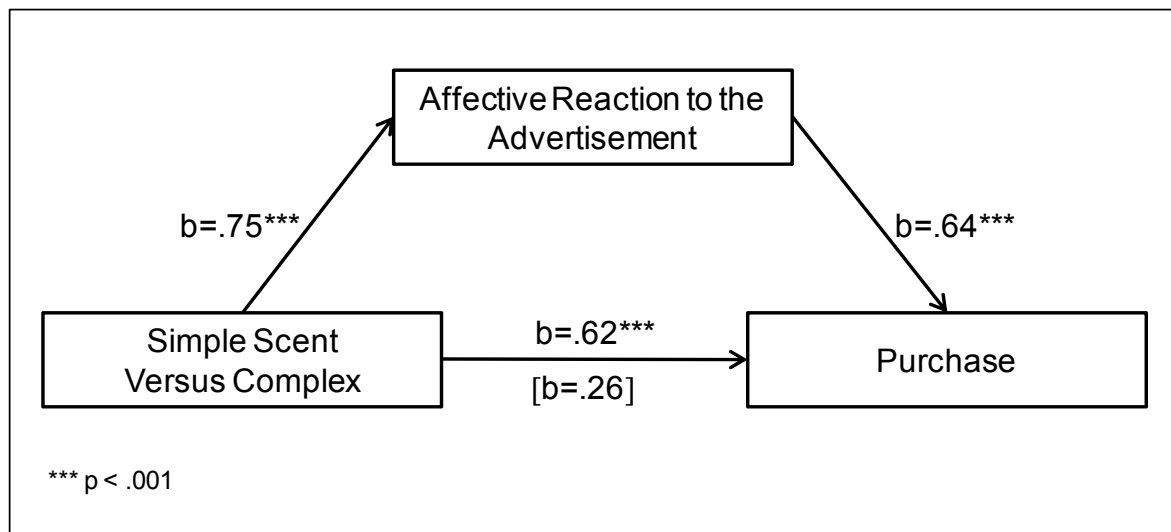
As Figure 2 illustrates, results support mediation when comparing the simple scent to the control condition, indicating that: (1) the independent variable (simple scent vs. no scent) is positively related to the mediator (affective response) ($b = .35, p < .001$); (2) the mediator (affective response) relates significantly to the dependent variable (purchasing), controlling for the effects of the independent variable ($b = .75, p = .001$); and (3) the relationship between the simple scent and the purchase variable ($b = .54, p = .001$) weakens when affective response are accounted for in the model, such that beta coefficients decrease and become non-significant ($b = .15, p > .61$). The Sobel test reached statistical significance ($p = .001$).

FIGURE 2
Study 4 Results: Mediation Model Simple Scent vs. Control



As shown in Figure 3, we also find support for mediation when comparing the simple scent with the complex scent condition, finding that: (1) the independent variable (simple scent vs. complex scent) positively affected the mediator (affective response) ($b = .75, p < .001$); (2) the mediator (affective response) significantly influenced the dependent variable ($b = .75, p = .001$); and (3) the relationship between the simple scent and the purchase variable ($b = .62; p = .001$) weakened when affective response were accounted for in the model, such that beta coefficients decreased and became non-significant ($b = .26, p > .21$). The Sobel test reached statistical significance ($p = .001$). Finally, a similar set of models were conducted to compare the complex scent to the control condition with no effects evident. Overall, the results of these mediation analyses provide support for H3 suggesting that fluency underlies observed findings.

FIGURE 3
Study 4 Results: Mediation Model Simple vs. Complex Scent



Discussion

The pattern of results replicates those of the previous studies in a different context and further highlights the superiority of simple (vs. complex) scents in affecting the behavior of actual shoppers. The design of Study 4 allowed us to manipulate scent fluency in a more tightly controlled manner than the earlier studies with customers paying focused attention to the scent and the associated advertisement. With this approach, we found stronger mediational results, such that affective responses were clearly shown to mediate the effect of scent on choice for the simple scent (as compared to both the control condition and the complex scent condition). These findings provide strong support for H3 and our assertion that increased scent fluency leads to positive affective responses (see Reber, Winkielman, and Schwarz 2004; Winkielman et al. 2003), which in turn impacts sales.

GENERAL DISCUSSION

Prior research has clearly demonstrated that olfactory cues can influence the perceptions and (sometimes) behaviors of consumer markets. Despite commercial interest, however, research investigating the impact of scent on actual behavior, and identifying theoretical underpinnings or process evidence for observed effects has been li-

mitted, and indeed apparently equivocal in some instances. Much of the prior work has simply relied upon, or assumed, the rather simplistic stimulus-organism-response model of environmental psychology rather than push for a thorough theoretical explanation. The research reported herein begins to address this dearth of explanation by identifying and presenting empirical evidence for fluency as a theoretically meaningful concept.

In four studies of real customers, actual consumer purchases were significantly impacted by scents varying with regard to a fluency manipulation. Specifically, we provide empirical evidence that complexity of ambient scents, which were objectively manipulated based on an approach suggested by the fluency literature, determines whether a scent is able to positively influence consumers' responses within a retail store. In particular, simple or more fluent scents lead to more positive responses from customers, while complex or less fluent scents had no effect on retail patrons. Results of our field studies also show that, contrary to the conclusions drawn by many retailers attempting to implement findings from earlier work on olfaction, not just any pleasant scent will impact consumer cognitions and behaviors as firms might desire. Further, while simple and complex scents may be similar in terms of congruency with a given retail setting or product offering, we find that a simple or fluent ambient scent is better in eliciting consumer responses desired by marketers (e.g., increased purchase rates). Complex scents may be just that—too complex, thereby disallowing fluent processing by consumers and reducing the likelihood of beneficial consumer responses. Further, we demonstrate that, consistent with the literature on fluency, consumers' affective reactions to an olfactory cue can fully mediate the relationship between a fluent (or simple) ambient scent and customer purchase behavior. Thus, our work moves beyond the conclusions of earlier research suggesting that not just any pleasant, congruent scent will positively impact customer behavior; simplicity (or complexity) of the scent must also be considered.

Theoretical Implications

From a theoretical perspective, the current research is the first to examine olfactory cues through the lens of the metacognitive construct of fluency. Not only in a marketing context, but also in psychological research, most studies have focused on

visual stimuli as objects of interest (cf. Reber, Schwarz, and Winkielman 2004). This may be explained by the fact that the human visual system is the most advanced sensory system and offers the most differentiated perception of a given stimulus. Many of the investigated stimulus characteristics that influence ease of processing require quite elaborated processing to unfold fluency effects. For example, to perceive different degrees of figure-ground contrasts (a common fluency manipulation), one has to perceive different elements of a given stimulus and how these relate to one another. While such a task can be accomplished visually, it is less likely to be achieved for sounds, tastes or scents (at least for normally gifted persons). On the one hand, this predominate focus on visual processing has allowed researchers to gain a deeper understanding of the processes and effects occurring in connection with experienced fluency and thereby to refine the theoretical assumptions of this account. On the other hand, by neglecting other sensory domains and their possible interactions with the visual domain, many interesting relationships still await discovery.

Our results extend the existing fluency literature with two primary new insights. First, the finding that the complexity of scents is perceived, evaluated, and influential in a comparable fashion to visual stimuli suggests that other established effects might also be applied to scents. This realization is not as straightforward as it may appear at first glance, since the olfactory system is, from an evolutionary point of view, much older than the visual system and might have worked quite differently with regard to processing fluency. Second, our work demonstrates that the positive affect elicited by one stimulus is not necessarily limited to influencing the evaluation of that same type of stimulus but may also transfer to other stimuli. In particular, this transfer can take place across sensory modalities, as indicated by the positive effect that scents obviously had on customers' responses to the shopping environment and/or product. As outlined earlier, the transfer of affect is especially likely to occur in the present context where a non salient stimulus category (scent) is used to induce fluency and a more salient category (retailer or product) needs to be evaluated.

While our results are highly consistent across four studies and different shopping contexts, this fluency induced affect transfer may constitute an interesting topic for

future research. In addition, moderating effects and limitations to that cross-modal affect transfer would constitute other important topics for future research. Furthermore, our studies focused on the ultimate outcome of consumer behavior — the act of buying something. We deliberately chose this as our dependent variable to circumvent the problems associated with hypothetical measures of buying intention or evaluations of products with respect to liking and their connection to actual behavior. By this approach, we maximized the external validity of our results but may suffer a bit with respect to internal validity. While our results can be explained by existing theory and fit well in the general theoretical framework of fluency, subsequent, more controlled, studies may elaborate on the underlying mechanisms and help to further refine the idea of affect transfer.

Beyond these implications and suggestions for future research and theory development in the fluency domain, our findings also have important implications for integrating existing findings in the scent domain into a comprehensive framework. In particular, we believe that the notion of fluency is useful in explaining prior demonstrations of olfactory effects found in this research stream. For example, while findings regarding the effects of scented advertisements are equivocal (Bone and Ellen 1999; Bosmans 2006), our fourth study clearly shows that a scent (in particular, a simple or fluent scent) associated with an advertisement can have a positive effect on product choice. Another example is in the area of scent congruity where research has found that the congruence of a scent with product offerings and/or the retail environment will lead to positive consumer outcomes. While this finding has clear implications for the selection of suitable scents for a given shopping environment, it lacks a compelling theoretical explanation. Clearly, ease of processing associated with a congruent (as compared to an incongruent) scent may be a likely explanation for reported effects of scent congruency. The current research demonstrated consistent levels of congruity, therefore future research may wish to explore the potential interactive effects between scents that differ in terms of both fluency and congruency. These findings (and others) suggest that the equivocal nature of earlier work may indeed be explained by the complexity (or failure to be simple enough) of olfactory stimuli used in this earlier work. Indeed, the current work motivates additional examination of earlier olfaction research in marketing in terms of stimulus complexity and/or other fluency determining stimulus characteristics.

Managerial Implications

Our work is of obvious practical importance in that, while conventional wisdom holds that scents influence bottom line outcomes in the market, there is little published evidence that this is the case. In fact, the effect of ambient scent on purchases is rarely seen in the literature (for exceptions, see Schifferstein and Blok 2002; Spangenberg et al. 2006). The current studies therefore provide important real-world evidence of olfactory effects on consumer purchases, suggesting that marketing practitioners can feel confident in using such environmental manipulations in the marketplace. Indeed, the introduction of a simple scent could result in significant additional revenues. For example, assuming \$20 additional sales per customer for 400 shoppers per day, with the store being open 300 days per year and an annual cost of scent infusion to be \$400,000), the expected increase in revenue could be around \$2M.

Given that the use of olfactory cues in a marketing context is relatively inexpensive and easy to implement (especially in a retail setting), there is little standing in the way of a firm that wishes to adopt scent as a component of the marketing mix. One concern levied against the use of olfactory cues is that odors can become overwhelming or offensive to certain segments of the market who are more sensitive to such cues than others. While more research is required, it seems reasonable that simple scents (as compared to more complex scents) would be less offensive or overwhelming to customers who are hypersensitive to olfactory stimuli. Thus, the use of a more fluent scent could have the added benefit of being more appealing to the broader market. Future research aimed at understanding the interaction between consumer smell sensitivity and scent fluency would be useful.

Conclusion

While prior published research has repeatedly shown that olfactory cues can influence consumers, few studies have provided guidance beyond the notions of developing pleasant, familiar, and congruent (with product or retail environment or advertisement) scents for use in marketing contexts. Our work moves beyond these initial understandings and provides practical and concrete insight into a new dimension of scent - that is, complexity - for use in marketing contexts. Specifically, the

fluency of an olfactory stimulus must be taken into account when applying such environmental techniques and may provide a differential advantage to firms implementing such olfactory cues in marketing contexts. Our research also suggests a clear, concrete manner by which to manipulate the fluency of the scent. Building upon the work of Lévy, MacRae, and Köster (2006), we showed that scents with fewer component elements were perceived to be simpler and more impactful on consumers, as compared to scents with multiple elements. While a variety of scents were employed in this research, additional inquiry would be useful that tests other simple versus complex combinations of scents within the fluency paradigm.

In summary, processing fluency is clearly an important dimension of olfactory stimuli, as we have demonstrated that the simplicity or fluency of a scent impacts consumer purchase behavior. Findings from our series of field studies (novel in the fluency domain) provide clear guidance to firms regarding the nature of scents that should (and should not) be used in marketing settings. All else being equal, simple scents are best and more complex scents should be avoided since they provide no discernable benefits beyond no scent at all. By using olfactory cues that are easier to process, positive affect is generated which in turn yields increased purchases for product and retailers associated therewith.

REFERENCES

- Alter, Adam L., Daniel M. Oppenheimer, Nicholas Epley, and Rebecca N. Eyre (2007), "Overcoming Intuition: Metacognitive Difficulty Activates Analytic Reasoning," *Journal of Experimental Psychology: General*, 136 (November), 569-76.
- Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (December), 1173-82.
- Bless, Herbert, Gerd Bohner, Norbert Schwarz, and Fritz Strack (1990), "Mood and Persuasion: A Cognitive Response Analysis," *Personality and Social Psychology Bulletin*, 16 (June), 331-45.
- Bone, Paula Fitzgerald and Pam Scholder Ellen (1999), "Scents in the Marketplace: Explaining a Fraction of Olfaction," *Journal of Retailing*, 75 (Summer), 243-62.
- Bone, Paula Fitzgerald and Swati Jantrania (1992), "Olfaction as a Cue for Product Quality," *Marketing Letters*, 3 (July), 289-96.
- Bosmans, Anick (2006), "Scents and Sensibility: When do (In)congruent Ambient Scents Influence Product Evaluations," *Journal of Marketing*, 70 (July), 32-43.
- Brown, Steven P., Pamela M. Homer, and J. Jeffrey Inman (1998), "A Meta-analysis of Relationships Between Ad-Evoked Feelings and Advertising Responses," *Journal of Marketing Research*, 35 (February), 114-26.
- Chebat, Jean-Charles and Richard Michon (2003), "Impact of Ambient Odors on Mall Shoppers' Emotions, Cognition, and Spending: A Test of Competitive Causal Theories," *Journal of Business Research*, 56 (July), 529-39.
- Cohen, Jacob (1988), *Statistical power analysis for the behavioral sciences*, 2d ed. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, Joel B. and Charles S. Areni (1991), "Affect and Consumer Behavior," in *Handbook of Consumer Behavior*, Thomas S. Robertson and Harold H. Kassarian, eds. Englewood Cliffs, NJ: Prentice Hall, 188-240.
- Crowley, Ayn E. (1993), "The Two-Dimensional Impact of Color on Shopping," *Marketing Letters*, 4 (January), 59-69.
- DeBono, Kenneth G. (1992), "Pleasant Scents and Persuasion: An Information Processing Approach," *Journal of Applied Social Psychology*, 22 (June), 910-19.

- Ehrlichman, Howard and Jack N. Halpern (1988), "Affect and Memory: Effects of Pleasant and Unpleasant Memories," *Journal of Personality and Social Psychology*, 55 (November), 769-79.
- Ellen, Pam S. and Paula F. Bone (1998), "Does It Matter if it Smells? Olfactory Stimuli as Advertising Executional Cues," *Journal of Advertising*, 27 (Winter), 29-39.
- Fisher, Jeffrey (1974), "Situation Specific Variables as Determinants of Perceived Environmental Aesthetic Quality and Perceived Crowdedness," *Journal of Research in Personality*, 8 (August), 177-88.
- Fox, John (2008), *Applied Regression Analysis and Generalized Linear Models*. Thousand Oaks, CA: Sage Publications.
- Garner, Wendell R. (1974), *The processing of information structure*. Potomac, MD: Lawrence Erlbaum Associates.
- Goldstein, E. Bruce (1996), *Sensation and Perception*, 4th ed. Pacific Grove, CA: Brooks/Cole Publishing.
- Halberstadt, Jamin B. and Gillian Rhodes (2003), "It's Not Just Average Faces That Are Attractive: Computer-Manipulated Averageness Makes Birds, Fish, and Automobiles Attractive," *Psychonomic Bulletin and Review*, 10 (March), 149-56.
- Herz, Rachel S. and Trygg Engen (1996), "Odor Memory: Review and Analysis," *Psychonomic Bulletin and Review*, 3 (September), 300-313.
- Hirsch, Alan (1995), "Effects of Ambient Odors on Slot Machine Usage in a Las Vegas Casino," *Psychology and Marketing*, 12 (October), 585-94.
- Hirschman, Elizabeth C. and Stern, Barbara B. (1999), "The Roles of Emotion in Consumer Research," in *Advances in Consumer Research*, Vol. 26 (1), E.J. Arnould and L.M. Scott eds. Provo, UT: Association for Consumer Research, 4-11.
- Isen, Alice. M. (1987), "Positive Affect, Cognitive Processes, and Social Behavior," in *Advances in Experimental Social Psychology*, Vol. 20, Leonard Berkowitz, ed. New York: Academic Press, 203-53.
- Janiszewski, Chris and Tom Meyvis (2001), "Effects of Brand Logo Complexity, Repetition, and Spacing on Processing Fluency and Judgment," *Journal of Consumer Research*, 28 (June), 18-32.
- Labroo, Aparna A. and Angela Y. Lee (2006), "Between Two Brands: A Goal Fluency Account of Brand Evaluation," *Journal of Marketing Research*, 43 (August), 374-85.

- Labroo, Aparna A. and Vanessa M. Patrick (2008), "Psychological Distancing: Why Happiness Helps You See the Big Picture," *Journal of Consumer Research*, 35 (October), 800-09.
- Labroo, Aparna A., Ravi Dhar, and Norbert Schwarz (2008), "Of Frog Wines and Frowning Watches: Semantic Priming, Perceptual Fluency, and Brand Evaluation," *Journal of Consumer Research*, 34 (April), 819-31.
- Landwehr, Jan. R., Aparna A. Labroo, and Andreas Herrmann (2009), "The Pervasive Effect of Aesthetics on Choice: Evidence from a Field Study," in *Advances in Consumer Research*, Vol. 36, Ann L. McGill and Sharon Shavitt, eds. Duluth, MN: Association for Consumer Research, 751-52.
- Lee, Angela Y. and Aparna A. Labroo (2004), "The Effect of Conceptual and Perceptual Fluency on Brand Evaluation," *Journal of Marketing Research*, 49 (May), 151-65.
- Lévy, C. M., A. MacRae, and E. P. Köster (2006), "Perceived Stimulus Complexity and Food Preference Development," *Acta Psychologica*, 123 (November), 394-413.
- Mattila, Anna S. and Jochen Wirtz (2001), "Congruency of Scent and Music as a Driver of In-Store Evaluations and Behavior," *Journal of Retailing*, 77 (Summer), 273-89.
- Mehrabian, Alpert and James A. Russell (1974), *An Approach to Environmental Psychology*. Cambridge, MA: The MIT Press.
- Milliman, Ronald E. (1982), "Using Background Music to Affect the Behavior of Supermarket Shoppers," *Journal of Marketing*, 46 (April), 86-91.
- Mitchell, Deborah J., Barbara E. Kahn, and Susan Knasko (1995), "There's Something in the Air: Effects of Congruent or Incongruent Ambient Odor on Consumer Decision Making," *Journal of Consumer Research*, 22 (September), 229-38.
- Morrin, Maureen and S. Ratneshwar (2000), "The Impact of Ambient Scent on Evaluation, Attention and Memory for Familiar and Unfamiliar Brands," *Journal of Business Research*, 49 (August), 157-65.
- Morrin, Maureen and S. Ratneshwar (2003), "Does It Make Sense to Use Scents to Enhance Brand Memory?" *Journal of Marketing Research*, 40 (February), 10-25.
- Nicki, Richard M., Poh Lin Lee, and Virginia Moss (1981), "Ambiguity, Cubist Works of Art, and Preference," *Acta Psychologica*, 49 (October), 27-41.

- North, Adrian C. and David J. Hargreaves (1998), "The Effect of Music on Atmosphere and Purchase Intentions in a Cafeteria," *Journal of Applied Social Psychology*, 28 (December), 2254-73.
- Novemsky, Nathan, Ravi Dhar, Norbert Schwarz, and Itamar Simonson (2007), "Preference Fluency in Choice," *Journal of Marketing Research*, 44 (3), 347-56.
- Oppenheimer, Daniel M. (2008), "The Secret Life of Fluency," *Trends in Cognitive Sciences*, 12 (June), 237-41.
- Peck, Joann and Terry L. Childers (2008), "If it Tastes, Smells, Sounds, and Feels Like A Duck, Then it Must Be A...: Effects of Sensory Factors on Consumer Behaviors," in *Handbook of Consumer Psychology*, Curtis P. Haugtvedt, Paul M. Herr, and Frank R. Kardes eds. Mahwah, NJ: Lawrence Erlbaum Associates, 193-220.
- Reber, Rolf and Norbert Schwarz (2006), "Perceptual Fluency, Preference, and Evolution," *Polish Psychological Bulletin*, 37 (1), 16-22.
- Reber, Rolf, Norbert Schwarz, and Piotr Winkielman (2004), "Processing Fluency and Aesthetic Pleasure: Is Beauty in the Perceiver's Processing Experience?" *Personality and Social Psychology Review*, 8 (November), 364-82.
- Reber, Rolf, Piotr Winkielman, and Norbert Schwarz (1998), "Effects of Perceptual Fluency on Affective Judgments," *Psychological Science* 9 (January), 45-48.
- Repp, Bruno H. (1997), "The Aesthetic Quality of a Quantitatively Average Music Performance: Two Preliminary Experiments," *Music Perception*, 14 (Summer), 419-44.
- Schifferstein, Hendrik. N.J. and Sylvia T. Blok (2002), "The Signal Function of Thematically (In)congruent Ambient Scents in a Retail Environment," *Chemical Senses*, 27 (July), 539-49.
- Schwarz, Norbert (2004), "Metacognitive Experiences in Consumer Judgment and Decision Making," *Journal of Consumer Psychology*, 14 (4), 332-48.
- Schwarz, Norbert and Gerald L. Clore (1983), "Mood, Misattribution, and Judgments of Well-Being: Informative and Directive Functions of Affective States," *Journal of Personality and Social Psychology*, 45 (September), 513-23.
- Schwarz, Norbert and Gerald L. Clore (1988), "How Do I Feel About It? Informative Functions of Affective States," in *Affect, Cognition, and Social Behavior*, Klaus Fiedler and Joseph P. Forgas, eds. Toronto: Hogrefe International, 44-62.

- Spangenberg, Eric R., Ayn E. Crowley, and Pamela W. Henderson (1996). "Improving the Store Environment: Do Olfactory Cues Affect Evaluations and Behaviors?" *Journal of Marketing*, 60 (April), 67-80.
- Spangenberg, Eric R., David E. Sprott, Bianca Grohmann, and Daniel L. Tracy (2006), "Gender-Congruent Ambient Scent Influences on Approach and Avoidance Behaviors in a Retail Store," *Journal of Business Research*, 59 (November), 1281-87.
- Turley, L. W. and Ronald E. Milliman (2000), "Atmospheric Effects on Shopping Behavior: A Review of the Experimental Evidence," *Journal of Business Research*, 49 (2), 193-211.
- Winkielman, Piotr and John T. Cacioppo. (2001), "Mind at Ease Puts a Smile on the Face: Psychophysiological Evidence That Processing Facilitation Elicits Positive Affect," *Journal of Personality and Social Psychology*, 81 (December), 989-1000.
- Winkielman, Piotr, Norbert Schwarz, Tedra A. Fazendeiro, and Rolf Reber (2003), "The Hedonic Marking of Processing Fluency: Implications for Evaluative Judgment," in *The Psychology of Evaluation: Affective Processes in Cognition and Emotion*, Jochen Musch and Karl C. Klauer, eds. Mahwah, NJ: Lawrence Erlbaum Associates, 189-217.

Essay II

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**Scents that Make Sense:
The Influence of Moderately Incongruent Product Ambient Scents on Buying
Behavior in a Retail Store**

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ABSTRACT

Ambient scents within retail stores have been demonstrated to influence shoppers. However, extant research has not provided an adequate theoretical explanation for observed effects and measured intentions rather than shopping behavior. The current research addresses these open questions through exploration of the role of G. Mandler's (1982) schema congruity theory with regard to effects of olfactory cues. In a field experiment, and consistent with this theory, results showed that products associated with moderately incongruent scents impact shoppers' responses to olfactory cues. In comparison to a control condition, moderately incongruent ambient scents diffused by a retailer led to increased customer spending, while either congruent or incongruent scents had no such effect on shoppers. Results indicate that affective responses to scent mediate observed effects. Implications for theory and practice are provided.

INTRODUCTION

Research shows that environmental cues like color (Crowley 1993), music (Yalch and Spangenberg 1990), or product sound (Lageat, Czellar, and Laurent 2003) can influence consumer responses. The past few years, researchers try to shed light onto the so far underestimated olfactory cues effects (e.g., Bosmans 2006; Spangenberg, Crowley and Henderson 1996; Spangenberg, Sprott, Grohmann, and Tracy 2006). In practice, retailers have been using scents in the marketplace for a long time to influence consumers' purchase behaviors and attitudes. For instance, pumping the smell of freshly baked bread into a supermarket to draw customers to the bakery department and to signal freshness and quality. Likewise, Thomas Pink, an upscale British shirt retailer, applies the smell of linen to indicate freshly laundered cotton (Vlahos 2007).

It seems reasonable to assume that the liking of the environment is influenced by its perceived appropriateness to the product of evaluation. Research has shown that besides a scent's pleasantness, semantic information is provided (Bone and Jantrania 1992; Mitchell, Kahn, and Knasko 1995). For example, the smell of coconut not only evokes positive feelings but also might trigger concepts of a holiday in the Caribbean, and the smell of citrus may be connected with cleaning products (Holland, Hendriks and Aarts 2005).

As a consequence of these semantic associations, different scents can differ in their level of congruence with the product under evaluation. Given these strong semantic connections, it can be expected that the effect of ambient scents on product evaluations depends on how they match with the stimuli at hand, that is, the product (see Bosmans 2006). In other words, what all of these "natural" scent experiences have in common is "...the correspondence of an ambient scent with the (...) products offered for sale by a retailer" (Spangenberg et al. 2006, p. 1281), which is the match between the scent and the range of situational and other emotional stimuli at the point of sale.

An overall look into the literature reveals that much recent work has focused on the effects of olfactory stimuli on consumers and their responses to those cues (e.g., Bosmans 2006; Mitchell, Kahn, and Knasko 1995; Morrin and Ratneshwar 2003;

Spangenberg, Crowley, and Henderson 1996). Researchers since the mid 1990's have demonstrated that olfactory stimuli can influence consumer cognitions (e.g., Bone and Jantrania 1992), affect (e.g., Bosmans 2006), attention (Morrin and Rataneshwar 2003), product evaluations (Spangenberg et al. 2006), and even purchase behavior (Chebat and Michon 2003; Spangenberg et al. 2006). These studies have shown, for instance, that pleasant scents improve the store image and the intention to visit the store (Mattila and Wirtz 2001; Spangenberg, Crowley and Henderson 1996; for a detailed review, see Peck and Childers 2008). Particularly, in the marketing literature boundary conditions to the effects of scent on attitudes and behaviors were explained by the appropriateness or congruity of product scents (Bosmans, 2006; Mitchell, Kahn, and Knasko, 1995) and ambient store scents (Spangenberg et al., 2006). Intuitively, customers might evaluate products most favorably when carrying scents that are congruent with associations tied to the product.

Despite the intuitive appeal of this view, this line of research presents mixed results. Some researchers show, that applying congruent scents increase product evaluations (Bosmans 2006) and purchase behavior (Spangenberg et al., 2006, see for a review). Others, however, show the opposite effect, that is, ambient scents did not increase sales for congruent products (Bone and Ellen 1999; Schifferstein and Blok 2002). A growing body of research calls inference into question, suggesting that products associated with rather moderately incongruent scents might be preferred over those with either congruent or incongruent scents (Bone and Ellen 1999; Bosmans 2006; Michon, Chebat and Turley 2005; Spangenberg et al. 2006). More specifically, with respect to scents, some researchers argue that applying congruent scents might not be highly effective since they do not provide any additional and/or diagnostic information to the product attributes (Bone and Ellen 1999) because semantic overlap between the scent and the target product is high (Bosmans 2006). Diagnosticity refers to "...the degree to which the information is helpful in categorizing (i.e., high quality, low quality) or interpreting the product or service" (Bone and Ellen 1999, p. 253). When a congruent scent duplicates a present information, judgments may not be improved. In a study by Ellen and Bone (1998), an ad with a picture of wildflowers and a floral scent provided little new information and had no effect on product evaluation compared to the control group. Similarly, Spangenberg et al.'s (1996) findings did not reveal convincing effects of scent on product evaluations. It

might simply be the case that the scent was not diagnostic for the product and did not add any new relevant information to the customer. This may have happened because product attributes were already accessed by the information presented and thus, competed with the effect of scent.

Incongruity on the other hand interferes with elaboration reducing the amount of relevant information available to the customer and making the task more difficult (Mitchell, Kahn, and Knasko 1995). Scents that are of moderate incongruity have been shown to increase consumer responses. For instance, Bosmans (2006, Experiment 3) argues that low processing participants were influenced by moderate incongruent scents because the semantic overlap is given which would not allow any correcting or cancelling out efforts of a scent. Only extremely incongruent scents lead to overcorrection and decreased product evaluations. Thus, a scent activating inappropriate information that is unrelated to the presented target product, may produce cognitive interference and decreasing buying intentions and sales. Since congruency effects are more often due to the detrimental effects of an incongruent scent than to the improvement by a congruent scent (Bone and Ellen 1999), both the positive and negative effects of an ambient scent need to be monitored to understand the effect of (in)congruency.

With reference to Mandler's schema theory (1982) and in line with Spangenberg's et al. (2006) conclusions, we argue that a moderately incongruent scent might go around the lack of influence towards product evaluation and/or purchase intentions, that is, mildly incongruent scents with retailers' product offerings could be more effective and lead to enhanced customers responses (Spangenberg et al. 2006). Mandler (1982) theorized that the extend of congruity between a specific product and a general product category schema might affect the mode of processing and as a result product evaluations and purchase behavior. The degree to which a stimuli (e.g., a scent) and a product are congruent or linked by common associations is presented to be an important factor in this regard. According to Mandler (1982), we suggest that scents, that are moderately incongruent with the products at hand are expected to stimulate processing that leads to a more favorable response relative to scents that are either congruent or extremely incongruent with the products.

This idea becomes relevant from a practical point of view: Applying moderately incongruent scents (vs. congruent and/or incongruent scents) could be more effective because retailers could diffuse a single scent in a variety of areas and product categories. Thus, instead of applying a scent that might be thematically congruent with some products whereas others are not, sales of the congruent products may have an advantage from the scent, whereas sales of incongruent products may be reduced by it. Therefore, we propose a more widely applicable view of how the congruency dimension of olfactory cues enhance consumers responses, which is, exploring the influence of moderately incongruent scents on retail sales.

In the current research, we focus on the effects of scent on consumers from a schema congruity theory, such that moderately incongruent olfactory stimuli will lead to favorable marketing outcomes. Here, we examine the effects of ambient scents in the environment, excluding scents that emanate from the product (e.g., perfumes and air fresheners). Thus, the contribution of this project is two-fold: First, we propose that Mandler's (1982) schema theory can be applied in the context of scents and might explain the findings within this research tradition. We intend to extend previous literature by examining the usefulness and validity of schema congruency in the field of sensory marketing context in a field experiment. Given that this theory has not explored olfactory effects, further development of this basic idea is warranted. Second, while lots of research has focused on the congruency dimension, numerous empirical evidence, however, investigated the effects of scent on consumer self-reports and/or proximal dependent variables. Researchers typically report effects of olfactory cues on measured attitudes and intentions, rather than actual purchase behavior. In a commercial environment, however, a successful test of an effect is purchase behavior (see Hirsch 1995; Schifferstein and Blok 2002; Spangenberg et al. 2006). Thus, a second contribution of the current work is to address the absence of practical application in prior research with a field study wherein the effects of olfactory cues are demonstrated with regard to actual retail sales.

Below, we begin with a presentation of Mandler's (1982) schema theory paying particular attention to marketing related investigations and how this explanation can be applied to the context of olfaction. Proposed hypotheses are empirically tested in

a field study. A discussion of our empirical findings and implications of these findings for theory and practice are provided.

Schema Congruity in the Marketing Context

Mandler (1982) theorized that the process of responding to different levels of schema congruity can itself influence the valence and extremity of affective responses. This basic proposition - that people's preferences are related to the levels of incongruity in an inverted U-shaped manner - has been observed in a variety of consumer contexts such that perceptions of incongruity often leads to elaboration in ways that encourage positive evaluations (e.g., Meyers-Levy, Louie, and Curren 1994; Meyers-Levy and Tybout 1989, Peracchio and Tybout 1996; Priester, Godek, Nayakan-kuppum, and Park 2004; Stayman, Alden, and Smith 1992). In particular, past research suggests that a moderate degree of incongruity may enhance liking because the incongruity itself increases arousal while being able to resolve the incongruity produces a feeling of satisfaction, positive affect that carries over to the assessment of the target (Fiske 1982; Mandler 1982; see also Meyers-Levy and Tybout 1989). Extreme congruity is liked less than moderate incongruity because the arousal and subsequent satisfaction of solving the mismatch is absent. By contrast, extreme incongruity decreases liking because the incongruity cannot be resolved, transferring the negative affect of frustration to the target object.

To date, Mandler (1982) has offered the most detailed explanation for such findings, suggesting that this U-shaped relationship occurs in response to the extent of elaboration prompted by the congruity or incongruity and the success of such elaboration in resolving any incongruity. Schema congruity leads to a favorable response because people like objects that conform to their expectations and allow predictability. However, the predictability of such congruent characteristics (e.g., scents) may produce a mildly favorable response. That is, because they do not require resolution and, therefore, are generally predictable and satisfying. However, the predictability due to the congruency may cause limited interest and is relatively immune from extensive processing that might itself stimulate more extreme responses (Meyers-Levy, Louie, and Curren 1994). The authors found that a moderate level of incongruity between the extension and a parent brand resulted in more favorable evaluations than either a high level of congruity or incongruity. The authors explain the

observed inverted U pattern by drawing inferences from the schema theory with regarding to how schema congruity affects cognitive elaboration (see Mandler 1982). According to this view, encountering incongruity prompts greater elaboration than does encountering congruity.

Looking at the world of scents, research suggests that schema congruent scents are not delivering much diagnostic information and therefore are unlikely to prompt extensive cognitive elaboration (see Bone and Ellen 1999). Hence, the response that they generate typically is mild rather than extreme. A different scenario occurs when schema incongruity is encountered. The novelty of the object increases arousal, and greater cognitive elaboration may occur in an effort to resolve and find meaning in the incongruity. Mandler (1982) suggests that moderate incongruities are those that can be successfully resolved. Moderate incongruities are regarded as “interesting and positively valued” (Mandler 1982, p. 22), thereby leading to more positive responses than ones elicited by schema congruity. Indeed, the very process of resolving incongruity is thought to be rewarding and thus may contribute to the resulting positive affect. By contrast, extreme incongruity is defined as incongruity that cannot be resolved or can be resolved only if fundamental changes are made in the existing cognitive structure. Such incongruities may generate cognitive elaboration, but this elaboration may lead more to frustration than resolution. Thus, extreme incongruities typically elicit more negative evaluations than do moderate incongruities (Mitchell, Kahn, and Knasko 1995).

This theorizing implies that a nonmonotonic, or inverted U-shaped relationship is likely to exist between scent and product incongruity and consumer responses. The present research explores customers’ responses to an ambient scent in an actual store. This project will examine the idea if moderate schema incongruity will lead to increased approach behavior and higher purchase than will complete congruity or incongruity between the product at hand and the ambient scent. As such, the study explores congruity between the product offerings of a male clothing retailer and the perceived congruity of ambient scents. Consistent with Mandler’s (1982) conceptualizations of product-scent congruity (i.e., the correspondence or fit of a particular scent with a target object, or its appropriateness in certain contexts; Bone and Ellen 1999), we operationalize product-scent congruity as the correspondence of a scent

with the products offered for sale by a retailer. Analogously, Bosmans (2006) manipulated scent congruency by creating scents that contained different semantic connections between the olfactory cue and the target (e.g., product category). Therefore, scent congruency can be manipulated by means of creating stimuli with differing degrees of congruency or, in other words, with differing matches of informational elements to be processed (Morrin and Ratneshwar 2003). On this basis, we offer several predictions that relate to Mandler's (1982) proposition and the process believed to be responsible for the inverted U-shaped relationship. Given that moderately incongruent scents should evoke more positive responses than those that are (in)congruent, we hypothesize that:

- H1: A moderately incongruent, as compared to an incongruent or congruent scent, will lead to an increase in actual customer spending.

In particular, the study will use a between-subjects design with three conditions manipulated via ambient scents: congruent scent, incongruent scents and a moderately incongruent scent condition as well as a control condition when no ambient scent is present. The field experiment will take part in a male clothing store. Participants will randomly be assigned to the conditions.

Research has demonstrated that positive affect can directly influence behavior (e.g., Cohen and Areni 1991; Hirschman and Stern 1999) and that ambient scents can similarly influence how consumers behave. Based on the theoretical predictions derived from the schema theory, one can reasonably predict that triggering consumers' implicit affects with a moderately incongruent olfactory cue should lead to more favorable responses to retail environments and products associated with that scent. Prior research has shown that moderately incongruent stimuli cause greater affective responses which may be transferred to associated surroundings (Peracchio and Tybout 1996). Given that extreme incongruities may generate elaboration, but this elaboration may lead rather to frustration than resolution one can reasonably expect that incongruent scents elicit more negative responses than do moderate incongruities (Mitchell, Kahn, and Knasko 1995). Thus, a scent (e.g., bergamot) which is moderately incongruent with the product category at hand should evoke a positive affective state than a scent being extremely incongruent (e.g., lily of the valley).

Given that a congruent and incongruent scent does not lend itself to increased affect, such a scent should not increase spending as compared to a no scent (control) condition. The positive feelings elicited by the moderately incongruent scent are expected to serve as the mediating mental construct of customer behavior. Thus, with regard to process, and assuming that moderately incongruent scents are more likely to elicit positive affect (as compared to a congruent scent at all or a incongruent scent), we hypothesize:

- H2: The impact of scent congruency on sales is mediated by affective responses elicited by a moderately incongruent, as compared to a congruent or incongruent scent or no scent at all.

METHOD

A field experiment was conducted to assess the effect of scent congruency on customer behavior within an actual retail store. The study was performed in an exclusive male clothing store offering all kinds of men's clothing products (e.g., suits, shirts, tights, etc.) targeting both men and women. Ambient scents were manipulated within the store environment, customers who made purchases within the store served as research participants, and actual sales served as the primary dependent variable of interest. While the authors are not aware of any research documenting the congruency of ambient scent with males clothing, the aroma supplier suggested several scents likely to be male-oriented as to being perceived more congruent with the products than female-oriented scents which, in turn, ought to be perceived as being less congruent with the target product. Analogously, Spangenberg et al. (2006) manipulated gender congruency by creating scents that were perceived as feminine/masculine. Given the close affiliation between gender orientation in the Spangenberg's et al. study and the (in)appropriateness of a scent in a male clothing store, we approached scent congruency in a similar manner in our studies. Thus, scent congruency was operationalized by developing scents varying in terms of the perceived semantic between scent and the target product with the rationale being that a higher match would be more congruent than a lower match (see also Bosmans 2006; Morrin and Ratneshwar 2003).

In addition, and following Spangenberg et al. (2006), we choose scents that would be currently used by retailers such that managers would consider them to be actual alternatives.

Pretest

Pretest participants included 195 customers intercepted at the target store where the study was conducted, thus insuring pretest scent ratings matched later customers' scent perceptions. Pretesting followed Spangenberg, Crowley, and Henderson (1996), wherein 12 scents were evaluated on several seven-point semantic differential scales. To avoid possible measurement effects, participants randomly chose 1 of 12 possible vials which were opaque and labeled with random numbers. Scents originated from a cotton ball contained within the vial that had been applied with 20 to 25 drops of an essential oil. Participants were allowed to sniff the vial as many times as they wanted while responding to questions

The pretest scent selection was done in cooperation with an aroma supplier who prepared the scent compositions by using scents that are currently used in stores. As prior research has revealed the hedonic preference of the scents for the store to be a potential moderator (Spangenberg, Crowley, and Henderson 1996), we assessed the construct by using items from Fisher's (1974) environmental quality scale. All six scents were perceived as equally pleasurable (positive/negative, pleasurable/unpleasurable, bad/good; $\alpha = .95$) on seven-point scales ($p > .47$). Also, the six scents selected for Study 1 did not differ ($p > .51$) according to perceived familiarity on a seven-point scale ranging from "not at all familiar" (1) to "highly familiar" (7).

To validate the scent congruency manipulation, participants rated the congruency (very incongruent / very congruent; Morrin and Ratneshwar 2003) of the scents. To increase generalizability of the pretest, two different sets of congruent, moderately incongruent, and incongruent scents were tested, implemented as nested factors in the experimental design and subsequently aggregated in congruent, moderately incongruent, and incongruent scent conditions. Results of the pretest supported the congruency manipulation for the main experiment.

Oils of “nutmeg” and “patchouli-amber” as well as “tangerine” and “sandal- and cedar wood” were selected as congruent scents; “Lily of the valley” and blended oils of “rose” and “jasmine” represented our incongruent scents, and “bergamot” as well as blended oils of “viola” and “almond-lemon” were selected as moderately incongruent scents which differed significantly on the subjective congruency measures as intended (all $ps < .001$). Results indicated that the two congruent scents did not differ from one another in terms of congruency ($p < .75$), nor did the two moderately incongruent scents differ from each other ($p < .46$), or the two incongruent scents differ from each other ($p < .80$). As expected, each of the congruent scents differed from each of the incongruent and moderately incongruent scents (all $ps < .001$). Additionally, the congruent scents were perceived significantly above the scale midpoint ($p < .001$), the moderately incongruent scents did not differ ($p > .48$) and the incongruent scent was rated significantly below the scale midpoint ($p < .001$).

Given the results of the pretest, the congruent scents, the moderately incongruent scents, and the incongruent scents were respectively aggregated (for analytic and reporting purposes) in the main field study.

Field Experiment

Design, Participants, and Procedure. Our Study applied a between-participants design with four conditions: congruent scent X incongruent X moderately incongruent and no scent at all. Procedures largely followed prior research in the marketing literature with regard to data collection in the field, as well as use of a commercial diffusion system, insurance of absence of “other” scents competing with our manipulations and so forth (Spangenberg, Crowley, and Henderson 1996; Spangenberg et al. 2006). Conditions were randomly assigned to days of the week over the 20-day period in which the study was conducted and consistent advertising, pricing, and product availability was ensured by proprietor of the store. Participants were 274 shoppers making purchases in the store during the time of the field experiment. 81 customers were exposed to the congruent scent, 72 to the moderately incongruent scent, 81 to the incongruent scent, and 40 were shopping when no scent was present. Data were collected only from shoppers who spent at least five minutes in the store to ensure that customers had sufficient opportunity to be impacted by the

ambient scent. Time was unobtrusively monitored by the interviewer and double checked with the customer once they had completed the survey. Data collection took place from 10am to 7pm on weekdays and Saturday from 10am to 5pm. Data were not collected for at least one day after changing scents in order to allow the previous scent to dissipate and the new scent to completely diffuse throughout the store. The intensity and concentration of the ambient scent was continuously monitored to ensure that it would be perceived by shoppers, but not be so intense as to be bothersome. Additionally, the trained interviewers left the store every hour in order to prevent them from undergoing sensory adaptation. This procedure allowed the interviewers to perceive changes in the scent's intensity level and to make any required adjustments in order to ensure that the intensity was kept at moderate levels throughout the entire store and throughout the day. There were no aggressive, exogenous odors in the retail store and all efforts were made to reduce the effect of any extraneous odors during the study (e.g., interviewers were instructed not to wear perfume, aftershave, or other scents).

Upon making a purchase at the store, customers at the cash register were contacted by the interviewer blind to the study's hypotheses and asked to fill out a short, self-administered questionnaire about the store. There was no reference to ambient scent and no customers mentioned scent in the open-ended question included with the survey. In exchange for participation, participants were entered in a lottery for a coupon at the store and were debriefed and thanked afterwards.

As noted in pretest discussions, the two congruent scents (blended oils of "nutmeg" and "patchouli-amber"; "tangerine" and "sandal- and cedar wood") were combined into a single congruent scent condition, the two incongruent scents ("lily of the valley"; blended oils of "rose" and "jasmine") were combined into a single incongruent condition, and the two moderately incongruent scents ("bergamot", blended oils of "viola" and "almond-lemon") were combined into a single moderately incongruent scent condition for analytic purposes. Additional analyses further supported collapsing the data in this fashion. In particular, there were no significant differences between the two incongruent scents regarding the focal dependent variable ($p > .15$), nor did any differences emerge between the two congruent scent conditions ($p > .24$), nor the moderately incongruent scent conditions ($p > .40$).

Measures. In-store sales served as the primary dependent variable. The survey instrument included an open-ended question that asked participants how much money they had spent in the store during the shopping trip. Accuracy of shoppers' self-reported expenditures were checked against sales receipts. The sales variable was highly dispersed and non-normally distributed, thus a logarithmic transformation was used to achieve a normal distribution (Fox 2008).

In addition, shoppers were also asked to provide affective responses as a measure of process. This mediator was assessed on a 4-item scale (unpleasant/pleasant; negative/positive; unattractive/attractive; unappealing/appealing (Crowley 1993; Fisher 1974; Spangenberg, Crowley, and Henderson 1996) measured on seven-point scales (Cronbach's Alpha = .87).

The survey also asked customers about the characteristics of the ambient scent including: scent-store congruity (incongruent/congruent/moderately congruent, Spangenberg et al. 2006), scent familiarity (unfamiliar/familiar, Morrin and Ratneshwar 2003), and scent pleasantness (pleasant/unpleasant, Spangenberg, Crowley, and Henderson 1996). The last two items were included to ascertain whether differences on these dimensions might account for any observed treatment effects.

RESULTS

Manipulation Check. The congruent ambient scent condition ($M = 5.36$) was perceived to be more congruent than the moderately incongruent ambient scent condition ($M = 4.26$), $t(151) = 4.67, p < .001$ and the incongruent scent condition ($M = 3.31$), $t(160) = 8.75, p < .001$. Additionally, the moderately incongruent scent condition was perceived to be more congruent than the incongruent ambient scent condition, $t(151) = 3.98, p < .001$. A one-way ANOVA using three levels of scent as a fixed factor was performed revealing that participants rated the scents as equally pleasant ($F(2, 231) = 1.40, p > .25$) and familiar ($F(2, 231) = 0.84, p > .43$). Thus, the manipulations were deemed successful.

Sales. An ANOVA model was estimated, including the three scent and the control condition (congruent vs. moderately incongruent vs. incongruent vs. control); The

sales variable served as the central dependent variable. It was highly dispersed and non-normally distributed, thus a logarithmic transformation was used to achieve a normal distribution (Fox 2008). As proposed, the model indicated a significant impact of ambient scent on sales, $F(3, 270) = 7.64, p < .001$. Shoppers spent significantly more money in the presence of a moderately incongruent ambient scent ($M = 5.53$) than those shopping in the presence of an incongruent ambient scent ($M = 4.76$), $t(151) = 4.38, p < .001$, as well than those shopping in the presence of a congruent scent ($M = 5.12$), $t(151) = 2.40, p < .03$ or no scent at all ($M = 4.74$), $t(110) = 3.93, p < .001$. As prior research on olfactory cues has indicated, customers spent more money when a congruent scent was present as opposed to an incongruent scent condition, $t(160) = 2.00, p < .05$ (Spangenberg et al. 2006). Mean differences on sales between the congruent scent condition and no scent at all reached marginal significance, $t(119) = 1.78, p < .08$. There was no significant difference of money spent between the incongruent scent condition and no scent at all, $t(119) = 1.00, p > .92$.

Affective Mediation. Prior research has shown that moderately incongruent stimuli cause greater affective responses which may be transferred to associated surroundings (Peracchio and Tybout 1996). If affect either partially or fully mediates observed effects of scent on sales, the inclusion of affect as an additional independent variable should reduce the main effect of the moderately incongruent ambient scent. Given that congruities fail to enhance consumer responses since no additional information is present, we expect that moderate incongruities lead to enhanced positive affective reaction as compared to congruent scents. In addition, as any incongruities may generate elaboration, but this elaboration may lead more to frustration than resolution we expect that incongruent scents elicit more negative responses than do moderate incongruities (Mitchell, Kahn, and Knasko 1995). Thus, we expect to find the same mediational pattern when comparing the moderately incongruent scent condition to both the congruent and the incongruent scent condition. No mediational effects are expected when comparing the incongruent and control conditions. The mediating role of affective reaction in the preceding effects was tested via OLS regression (Baron and Kenny 1986).

Results reveal that the conditions for mediation are met when comparing the moderately incongruent scent condition to the congruent scent condition, such that: (1) the independent variable (moderately incongruent ambient scent vs. congruent scent) had a statistically significant effect on the mediator (affective response) ($b = .54, p < .001$); (2) the mediator (affective response) had a statistically significant effect on the dependent variable (spending), controlling for the effects of the independent variable ($b = .21, p < .01$); and (3) the direct effect of the moderately incongruent scent on spending ($b = .41; p < .02$) was significantly mediated by consumers' affective responses, such that when consumers' affective reactions are included in the model, the relationship between scent and sales weakens and becomes non significant ($b = .31, p > .08$) (Baron and Kenny 1986). The Sobel test reached statistical significance ($p < .03$). Additional analyses regarding the moderately incongruent scent and the incongruent scent condition did not support the expected mediation. In particular, the independent variable had a significant effect on affective response and on spending (all $ps < .001$), but the direct effect of moderately incongruent scent was not weakened when affective reactions were included in the model. Finally, mediational models were conducted for the moderately incongruent scent in comparison to the control condition and, as expected, no significant effects emerged among the variables included in the model.

GENERAL DISCUSSION

The current research demonstrated that ambient scents, which are of moderate incongruity with a given product, can have a strong influence on consumers' responses and purchase behaviors. As long as ambient scents are moderately incongruent with the product category, they continue to affect customers behaviors, even when they are not diagnostic for the product itself. As expected, the incongruent ambient scent did not enhance shoppers' purchases as compared to the control condition. In addition, scents that are congruent with the product category did marginally influence consumers' purchase behaviors. To understand the postulated underlying mechanism of scent congruency, we explored the psychological process accounting for the observed effects and additionally could show why increased buying behavior took place. These results emerged when the scents did not differ in terms

of familiarity or pleasantness and other store factors like pricing and advertising were held constant.

Our findings provide new insights from both theoretical and managerial perspectives.

Of theoretical importance is empirical evidence that the schema theory provides a useful framework for explaining observed effects. So far, pluralistic theoretical approaches (e.g., SOR) have served as a basis for explaining olfactory cue effects. The results suggest that scent researchers should widen their view further acknowledging the schema congruency construct for testing olfactory cue effects. While a number of researchers have examined the congruency dimension with scents, the authors are unaware of any study exploring the effects of olfactory cues with regard to Mandler's (1982) schema theory. Thus, so far the congruency dimension was considered at two levels only: congruent and incongruent scents which led to mixed results. Scents appear to be evaluated not just in terms of those two levels but a more sensitive look at the full degree of congruity with the product category at hand should be taken into consideration. Our findings suggest the notion as suggested by other researchers (e.g., Bone and Ellen 1999) that moderately incongruent scents give some additional and/or diagnostic information to the product attributes but do not duplicate information which is represented by other cues. Thus, transferring Mandler's theoretical application into the sensory domain is one contribution that can be extended further.

Despite the field experimental character of the current study, another important theoretical aspect is that we shed light on the underlying psychological mechanism being responsible for observed effects. Affect mechanism which was induced only by the moderately incongruent scent. Intuitively, one might expect that any pleasant olfactory cue might induce a positive emotional state. That is, because scents are processed in a more primitive portion of the brain, rather than in higher-level centers as occurs with other sensory cues. However, our results show that the processing of scents does not stop at the limbic system. Thus, a scent alone is not sufficient to elicit positive affect. Our research suggests that the scent needs to be transmitted to the preexisting schema customers have incorporated and, in turn, be

compared to the products they are exposed to. A slightly deviating scent allows consumers to solve the moderate incongruity which then improves affect. Thus, it is not surprising that process effects have gone undetected / mixed in research about olfactory cues effects with regard to the congruency dimension. Further research could shed light onto the multiple elements that are set into relation with each other, and how the match of multiple informational and/or sensory inputs is processed. What associations may be formed between scents and other informational elements? Are they working alone or in conjunction with each other? What stimuli is the reference category?

Related to the aspect mentioned above is the implicit assumption that the association between the scent and the product is rather passive than active in nature and thus, not of conscious awareness. That is, participants were not used to being confronted with a scented environment and integrated the scent spontaneously into their feelings and judgments. As marketers spent more time in creating product related scents and teach consumers those associations, it may become part of consumer expectation. Further research might want to investigate if the theoretical explanation still holds when consumers learn an association between a particular scent and a certain product through advertising or product experience. In the current research the consumer did not expect a specific smell. It is plausible, that the meaning of the scent and the match with the presented product category will become usual and thus, does not need to be solved which is the act of triggering a positive affect. As a consequence, an individual might change the evaluation when an initial moderately incongruent scent becomes part of the expected product attributes and ends up being perceived as to be congruent which in turn does not lead to increased spending.

While this study generated support for the application of the schema theory in consumers' perceptions of ambient scented store environments, future research is necessary to determine whether the hypothesis generalizes to other than clothing stores. Consumers' abilities to process a scent is influenced by surrounding cues. For example, a consumer is more likely to categorize a citrus scent when the scent is presented in a yellow bottle than when it is presented in a purple bottle. In our study, the salient products were prototypically male in nature and the male scheme was highly accessible. Thus, if product categories are mixed (e.g., accessories) it

remains to be discovered to what category the consumer will attribute the scent to and set the comparison point for the applied schema. Results would suggest that as long as the scents are not too incongruent but congruent to mildly incongruent, consumers' behaviors should still be enhanced.

It is hoped that the current investigation will encourage future research that further develops the understanding of consumers to ambient scents in a wider variety of contexts and segmentation units. Moreover, future research is necessary to determine whether the hypothesis generalizes to other contexts such as advertising or direct mailing. Specifically, a deeper understanding of how moderately incongruent scent affect consumers when the scent emanates from the product. Thus, a scent being diagnostic for a product attribute (e.g., a hand lotion) and/or salient might cause differentiating effects. Research examining the relative impact of factors such as product involvement and / or expertise would be an additional contribution to the impact of ambient scents on judgment and behavior.

From a managerial standpoint several implications emerge. Whereas previous studies have shown that congruent scents may have beneficial effects on consumers' reactions, moderately incongruent scents seem to improve shoppers' reactions most, that is, increase approach behaviors in an actual store including money spent. In fact, the findings are of practical interest. Few controlled experimental studies of atmospheric effects have access to actual sales figures. The findings of the field experiment extend prior research by demonstrating that beyond merely incorporating ambient scent, managers should identify scents that are of moderate incongruity to the products and diffuse in their retail environments. A distinction between the current research and prior work is that this investigation focuses on congruency between an environmental scent and a product category without an inherent scent. For retailers offering such products, yet desire to use ambient scents, some other form of congruity, such as that between scent and product, is necessary for effective implementation of this atmospheric cue.

In accordance with Spangenberg's et al. (2006) suggestion, our research confirm that moderately incongruent scents may be an easily implemented, inexpensive, and effective way to enhance consumer responses to store environment and merchandise

even when multiple product categories are presented. Even scents that are incongruent to product categories do not seem to harm approach behavior. Thus, retailers do not be worried about effects of those scents.

REFERENCES

- Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (December), 1173-82.
- Bone, Paula Fitzgerald and Pam Scholder Ellen (1999), "Scents in the Marketplace: Explaining a Fraction of Olfaction," *Journal of Retailing*, 75 (Summer), 243-62.
- Bone, Paula Fitzgerald and Swati Jantrania (1992), "Olfaction as a Cue for Product Quality," *Marketing Letters*, 3 (July), 289-96.
- Bosmans, Anick (2006), "Scents and Sensibility: When do (In)congruent Ambient Scents Influence Product Evaluations," *Journal of Marketing*, 70 (July), 32-43.
- Chebat, Jean-Charles and Richard Michon (2003), "Impact of Ambient Odors on Mall Shoppers' Emotions, Cognition, and Spending: A Test of Competitive Causal Theories," *Journal of Business Research*, 56 (July), 529-39.
- Cohen, Joel B. and Charles S. Areni (1991), "Affect and Consumer Behavior," in *Handbook of Consumer Behavior*, Thomas S. Robertson and Harold H. Kassarian, eds. Englewood Cliffs, NJ: Prentice Hall, 188-240.
- Crowley, Ayn E. (1993), "The Two-Dimensional Impact of Color on Shopping," *Marketing Letters*, 4 (January), 59-69.
- Ellen, Pam S. and Paula F. Bone (1998), "Does It Matter if it Smells? Olfactory Stimuli as Advertising Executional Cues," *Journal of Advertising*, 27 (Winter), 29-39.
- Fisher, Jeffrey (1974), "Situation Specific Variables as Determinants of Perceived Environmental Aesthetic Quality and Perceived Crowdedness," *Journal of Research in Personality*, 8 (August), 177-88.
- Fiske, Susan T. (1982), "Schema-Triggered Affect: Applications to Social Perception," in *Affect and Cognition*, 17th Annual Carnegie Symposium on Cognition, Margaret S. Clark and Susan T. Fiske eds. Hillsdale, NJ: Erlbaum, 55-78.
- Fox, John (2008), *Applied Regression Analysis and Generalized Linear Models*. Thousand Oaks, CA: Sage Publications.
- Hirsch, Alan (1995), "Effects of Ambient Odors on Slot Machine Usage in a Las Vegas Casino," *Psychology & Marketing*, 12 (October), 585-94.

- Hirschman, Elizabeth C. and Stern, Barbara B. (1999), "The Roles of Emotion in Consumer Research," in *Advances in Consumer Research*, Vol. 26 (1), E.J. Arnould and L.M. Scott eds. Provo, UT: Association for Consumer Research, 4-11.
- Holland, Rob W., Merel Hendriks, and Henk Aarts (2005), "Smells Like Clean Spirit Nonconscious Effects of Scent on Cognition and Behavior," *Psychological Science*, 16 (September), 689-93.
- Lageat, Thierry, Sandor Czellar, and Gilles Laurent (2003), "Engineering Hedonic Attributes to Generate Perceptions of Luxury: Consumer Perception of an Everyday Sound," *Marketing Letters*, 14 (July), 97-109.
- Mandler, George (1982), "The Structure of Value: Accounting for Taste," in *Affect and Cognition*, Margaret S. Clark and Susan T. Fiske, eds. Hillsdale, NJ: Erlbaum, 3-36.
- Mattila, Anna S. and Jochen Wirtz (2001), "Congruency of Scent and Music as a Driver of In-Store Evaluations and Behavior," *Journal of Retailing*, 77 (Summer), 273-89.
- Meyers-Levy, Joan and Alice M. Tybout (1989), "Schema Congruity as a Basis for Product Evaluation," *Journal of Consumer Research*, 16 (June), 39-54.
- Meyers-Levy, Joan, Therese A. Louie, and Marry T. Curren (1994), "How Does the Congruity of Brand Names Affect Evaluations of Brand Name Extensions?," *Journal of Applied Psychology*, 79 (February), 46-53.
- Michon, Richard, Jean-Charles Chebat, and L.W. Turley (2005), "Mall Atmospherics: The Interaction Effects of the Mall Environment on Shopping Behavior," *Journal of Business Research*, 58 (May), 576-583.
- Mitchell, Deborah J., Barbara E. Kahn, and Susan Knasko (1995), "There's Something in the Air: Effects of Congruent or Incongruent Ambient Odor on Consumer Decision Making," *Journal of Consumer Research*, 22 (September), 229-38.
- Morrin, Maureen and S. Ratneshwar (2003), "Does It Make Sense to Use Scents to Enhance Brand Memory?" *Journal of Marketing Research*, 40 (February), 10-25.
- Peck, Joann and Terry L. Childers (2008), "If it Tastes, Smells, Sounds, and Feels Like A Duck, Then it Must Be A...: Effects of Sensory Factors on Consumer Behaviors," in *Handbook of Consumer Psychology*, Curtis P. Haugtvedt, Paul M. Herr, and Frank R. Kardes eds. Mahwah, NJ: Lawrence Erlbaum Associates, 193-220.

- Peracchio, Laura A. and Alice M. Tybout (1996), "The Moderating Role of prior Knowledge in Schema-Based Product Evaluation," *Journal of Consumer Research*, 23 (December), 177-92.
- Priester, Joseph R., John Godek, Dhanajay Nayakankuppum, and Kiwan Park (2004), "Brand Congruity and Comparative Advertising: When and Why Comparative Advertisements Lead to Greater Elaboration?," *Journal of Consumer Psychology*, 14 (), 115-23.
- Schifferstein, Hendrik. N.J. and Sylvia T. Blok (2002), "The Signal Function of Thematically (In)congruent Ambient Scents in a Retail Environment, " *Chemical Senses*, 27 (July), 539-49.
- Spangenberg, Eric R., Ayn E. Crowley, and Pamela W. Henderson (1996). "Improving the Store Environment: Do Olfactory Cues Affect Evaluations and Behaviors?" *Journal of Marketing*, 60 (April), 67-80.
- Spangenberg, Eric R., David E. Sprott, Bianca Grohmann, and Daniel L. Tracy (2006), "Gender-Congruent Ambient Scent Influences on Approach and Avoidance Behaviors in a Retail Store," *Journal of Business Research*, 59 (November), 1281-87.
- Stayman, Douglas M., Dana L. Alden, and Karen H. Smith (1992), "Some Effects of Schematic Processing on Consumer Expectations and Disconfirmation Judgments," *Journal of Consumer Research*, 19 (September), 240-55.
- Vlahos, James (2007), "Scent and Sensibility," *The New York Times*, (September 9).
- Yalch, Richard F. and Eric R. Spangenberg (1990), "Effects of Store Music on Shopping Behavior," *Journal of Consumer Marketing*, 7 (Spring), 55-63.

Essay III

Haberland, Friederike, "Scented Message: The Effects of Advertising Olfactory Cues on Persuasion and Sales," under preparation for submission to Journal of Applied Social Psychology.

Scented Message:
The Effects of Advertising Olfactory Cues on Persuasion and Sales

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ABSTRACT

Previous research on scent perception has focused on the effects of ambient scents (i.e., scents in the environment) on consumer decision making. However, little work has examined how consumers process olfactory attributes that are integral to advertised products. Applying insights from social psychology, the proposed research investigates the effects of argument strength in the presence and absence of an olfactory cue using “scratch-and-sniff” advertisements. Results of a field experiment indicate that buying behavior increases in the presence of a scent even when argument quality is weak. In contrast, when no scent is present, purchase behavior is only higher when argument quality is strong. Results indicate that affective responses to scent mediate observed effects. Theoretical and practical implications are discussed.

INTRODUCTION

In the advertising industry the problem of information overload is well known. Penetrating this bead of information and reaching costumers with advertising messages leads to the search for other modalities of transmitting information to persuade consumers of their goods and services. In addition, there is a common theme, that differences in the products' quality become less evident to costumers. Today's environment is competitive and customers demands become greater. Therefore, practitioners as well as researchers have identified the need to expand research to the sensory domain.

In research, visual cues such as images and acoustic cues like music have been studied extensively. A decade ago, consumer psychologists have started examining olfactory cue effects on product evaluation and consumers' attitudes (Ellen and Bone 1998).

Explaining olfactory cue effects, most published research relies on the stimulus-organism-response (S-O-R) paradigm, the core of which suggests that pleasant scent (S) triggers a positive affective state in the consumer (O), thereby evoking approach behaviors (R) (for a review see Spangenberg, Crowley and Henderson 1996). Additionally, some boundary conditions like the appropriateness, or congruity, of product scents (Bosmans 2006) and familiarity (Morrin and Ratneshwar 2003) have been identified to moderate olfactory cue effects. While this literature has shown that pleasant olfactory stimuli should enhance consumer responses, it has rarely been studied as to how the presence of an olfactory cue interacts with the processing of an advertising message and how the emerging attitudes and actual behavior are affected.

Cognitive models of persuasion provide a framework for understanding the antecedents and consequences of attitude change. They posit processes by which persuasion can occur. The heuristic-systematic model (HSM; Bohner, Moskowitz, and Chaiken 1995; Chaiken, Liberman, and Eagly 1989; Eagly and Chaiken 1993) and the elaboration likelihood model (ELM; Petty and Cacioppo 1986a; 1986b; Petty and Wegener 1999) propose two concurrent modes of processing a persuasive message. Persuasion via the systematic or central route occurs when perceivers careful-

ly attend to, evaluate, and elaborate the message. Systematic or central processing requires cognitive capacity and motivation to digest the arguments offered in a careful and critical manner. Both models are equivalent for the purpose of this work. To reveal the research question, the terminology of the HSM will be used.

When processing systematically, recipients are typically more strongly affected by argument quality, with strong arguments eliciting stronger persuasion effects than weak arguments (Petty, Cacioppo, and Goldman 1981). If recipients are unable or unmotivated to process a persuasive message, however, fewer cognitive resources are available to form attitudinal response. In this case, recipients use simple decision rules or cognitive heuristics to formulate their judgments and decisions (Eagly and Chaiken 1993). The attitude issue or object is associated with a heuristic cue that may help the recipient to accept the validity of the message without a systematically considering the arguments presented (Chaiken 1987). For example, some of the most widely studied source characteristics are attractiveness (Chaiken 1979), sympathy (Petty, Cacioppo, and Schuman 1983), and expertise (Chaiken and Maheswaran 1994). Further, message features like lengths (Wood, Kallgren, and Preisler 1985), and environmental cues such as store atmospherics (Sharma and Stafford 2000) and perfumed advertisements (DeBono 1992) can serve as such cues. In this situation, the attitude change is mainly a function of the presented cue and the quality of the arguments hardly impact the persuasiveness.

Lots of research has been devoted to discovering those cues or factors that influence whether a person is likely to process either the systematic or heuristic way or, in other words, those variables that affect either the motivation or the ability to carefully process a message. Those factors include recipients' issue involvement (Petty, Cacioppo and Goldman 1981), mood (e.g., Bless, Bohner, Schwarz and Strack 1990), and need for cognition (for a review, see Cacioppo, Petty, Feinstein, and Jarvis 1996).

The present research explores whether the presence of an olfactory cue, in particular, a scented ad of a shower gel, serves as a situational variable which affects the mode of processing. One reason to suspect that the presence of a scent may influence processing is that scent has been shown to influence individuals' thoughts and

feelings in many contexts. Since the mid 1990's, researchers have demonstrated that olfactory stimuli can influence consumers' cognitions (e.g., Chebat and Michon 2003), affect (e.g., Bosmans 2006), attention (Morrin and Ratneshwar 2003), product evaluations (Spangenberg et al. 1996), and even purchase behavior (Schiffers-stein and Blok 2002; Spangenberg, Sprött, Groham, and Tracy 2006). However, observed olfactory cue effects have rarely been studied in the context of persuasion, that is, little is known about the potential of how scent can moderate the effect of argument strength and alter consumers' attitudes and behavioral responses in an advertising context.

Thus, one goal of the current work is to demonstrate that the heuristic-systematic model (Chaiken 1980; Chaiken et al. 1989) can be usefully applied in the context of scents by investigating the interplay between scents and processing style. Indeed, some studies have shown that scents can elicit more holistic (Mattila and Wirtz 2001) and heuristic (DeBono 1992) processing. DeBono (1992) showed that exposure to a pleasant perfume before observing an ad were influenced more by the heuristic cue (the spokeswoman's attractiveness) than by the strength of the arguments. In addition, a cognitive response analyses revealed that thoughts were more reflecting the cue than the argument strength. In contrast, those not exposed to a scent generated more message-oriented thoughts (for the rationale of cognitive responses, see Petty and Cacioppo 1986b). However, the study has not been replicated in a real world context and showed results only for attitudes and cognitive responses and not behavior. Thus, a further contribution of the current work is to address the absence of practical application in prior research with a field study wherein the effects of olfactory cues are demonstrated with regard to actual retail sales.

Further, with regard to process, why did the effects reported by DeBono (1992) occur? The author highlighted the relation between mood and scent as a plausible explanation for change in processing style, although such measured were not reported. Looking into findings reported in social psychology a basic finding in the persuasion literature is that affective states indirectly affect the amount of scrutiny given to the presented information. In persuasion settings, it has been often observed that people in a positive mood were more affected by peripheral cues and less by argument strength. For example, Bless and colleagues (1990) showed that positive

moods reduced the systematic processing of arguments, that is, argument quality led to equal attitudes. In contrast, recipients in a sad mood scrutinized given information and based their agreement with a message on the strengths of the arguments. Similarly, in a study by Petty, Schumann, Richman, and Strathman (1993) positive mood produced more favorable attitudes towards the message, suggesting that they may have been engaged in heuristic processing (for a meta-analysis, see Hullett 2005).

Based on these findings, it is reasonable to expect similar heuristic processing for scents such that the positive affective response elicited by a scent makes participants less likely to be affected by argument strength presented in a persuasive message. Support for this assumption comes from different research fields. For instance, in neuroscience it is well established that olfactory cues take an exceptional position in the processing of sensory stimuli. The sense of smell differs from other forms of perception in the direct connection between the olfactory and the limbic system, a more primitive portion of the brain. Scents are not directly processed in higher-level centers as occur with other sensory cues (Herz and Engen 1996). Scents require little, if any, cognitive effort to be experienced (Ehrlichman and Halpern 1988). In line with this domain, the literature in psychology and marketing suggests that olfactory cues may elicit consumers' affective responses which serve as a mediating construct explaining attitudinal and behavioral marketing outcomes (e.g., Bosmans, 2006; Spangenberg et al., 1996; Spangenberg et al., 2006). For instance, Baron (1997) has demonstrated that pleasant scents induced positive affective states which in turn significantly influenced behavior of participants. Similarly, Lehrner, Marwinski, Lehr, Jöhren, and Deecke (2005; see also Burnett, Solterbeck, and Strapp 2004) could show, that scents were capable of altering emotional states and behavioral tendencies, and Spangenberg et al. (2006) revealed similar effects in a retail store. Investigations in advertising research converge with above findings, such that inducing a positive mood in viewers or generating a positive affective response has been found to increase attitude toward the ad (Brown, Homer, and Inman 1998) and also shown to influence behavior directly (Isen 1987).

Based on the theoretical predictions derived from the reviewed literature, one can plausibly suggest that a similar affective-based process and according behavior will

occur for a scented print advertisement. An olfactory cue should trigger a positive affective response and lead to process a message in a rather heuristic fashion which leads to equal persuasion by either strong or weak arguments. Given that the absence of a scent may engage consumers rather in systematic processing, it is expected that consumers will be affected by the strengths of the arguments presented. This, in turn, evokes more favorable behavioral responses toward the advertised product only in the unscented control condition. Thus, assuming that a scent should lead to heuristic processing (as compared to no scent at all), I hypothesize:

H1: Exposure to a scent will lead to equal persuasion and purchase behavior for both strong and weak arguments. Exposure to no scent will lead to higher persuasion and purchase behavior only when strong arguments are present.

It has been shown in a variety of settings that positive affect can directly influence behavior (e.g., Cohen and Areni 1991; Hirschman and Stern 1999). The positive feelings evoked through the scent is expected to serve as the mediating construct of purchase behavior. Thus, with regard to process, and assuming that scents are more likely to elicit heuristic processing (as compared to no scent), it is hypothesized:

H2: The impact of scent on sales is mediated by affective responses elicited the scent, as compared to no scent.

METHOD

A field experiment was conducted in which customers were exposed to an advertisement in which the presence of a scent and the strengths of the arguments presented were varied. The focal product was a shower gel advertised on a scented (or unscented) sheet of card stock. To increase the generalizability of the empirical field work, two different sets of pleasant scents were selected for this project. In particular, the two scents included “lemon” and “orange” essential oils which were combined with either a “yellow” or “orange” colored shower gel.

Olfactory Stimuli Pretest. A pretest for scent attributes was conducted. A sample of undergraduates ($N = 211$) filled out a short, self-administered questionnaire. All measures used seven-point semantic differential scales. Students reported first their liking (dislike/like) of two shower gels (orange; yellow) which were presented in random order as photographs. Pictures had a white package and differed only by colored circles (orange; yellow) appearing in the middle of the package (brightness, contrast, and color intensity were held constant). Next, each participant evaluated a single scent (randomly selecting one scent of eleven) regarding its hedonic properties (bad/good; unfavorable/favorable; unpleasant/pleasant; $\alpha = .95$; Spangenberg, Crowley, and Henderson 1996), perceived scent familiarity (unfamiliar/familiar; Morrin and Ratneshwar 2000), and congruency (incongruent/congruent; Bosmans 2006), that is, the perceived appropriateness for the product category (e.g., yellow shower gel and lemon scent). Participants were allowed to sniff the vial as many times as they wanted while responding to questions about the scent.

The pretest confirmed similar levels of liking for the two products ($M_{\text{yellow}} = 4.30$ and $M_{\text{orange}} = 4.10$, $t(199) = 1.44$, $p > .15$). Mean comparisons revealed that participants rated the two scents as equally pleasant ($t(36) = 0.02$, $p > .98$) and pleasantness ratings were significantly above the scale midpoint (all $ps < .001$). As intended, participants rated both scents as equally familiar ($t(36) = 0.44$, $p > .66$). As expected, participants rated the orange scent congruent with the orange product and the lemon scent as congruent with the yellow product as congruency ratings were significantly above the scale midpoint (all $ps < .01$). Thus, scents chosen for the main field study were perceived to be appropriate and were aggregated for data analyses and reporting purposes.

Argument Strength Pretest. A variety of arguments for the shower gel were pretested with participants from the same student population. Students were exposed to the same photographs taken from the olfactory stimuli pretest in random order and received a questionnaire with 20 arguments in favor of the shower gel. The arguments dealt with skin smoothness, moisturizing functions and ingredients (building upon the work by Petty et al., 1983). Participants indicated how convincing they perceived each argument (1 = not at all convincing, 7 = totally convincing). Four

strong and four weak arguments were selected. A paired *t*-test indicated that the four strong arguments had been rated as more convincing ($M = 4.80$) than its weak counterparts ($M = 2.63$), $t(208) = 17.42$, $p < .001$. The arguments chosen for the main field study were perceived to be appropriate, as persuasiveness ratings were significantly above the scale midpoint for the strong arguments and below the scale midpoint for the weak arguments (all $ps < .001$).

Design, Participants, and Procedure. The study utilized a 2 (scent: present (orange; lemon), absent) \times 2 (argument strength: strong, weak) between-participants factorial design. The study was conducted in a local supermarket providing food and cosmetics. The sample consisted of actual supermarket shoppers ($N = 197$).

With the help of a professional advertising agency, two versions of the shower gel advertisement were created and varied in terms of the product's color (either orange or yellow) and message (strong arguments vs. weak arguments). The ad reflected a typical advertisement used by the store and featured one of the store's own brands. A scratch-and-sniff panel was applied over the entire card in the scent conditions with note to scratch and sniff. Commercial scents were applied by a leading firm which specialized in printing scented materials. In particular, the scents were packed into a microscopic capsule and hermetically conserved. Through mechanical means such as rubbing, pressing, cutting or scratching the content of the scent could be released. Thus, the advertisements were manipulated by applying appropriate modules of scent (orange or lemon) or by not providing a scent at all.

The persuasive message was based on pretested materials and consisted of an introductory sentence followed by either four strong or four weak arguments in favor of the shower gel. The messages were both equal in lengths, but each contained a different set of arguments. For example, strong arguments asserted that the shower gel "moisturizes the skin"; "skin compatibility is confirmed by dermatological tests". In contrast, some weak arguments stated that "it's a great shower gel", "doesn't clog plumbing".

Trained interviewers were placed in the cosmetic section of the store, but the actual target product was out of sight to participants. Customers were told that the purpose of the study was to gain consumer opinions of an advertisement for a shower gel

which was purchasable in the store. People were asked to observe the ad. Additionally, customers in the scent conditions were asked to scratch and sniff the card in order to release the scent. After observing the ad, customers were asked to fill out a short, self-administered questionnaire.

Measures. After observing the ad, customers indicated their overall attitude towards the product (1 = very bad/unlikeable/low quality, 7 = very good/likeable/high quality, $\alpha = .93$). In order to assess the potential process variable, customers rated their affective reactions (to the product) using a 7-point semantic differential scale (unappealing/appealing; unpleasant/pleasant; unattractive/attractive; ugly/beautiful). Further, customers rated the scents' valence (1 = unpleasant, 7 = very pleasant) and the arguments (1 = not at all convincing, 7 = very convincing), and the perceived familiarity and congruency as assessed in the pretest. Those measures were used as a manipulation check of the experimental treatment.

The primary dependent variable in the study included a binary choice measure asking participants if they would buy the shower gel for a given price, with the interviewer suggesting that the product was for sale. Customers were asked if they wanted to purchase the product ("no"/"yes") and a fake purchase transaction was initialized. In reality, given the experimental scent manipulations, it was not possible to provide the options of the real product to shoppers thus, before the purchase could be made, customers were debriefed about the study and the actual purchase was not allowed.

RESULTS

A series of ANOVA model assessed the impact of scent and argument strength on the continuous dependent variables. Further, a logistic regression was performed to assess the purchase behavior as a function of scent and argument strength.

Manipulation Check. The strong arguments ($M = 4.51$) were perceived to be more convincing than the weak arguments ($M = 3.75$), $t(194) = 3.23$, $p = .001$. As intended both scents were rated as equally pleasant ($t(88) = 0.72$, $p > .48$) and pleasantness ratings were significantly above the scale midpoint (all $ps < .001$). As ex-

pected, participants rated both scents as equally familiar ($t(89) = 1.30, p > .19$) and congruent to the product as ratings were both significantly above the scale midpoint (all $ps < .001$). Thus, the experimental manipulation was successful.

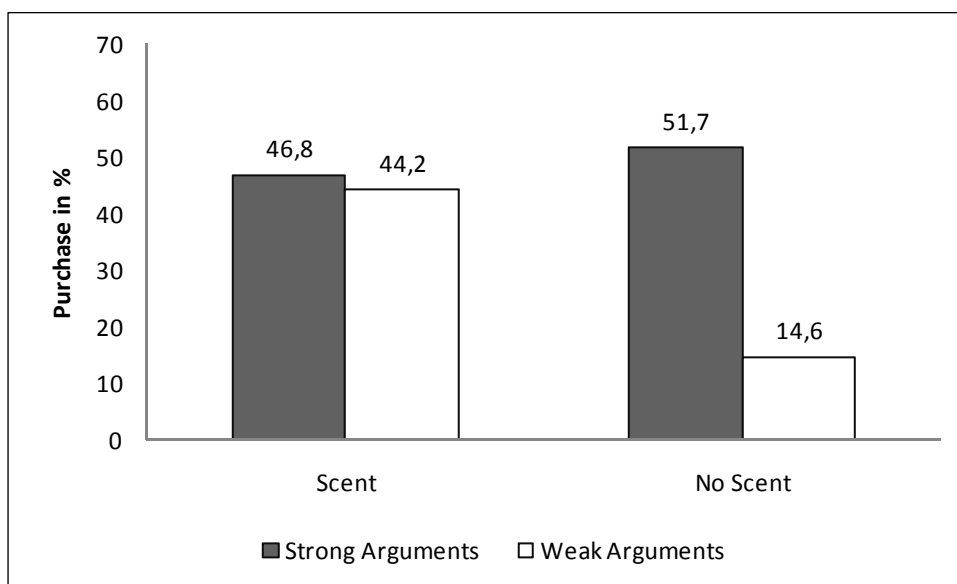
Attitude Toward the Product. An ANOVA found scent to have a significant impact on attitude toward product, $F(1, 193) = 21.73, p < .001$. Customers looking at an advertisement with a scent had more favorable product attitudes ($M = 4.88$), then when no scent was present ($M = 3.98$). A main effect for argument strength was found such that customers indicated a more favorable attitude toward the product when strong arguments were given ($M = 4.66$) as compared to weak arguments ($M = 4.11$), $F(1, 193) = 7.47, p < .01$. Of particular interest was the significant interaction term, $F(1, 193) = 3.88, p = .05$. It revealed, that customers exposed to the scented ads were equally persuaded by strong and weak arguments ($t(89) = 0.51, p > .61$) whereas customers in the no scent condition reported more favorable attitudes only when they were exposed to strong arguments ($t(104) = 3.52, p < .01$).

Purchase Behavior. A logistic regression was performed which included a model with the two dummy coded treatment variables (scent; argument strength) plus an interaction term (scent x argument strength) on the outcome if customers purchased the advertised product ("yes") or not ("no"). The model included scent (scent = 1; no scent = 0) and argument strength (strong arguments = 1; weak arguments = 0) as main effects, and their product (scent x strong arguments) as an appropriate interaction term. Due to the nature of the logit model with interaction terms, main effects of one variable are interpreted as conditioned on the reference category of the other variable (Jaccard 2001). Results revealed a significant conditional main effect for scent ($b = 1.53; p < .01$), such that when scent was given and weak arguments are present, the odds of purchasing the product was 4.46 times greater than when no scent (and weak arguments) was present. As expected, a significant conditional main effect for argument strength could be shown ($1.84; p < .001$) such that the odds of purchasing the product when exposed to strong arguments and no scent was 6.28 greater than for those customers, who were exposed to weak arguments (and no scent). The conditional main effects were qualified by a significant interaction ($b = -1.74, p < .01$) revealing that perception and the according behavior of argument quality differs in odds as a function of scent presence. Of further interest was the

effect of scent (vs. no scent) when strong arguments were present. As expected, the effect of scent (vs. no scent) does not appear when strong arguments are given ($1.53 - 1.74 = -.19$; $p > .61$). Descriptively, Figure 1 presents the percentages of purchasing the product as a function of scent and argument quality. Results reveal that customers seeing an advertisement with a scent were equally likely to purchase the product by weak (44.2%) and strong (46.8%) arguments. On the other hand, when not exposed to a scent at all, purchases were higher for strong (51.7%) than for weak (14.6%) arguments. Overall, these findings provide support for H1.

FIGURE 1

Mean Purchase Behavior as a Function of Argument Strength and Scent

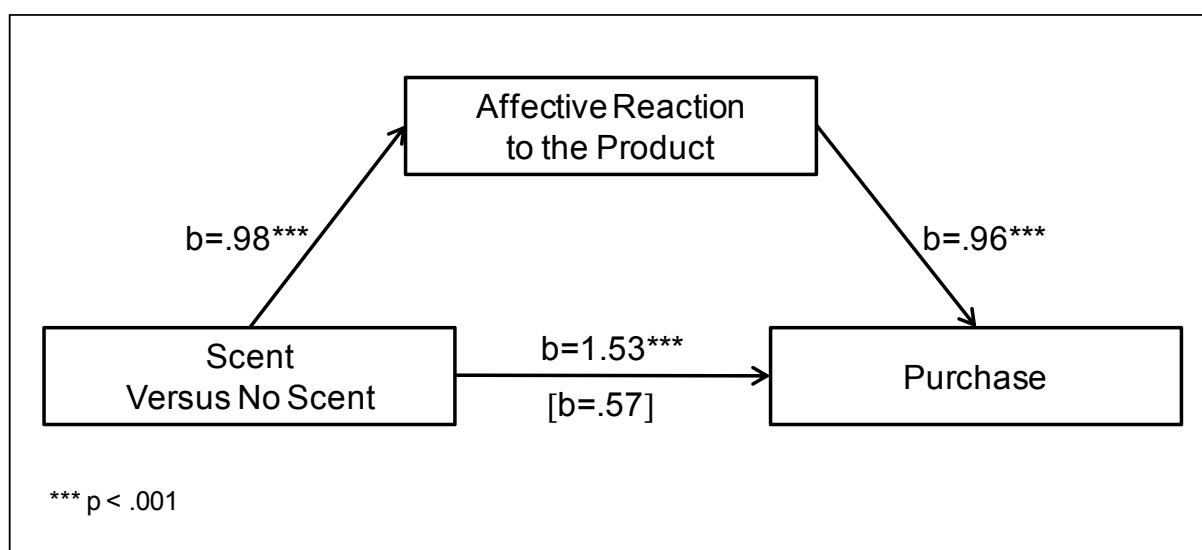


Note. Based on $N = 196$. The possible range of scores for purchase behavior is 1 to 100 (percentages), with higher values indicating more expenditures.

Affective Mediation. It is expected that consumers' affective reactions mediate the effect of scent on purchase. It is apparent from the data that an effect of scent can be revealed in accordance with weak arguments. Therefore, a comparison of scent vs. no scent in the presence of weak arguments was performed. To assess the mediating role of affective reaction in the preceding effects, a series of appropriate logistic and linear regression analyses were performed (Baron and Kenny 1986).

As Figure 2 illustrates, results support mediation when comparing the scent to the control condition, indicating that: (1) the independent variable (scent vs. no scent) is positively related to the mediator (affective response) ($b = 1.41, p < .001$); (2) the mediator (affective response) relates significantly to the dependent variable (purchasing), controlling for the effects of the independent variable ($b = .96, p < .001$); and (3) the relationship between the scent and the purchase variable ($b = 1.53; p < .01$) weakens when affective responses are accounted for in the model, such that the beta coefficient decreases and becomes non-significant ($b = .57, p > .36$). The Sobel test reached statistical significance ($p < .001$). Overall, the results of this mediation analysis provide support for H2.

FIGURE 2
Mediation Model: Scent vs. Control and Weak Arguments



DISCUSSION

Prior research has clearly demonstrated that scents can influence the perceptions and behaviors of consumers in a variety of contexts. Although intriguing, and of considerable practical importance, research to date has provided little insight re-

garding the processing of an advertising message and the process by which scents influence customers' attitudes and behaviors.

Indeed, nearly all prior work has merely relied upon the rather simplistic S-O-R model of environmental psychology rather than push for more theoretical explanation in varying contexts. The current research begins to address the question of olfactory cue effects in the context of advertising relying on a model from social psychology—the heuristic-systematic model of persuasion.

The current research makes a number of important scholarly and practical contributions. The primary aim of the present research was to advance understanding with regard to the interactive effects of argument strength and olfactory cues on behavior. In particular, the study demonstrates that scents in a persuasive advertising context can have a strong influence on consumers' affective reactions, product evaluations, and purchase behavior. Results show that message processing varies across olfactory cues which highlights the superiority of scents in affecting the behavior of actual shoppers.

In the no scent conditions, customers were very critical and showed a negative reaction to weak arguments and a positive reaction to strong arguments. The results suggest that customers' attention was focused on the presented message such that respondents were able to process systematically. As mentioned in the literature review, the effect of message quality on customers responses such as attitudes and behavior is a robust finding in the persuasion literature and could be replicated in this field study.

As expected, in the scent conditions evidence for the HSM's heuristic processing was found. Customers appeared to be more influenced by the scent than by the strengths of the arguments. Customers' reactions were equally favorable for both weak and strong arguments indicating that the olfactory cue lead responses into a positive direction. Results show that scent can act as a cue and triggers non-message related responses. That is, customers' cognitive resources seems to divert away from the presented information and the scent appears to provide sufficient diagnostic information for forming a judgment and making a choice.

On the question of underlying psychological mechanisms, this study found that affective responses clearly mediated the effect of scent (as compared to no scent) on choice which could be demonstrated for the weak message condition. This finding reflects that the presence of a scent affects the participants' ability or motivation to process a message and elevates the affective reaction which alters the mode of processing (Bless et al. 1990). In sum, the results provide strong support for the assertion that scent leads to positive affective responses which in turn impact sales. Importantly, this is the first known demonstration that message effects related to an olfactory stimulus affect behavior in a real world context. In addition, it serves as a unique contribution to the persuasion literature in addition to the literature on atmospherics and specifically olfactory environmental cues.

In the current work, the scent was a primary driver in consumers' choice. In future investigations, it might be possible to extend the findings to a different product categories in which the scent does not emanate from the product (e.g., a t-shirt). Research questions that could be asked include the diagnosticity of the olfactory cue on judgments and choice (for a discussion on this paradigm, see Ellen and Bone 1998). In the present research, the scent (e.g., lemon for a yellow shower gel) appeared to provide additional and/or diagnostic information to the presented message (i.e., the product attributes) (Bone and Ellen 1999). It might be possible that a scent not delivering any additional information to the attributes presented might not be a valid cue for judgment and thus, trigger differential processes. Further studies, which take unscented products into account, will need to be undertaken assessing the diagnostic cue effect of an "irrelevant" scent.

Another issue for further investigation is whether and how participants thoughts are affected by scent. The present research could shed light on the type of processing with regard to olfactory cue effects. In this investigation, the effects of scent on purchase was mediated by affective reaction (as a result of the pleasantness of the scent). However, thought listing as being a common tool in persuasion research was not assessed. In laboratory research the content of thoughts might probably be set into relation with the affect elicited by a scent and provide a different piece of information about the effectiveness of the message. This might clarify if higher order processes play a role or if lower level processes like affect mainly account for pre-

sented results. Experiments designed to shed light on the underlying process are required to establish this question and might help in disentangling the discussion of affect versus cognition and its potential interactive effects in olfactory cue research (e.g., Bosmans 2006; Chebat and Michon 2003).

This finding has important practical implications for developing and designing more effective advertisements. Researchers typically report effects of olfactory cues on measured attitudes and intentions. In a commercial environment, however, the final test of the effectiveness is its effect on sales (see Schifferstein and Blok 2002; Spangenberg et al. 2006). Therefore, this field experiment can give important insights into economic theory and provide useful guidance to marketers.

The results clearly suggest that non-persuasive information can be compensated by olfactory cues, that is, marketers can use scents to overcome a weak persuasive message. Thus, a scented ad can result in significant additional revenues: Comparing scented and unscented advertisements when weak arguments were given, an increase of 29 percentage points in purchase behavior could be observed. Given that the use of olfactory cues in an advertising context is relatively inexpensive and easy to implement, there is little standing in the way of a firm that wishes to adopt scent as a component of the marketing mix. Moreover, in a fast-growing industry, emerging new trends can be the key to increased market share and, more importantly, profit. This work provides real-world evidence of olfactory effects on consumer purchases suggesting that practitioners may feel more confident in using such manipulations.

In sum, this work contributes both theoretically as well as practically. The HSM provides an integrative framework for olfactory cues effects in advertising and can be seen as a fruitful source to consumer psychology and marketing. Findings herein provide guidance to firms with regard to the usage of scented advertisements and how to improve a particular communication that may not have been proved to be convincing. Indeed, it also suggests when scents do not seem to evoke additional buying behavior—that they, in fact, might waste their resources with olfactory stimuli that are presented with a strong message. More important, however, the results suggest scents will not hurt customers' responses. Reactions were not worse in any

of the scent conditions than in the no scent conditions. While more research will be useful, it appears from this field study that scents work well to influence consumer behavior in ways consistent with the goals of marketers.

REFERENCES

- Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (December), 1173-82.
- Baron, Robert A. (1997), "The Sweet Smell of... Helping: Effects of Pleasant Ambient Fragrance on Prosocial Behavior in Shopping Malls," *Personality and Social Psychology Bulletin*, 23 (May), 498-503
- Bless, Herbert, Gerd Bohner, Norbert Schwarz, and Fritz Strack (1990), "Mood and Persuasion: A Cognitive Response Analysis," *Personality and Social Psychology Bulletin*, 16 (June), 331-45.
- Bohner, Gerd., Moskowitz, Gordon B. and Shelly Chaiken, S. (1995), "The Interplay of Heuristic and Systematic Processing of Social Information," *European Review of Social Psychology*, 6 (January), 33-68.
- Bone, Paula F. and Pam S. Ellen (1999), "Scents in the Marketplace: Explaining a Fraction of Olfaction," *Journal of Retailing*, 75 (Summer), 243-62.
- Bosmans, Anick (2006), "Scents and Sensibility: When do (In)congruent Ambient Scents Influence Product Evaluations," *Journal of Marketing*, 70 (July), 32-43.
- Brown, Steven P., Pamela M. Homer, and J. Jeffrey Inman (1998), "A Meta-analysis of Relationships Between Ad-Evoked Feelings and Advertising Responses," *Journal of Marketing Research*, 35 (February), 114-26.
- Cacioppo, John T., Richard E. Petty, Jeffrey Feinstein, and W. Blair G. Jarvis (1996), "Dispositional Differences in Cognitive Motivation: The Life and Times of Individuals Varying in Need for Cognition," *Psychological Bulletin*, 119 (March), 197-253.
- Chaiken, Shelly (1979), "Communicator physical attractiveness and persuasion," *Journal of Personality and Social Psychology*, 37 (August), 1387-97.
- Chaiken, Shelly (1980), "Heuristic Versus Systematic Information Processing in the Use of Source Versus Message Cues in Persuasion," *Journal of Personality and Social Psychology*, 39 (November), 752-66.
- Chaiken, Shelly (1987), "The Heuristic Model of Persuasion," in *Social Influence: The Ontario Symposium*, Vol. 5, Mark P. Zanna, James, M. Olson, and Peter C. Herman eds. Erlbaum, Hillsdale, N.J., 3 - 39.

- Chaiken, Shelly, Akiva Liberman, and Alice H. Eagly (1989), "Heuristic and Systematic Information Processing Within and Beyond the Persuasion Context," in: *Unintended Thought: The Limits of Awareness, Intention and Control*. James S. Uleman and John A. Bargh, eds. New York, Guilford Press, 212 – 52.
- Chaiken, Shelly and Durairaj Maheswaran (1994), "Heuristic Processing Can Bias Systematic Processing: Effects of Source Credibility, Argument Ambiguity, and Task Importance on Attitude Judgment," *Journal of Personality and Social Psychology*, 66 (March), 460-73.
- Chebat, Jean-Charles and Richard Michon (2003), "Impact of Ambient Odors on Mall Shoppers' Emotions, Cognition, and Spending: A Test of Competitive Causal Theories," *Journal of Business Research*, 56 (July), 529-39.
- Cohen, Joel B. and Charles S. Areni (1991), "Affect and Consumer Behavior," in *Handbook of Consumer Behavior*, Thomas S. Robertson and Harold H. Kassarian, eds. Englewood Cliffs, NJ: Prentice Hall, 188-240.
- DeBono, Kenneth G. (1992), "Pleasant Scents and Persuasion: An Information Processing Approach," *Journal of Applied Social Psychology*, 22 (June), 910-19.
- Eagly, Alice H. and Shelly Chaiken (1993), *The Psychology of Attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.
- Ehrlichman, Howard and Jack N. Halpern (1988), "Affect and Memory: Effects of Pleasant and Unpleasant Memories," *Journal of Personality and Social Psychology*, 55 (November), 769-79.
- Ellen, Pam S. and Paula F. Bone (1998), "Does It Matter if it Smells? Olfactory Stimuli as Advertising Executional Cues," *Journal of Advertising*, 27 (Winter), 29-39.
- Herz, Rachel S. and Trygg Engen (1996), "Odor Memory: Review and Analysis," *Psychonomic Bulletin & Review*, 3 (September), 300-313.
- Hirschman, Elizabeth C. and Stern, Barbara B. (1999), "The Roles of Emotion in Consumer Research," in *Advances in Consumer Research*, Vol. 26 (1), E.J. Arnould and L.M. Scott, eds. Provo, UT: Association for Consumer Research, 4-11.
- Hullett, Craig R. (2005), "The Impact of Mood on Persuasion: A Meta Analysis," *Communication Research*, 32 (4), 423 – 42.
- Isen, Alice M. (1987), "Positive Affect, Cognitive Processes, and Social Behavior," in *Advances in Experimental Social Psychology*, Vol. 20, Leonard Berkowitz, ed. New York: Academic Press, 203–53.

- Jaccard, James (2001), "Interaction effects in Logistic Regression," in *Sage University Papers Series on Quantitative Applications in the Social Sciences*, Vol. 07-135. Thousand Oaks, CA: Sage.
- Lehrner, J., G. Marwinski, S. Lehr, P. Jöhren, and L. Deecke (2005), "Ambient Odors of Orange and Lavender Reduce Anxiety and Improve Mood in a Dental Office," *Physiology and Behavior*, 86 (September), 92-95.
- Mattila, Anna S. and Jochen Wirtz (2001), "Congruency of Scent and Music as a Driver of In-Store Evaluations and Behavior," *Journal of Retailing*, 77 (Summer), 273-89.
- Morrin, Maureen and S. Ratneshwar (2000), "The Impact of Ambient Scent on Evaluation, Attention and Memory for Familiar and Unfamiliar Brands," *Journal of Business Research*, 49 (August), 157-65.
- Morrin, Maureen and S. Ratneshwar (2003), "Does It Make Sense to Use Scents to Enhance Brand Memory?" *Journal of Marketing Research*, 40 (February), 10-25.
- Petty, Richard E. and Cacioppo, John T. (1986a), *Communication and Persuasion: Central and Peripheral Routes to Attitude Change*. New York: Springer.
- Petty, Richard. E. and Cacioppo, John T. (1986b), "The Elaboration Likelihood Model of Persuasion," in *Advances in Experimental Social Psychology*, Vol 19, Leonard Berkowitz, ed. New York: Academic Press, 123-205
- Petty, Richard. E., Cacioppo, John T., and Rachel Goldman (1981), "Personal Involvement as a Determinant of Argument-Based Persuasion," *Journal of Personality and Social Psychology*, 41 (November), 847-55.
- Petty, Richard. E., John T. Cacioppo, and David W. Schumann (1983), "Central and Peripheral Routes to Advertising Effectiveness: The Moderating Role of Involvement," *Journal of Consumer Research*, 10 (September), 135-46.
- Petty, Richard. E., David W. Schumann, Steven A. Richmann, and Alan J. Strathman (1993), "Positive Mood and Persuasion: Different Roles for Affect under High- and Low-Elaboration Conditions," *Journal of Personality and Social Psychology*, 64 (January), 5-20.
- Petty, Richard E. and Duane T. Wegener (1999), "The Elaboration Likelihood Model: Current Status and Controversies," in *Dual-Process Theories in Social Psychology*, Shelly Chaiken and Yaacov Trope, eds. New York: Guilford Press, 41-72.

- Sharma, Arun and Thomas F. Stafford (2000), "The Effect of Retail Atmospherics on Customers' Perceptions of Salespeople and Customer Persuasion: An Empirical Investigation," *Journal of Business Research*, 49 (August), 183-91.
- Schifferstein, Hendrik. N.J. and Sylvia T. Blok (2002), "The Signal Function of Thematically (In)congruent Ambient Scents in a Retail Environment," *Chemical Senses*, 27 (July), 539-49.
- Schwarz, Norbert, Herbert Bless, and Gerd Bohner (1991), "Mood and Persuasion: Affective States Influence the Processing of Persuasive Communications," in *Advances in Experimental Social Psychology*, Vol. 24, Mark P. Zanna ed. San Diego, CA: Academic Press, 161-199.
- Spangenberg, Eric R., Ayn E. Crowley, and Pamela W. Henderson (1996). "Improving the Store Environment: Do Olfactory Cues Affect Evaluations and Behaviors?" *Journal of Marketing*, 60 (April), 67-80.
- Spangenberg, Eric R., David E. Sprott, Bianca Grohmann, and Daniel L. Tracy (2006), "Gender-Congruent Ambient Scent Influences on Approach and Avoidance Behaviors in a Retail Store," *Journal of Business Research*, 59 (November), 1281-87.
- Wood, Wendy, Carl Kallgren, and Rebecca M. Preisler (1985), "Access to Attitude-Relevant Information in Memory as a Determinant of Persuasion: The Role of Message Attributes," *Journal of Experimental Social Psychology*, 21 (January), 73-85.

Essay IV

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*Publication of Abstract

**The Simple (and Complex) Effects of Scent on Retail Shoppers:
Processing Fluency and Ambient Olfactory Stimuli**

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ABSTRACT

Ambient scents within a store have been demonstrated to influence consumers. Extant research, however, has not adequately provided a theoretical explanation for observed effects. The current research addresses this issue by exploring the role of fluency (the perceived ease of processing a stimulus) in olfactory cue effects. The results of a field experiment show that scent complexity (a manipulation of fluency) impacts the effect of scent on behavior. In comparison to a control condition, simple or more fluent scents led to positive customer responses, while more complex scents had no effect on shoppers. Implications for theory and practice are provided.

INTRODUCTION

Researchers have long explored the effects of ambient stimuli on consumer responses in the retail environment [see Turley and Milliman (2000) for a review of atmospheric effects on shopping behavior]. While music is the most commonly studied atmospheric cue (e.g., Milliman, 1982; North & Hargreaves, 1998; Yalch & Spangenberg, 1990), olfactory cues have also been demonstrated to affect consumption-related behaviors (e.g., Bone & Ellen, 1999; also Hirsch, 1995; Mitchell, Kahn, & Knasko, 1995; Spangenberg, Crowley, & Henderson, 1996). While research has identified olfactory cues as attitudinal and behavioral moderators, mixed results raise concerns regarding the underlying mechanisms responsible for reported effects of scent on consumer behavior.

Most published research relies on the stimulus-organism-response (S-O-R) paradigm, the core of which suggests that pleasant scent (S) triggers a positive affective state in the consumer (O), thereby evoking approach behaviors (R) (for a review see Spangenberg et al., 1996). While this literature has shown that pleasant olfactory stimuli should enhance consumer responses, it is unclear as to how scents influence actual behavior. Recent research, however, has examined some moderating attributes of scents and suggests an avenue for future research. In particular, this research has demonstrated that the appropriateness, or congruity, of product scents (Bosmans, 2006) and ambient store scents (Spangenberg, Sprott, Grohmann, & Tracy, 2006) act as boundary conditions to the effects of scent on behavior. While intriguing, this research does not clearly detail how characteristics of a scent are more (or less) likely to alter behavior? Herein we explore this issue using a theoretical construct—fluency—to shed light on the mechanism underlying the olfactory cue effects on consumers.

Theoretical Background

Fluency is derived from cognitive psychology and defined as the metacognitive experienced ease of processing a stimulus (Schwarz, 2004). In other words, this promising mediational mental construct suggests that people monitor the cognitive effort they spend to process a stimulus and extract how difficult it feels to do so (e.g., Reber, Schwarz, & Winkielman, 2004). Feelings of ease can have multiple conse-

quences with some being relevant for the question at hand. First, easy processing feels good and triggers positive affect (Lee & Labroo, 2004; Winkielman & Cacioppo, 2001), which in turn is attributed to the processed stimulus. Thus, increased fluency results in greater liking of a stimulus if it is the most likely source of the elicited affect (i.e., feeling-as-information; Schwarz, 2004). Second, people implicitly associate ease and familiarity with importance and personal relevance (Schwarz, 2004). As a consequence, easy to process stimuli are also regarded as more functional, more self-relevant, and in sum more important for achieving individual goals (Bornstein, 1989, Schwarz, 2004, Zajonc, 1980). And third, fluency is associated with truth leading to a stronger persuasiveness if a stimulus can be processed easily (Schwarz, 2004).

The positive effects fluency can have with regard to stimulus evaluation have been shown in numerous contexts. Studies conducted by Zajonc (1968) set the stage for the idea of fluency to be viewed as a determinant of liking. In particular, he showed non-Chinese speaking participants a set of Chinese ideographic characters at varying frequencies, finding that liking was highest for those characters participants saw most often. Similar effects have been observed regarding the appeal of faces (Zajonc, 1968), line drawings, abstract paintings, pictures (Mandler, Nakamura, & Van Zandt, 1987; Reber, Winkielman, & Schwarz, 1998), music (Anand, Holbrook, & Stephens, 1988), food (Sullivan & Birch, 1990) and advertising (Labroo & Lee, 2006). Zajonc's term for this effect was "mere exposure", and it is consistent with the "increase in fluency" explanation for findings in the fluency literature (e.g., Reber, et al, 1998). In subsequent studies, evidence from research aimed at understanding fluency leads to the proposition that subjectively experienced ease of processing is a central determinant of liking for a given stimulus. In particular, positive feelings caused by ease of processing are used heuristically to make a judgment of liking. Stimulus complexity (or lack thereof) is proposed as one of the most important determinants of processing ease, such that simpler and more familiar stimuli are easier to process and are therefore more likely to be liked than more complex stimuli that result in "disfluency." Furthermore, simple in contrast to complex stimuli should trigger judgments of truth, self-relevance, and importance and might therefore increase approach behaviors in a consumer context.

Research has demonstrated that positive affect can directly influence behavior (e.g., Cohen & Areni, 1991; Hirschman & Stern, 1999) and that ambient olfactory cues can similarly influence how consumers behave. In the context of theoretical predictions of fluency, one can reasonably predict that being more familiar with a scent could make that scent more effective as a retail cue. Spangenberg et al. (2006), for example, showed typically “male” scents to be more effective in eliciting positive shopping behaviors for men and likewise for women and “female” scents. Therefore fluency is a construct worthy of consideration with regard to understanding the effects of ambient scents in the retail shopping environment. Just as with non-olfactory stimuli explored in the extant literature, we contend that scents with which customers are more familiar should lead to affectively positive ease of processing which will (in turn) influence consumer attitudes and behaviors. Given that “simple” scents should be more readily processed than those that are complex, we hypothesize that a fluent or “simple” scent compared to a “complex” or “no-scent control” will lead to an increase in positive attitudes toward products and the store environment, behavioral attitudes such as loyalty to the retailer, and perhaps most importantly, approach behaviors such as increased spending in the actual shopping environment.

METHOD

A field experiment was conducted to assess the effect of scent complexity and fluency on customer attitudes and behaviors within an actual retail store. Procedures largely followed Spangenberg et al. (2006) with regard to store and pretest scent selection, as well as use of a commercial diffusion system, insurance of absence of “other” scents competing with our manipulations, and so forth. Scent complexity was varied with a single scent representing the simple scent condition and the combination of multiple scents constituting the complex scent conditions.

Olfactory Stimuli Pretest

A pretest for complexity was adapted from Lévy, MacRae, and Köster (2006). Starting with a single scent, complex variations were prepared by adding very small quantities of different scents and served as an objective index of complexity. This

was done in cooperation with an aroma supplier who prepared the scent compositions by using scents that are currently used in stores. Pretesting followed Spangenberg, et al. (1996), wherein 10 scents were evaluated on several seven-point semantic differential scales.

Pretest participants included 208 customers intercepted in two retail stores including one wherein the main field study was conducted. To avoid possible measurement effects, participants randomly choose 1 out of 10 possible vials which were opaque and labeled with random numbers. The vials contained a cotton ball with 20 to 25 drops of the essential oil. Participants were allowed to sniff the vial as many times as they wanted while responding.

Pleasantness, liking, attractiveness and positivity were measured to obtain a scent preference measure ($\alpha = .94$). As prior research has revealed congruency of the scents for the store to be a potential moderator we assessed the construct by asking participants about the appropriateness for the store (Morrin & Ratneshwar, 2003) and arousal to insure it did not differ for scents ultimately selected (cf. Bosmans, 2006; it did not differ). Answers were given on a seven-point scale ranging from “not at all appropriate” (1) to “highly appropriate” (7). Scents chosen for the main field study were perceived to be appropriate as ratings were significantly above the scale midpoint (all $ps < .05$).

To validate the scent complexity manipulation, participants rated the complexity (simple - complex), heterogeneity (homogeneous - heterogeneous) and elaborateness (single - elaborated) of the scents ($\alpha = .89$). To increase generalizability of the pretest, two different sets of simple and complex scents were tested, implemented as nested factors in the experimental design and subsequently aggregated in simple and complex scent conditions. Results of the pretest supported the complexity manipulation for the main experiment. Natural oils of lemon and orange were selected as simple scents; the combination of lemon and basil-lime and orange, basil-lime, and green tea oils represented our complex scents which differed significantly on the subjective complexity measures as intended (all $ps < .05$).

Field Experiment

The study utilized a between-participants design (156 women and 30 men) with three conditions: simple scents versus complex scents versus a control condition (no ambient scent). The study was conducted in an interior decor store primarily targeting women in a major Swiss city. Conditions were randomly assigned to weekdays (73 simple, 75 complex, 38 control). Scents were diffused throughout the entire store at a moderate intensity level using a commercial retail scent diffuser. All customers were contacted at the cash register after payment and asked to fill out a questionnaire about the store. There was no reference to ambient scent and no customers mentioned scent in the open-ended question at the completion of the survey.

Measures

Based on prior research (Spangenberg et al., 1996; Spangenberg et al., 2006), dependent measures included: attitude toward the products (low quality/high quality, useless/useful, old fashioned/modern, inadequate/adequate; $\alpha = .69$); attitude toward the store (bad/good, low quality/high quality; $r = .43$); loyalty toward the store ("I would be willing to pay more in order to make purchases in this store again" ranging from "do not agree at all" (1) to "totally agree" (7)); and self-reported expenditures ("how much money did you spend?"). Accuracy of participants' self-reported expenditures were checked against sales receipts. Given highly dispersed, non-normally distributed sales, a logarithmic transformation was used to achieve a normal distribution (Fox, 2008).

RESULTS

A series of ANOVA models assessed the impact of scent complexity on the described dependent variables. The table provides descriptive statistics for all measures

Attitude toward Products. An ANOVA found ambient scent to have an impact on attitudes toward products, $F(2, 183) = 7.85, p < .01; \eta^2 = .08$ (medium effect size according to Cohen, 1988). Shoppers had more favorable product attitudes shopping in the presence of a simple scent ($M = 5.62$), then when shopping with a complex

scent ($M = 5.20$), $t(146) = 3.30$, $p < .01$; Cohen's $d = 0.54$ or no scent at all ($M = 5.12$), $t(109) = 3.54$, $p < .01$; Cohen's $d = .0.71$. There were no difference in product attitudes between the complex and no scent conditions, $t(111) = 0.53$, $p > .59$.

Attitude toward the Retailer. The ANOVA model demonstrated that ambient scent within the store impacted attitudes toward the retailer, $F(2, 183) = 17.29$, $p < .01$; $\eta^2 = .16$ (large effect). Retail patrons had a more favorable attitude when exposed to a simple scent ($M = 5.66$), as compared to a complex scent ($M = 4.93$), $t(146) = 5.49$, $p < .01$; Cohen's $d = .0.90$ or no ambient scent ($M = 4.99$), $t(109) = 4.37$, $p < .01$; Cohen's $d = .0.87$. There were no differences in store attitudes between the complex and no scent conditions, $t(111) = 0.36$, $p > .71$.

Store Loyalty. There was a significant effect of ambient scent on store loyalty, $F(2, 182) = 19.95$, $p < .01$; $\eta^2 = .18$ (large effect). Retail shoppers indicated greater store loyalty in the presence of the simple scent ($M = 4.30$) then when in the presence of the complex scent ($M = 2.73$), $t(146) = 5.56$, $p < .01$; Cohen's $d = .0.91$ or when there was no scent present ($M = 2.62$), $t(108) = 4.52$, $p < .01$; Cohen's $d = .0.91$. Loyalty did not differ between shoppers in the complex and no scent conditions, $t(110) = 0.37$, $p > .71$.

Money Spent. The ANOVA model indicated a significant impact of ambient scent on sales, $F(2, 182) = 8.08$, $p < .01$; $\eta^2 = .08$ (medium effect). Shoppers spent more money when exposed to a simple scent ($M = 3.95$), as compared to a complex scent ($M = 3.50$), $t(146) = 3.21$, $p < .01$; Cohen's $d = .53$ or no scent ($M = 3.37$), $t(108) = 3.21$, $p < .001$; Cohen's $d = .80$. Sales between the complex and no scent conditions did not differ, $t(110) = 0.75$, $p > .45$.

TABLE
Descriptive Statistics

Dependent Measures	Means and Standard Deviations for Ambient Scent		
	Simple (<i>n</i> = 73)	Complex (<i>n</i> = 75)	No Scent (<i>n</i> = 38)
Attitude towards Products	5.62 _a (0.71)	5.20 _b (0.81)	5.12 _b (0.69)
Attitude towards the Retailer	5.66 _a (0.75)	4.93 _b (0.86)	4.99 _b (0.79)
Store Loyalty	4.30 _a (1.96)	2.73 _b (1.45)	2.62 _b (1.59)
Money Spent (log)	3.95 _a (0.75)	3.50 _b (0.93)	3.37 _b (0.74)

Note. Standard deviations in parentheses. Based on *N* = 186. The possible range of scores for money spent is 1.10 to 6.02 (log transformed), with higher values indicating more expenditures. The possible range of scores for the remaining variables is 1 to 7, with higher values indicating more positive responses to the retailer. For each dependent variable, means not sharing a common subscript differ at $p < .05$.

DISCUSSION

Prior research has clearly demonstrated that ambient scents in a retail store can influence the perceptions and behaviors of retail consumers. Extant literature also reports that congruency of a scent with product offerings and or the retail environment itself can moderate observed effects. Although intriguing, and of considerable practical importance, research to date has not provided much theoretical explanation or empirical evidence regarding the process by which ambient scents influence customer attitudes, intentions, and behaviors. Indeed, nearly all prior work has merely relied upon the rather simplistic S-O-R model of environmental psychology rather than push for more theoretical explanation. The current research begins to address this dearth of explanation by identifying a theoretically meaningful moderator - that of fluency - that can help us explain prior findings.

The current research makes a number of important scholarly and practical contributions. Results of our field experiment provide the first evidence that complexity (a common manipulation of fluency) of an ambient scent moderates the effect of scent

on consumers' responses within a retail store. In particular, consumer attitudes toward a real store, its actual products, and their intention to loyally patronize the store, as well as actual consumer purchases, were significantly impacted by scent complexity. Simple or more fluent scents (as compared to a no scent control condition) led to more positive responses from customers (i.e., more favorable attitudes, greater loyalty and increased sales). More complex scents had no effect on retail patrons as compared to the control condition.

Importantly, ours is the first known demonstration of fluency effects related to an olfactory stimulus, therefore it serves as a unique contribution to the fluency literature in addition to the literature on atmospherics and specifically olfactory environmental cues. Future researchers should consider working with this unique stimulus manipulation. Further, the current work shows that, contrary to the conclusions drawn by many retailers attempting to implement the findings of earlier work on olfactory retailing stimuli, not just any pleasant ambient scent will impact consumer cognitions and behaviors as firms might desire. While the simple and complex scents may be similar in terms of congruency with a given retail setting, our initial work suggests that the simple scent may be the only one to have a positive impact on retail patrons. This is counter to prior research suggesting that any scent (with equivalent levels of congruency) should positively impact (from the retailer's perspective) customer behavior.

Our work is of further practical importance in that, while conventional wisdom holds that scents influence bottom line outcomes in the market, there is little evidence that this is the case. The effect we show on sales is only the second published demonstration of ambient scent on actual consumer expenditures (see Spangenberg et al., 2006) in an actual retail environment with actual shoppers. This work provides real-world evidence, suggesting that practitioners may feel more confident in using such manipulations and findings than those of some earlier published work. Thus, our work contributes both theoretically as well as practically. Findings herein provide firms guidance with regard to the types of scents they should consider for use in the retail environment. Indeed, it also suggests the types of scents that should not be used - that they may in fact be wasting their resources with stimuli that are too complex. While more research will be useful, it appears from this field study

that simple, less complex scents work best to influence consumer behavior in ways consistent with goals of the marketer.

REFERENCES

- Anand, P., Holbrook, M.B. & Stephens, D. (1988). The formation of affective judgments - The cognitive-affective model versus the independence hypothesis. *Journal of Consumer Research*, 15, 386-391.
- Bone, P. & Ellen, P. (1999). Scents in the marketplace: Explaining a fraction of olfaction. *Journal of Retailing*, 75, 243-262.
- Bornstein, R.F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968-1987. *Psychological Bulletin*, 106, 265-289.
- Bosmans, A. (2006). Scents and sensibility: When do (in)congruent ambient scents influence product evaluations? *Journal of Marketing*, 70, 32-43.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed). Hillsdale, NJ: Erlbaum.
- Cohen, J.B. & Areni, C.S. (1991). Affect and consumer behavior. In T.R. Robertson & H.H. Kassarian (Eds.) *Handbook of Consumer Behavior* (pp. 188-240). Englewood Cliffs, NJ: Prentice Hall,
- Fox, J. (2008). *Applied regression analysis and generalized linear models*. Thousand Oaks, CA: Sage Publications.
- Hirsch, A. (1995). Effects of ambient odors on slot machine usage in Las Vegas casino. *Psychology & Marketing*, 12, 585-594.
- Hirschman, E.C. & Stern, B.B. (1999). The roles of emotion in consumer research. In E.J. Arnould & L.M. Scott (Eds.) *Advances in Consumer Research*, Vol. 26 (pp. 4-11). Provo, UT: Association for Consumer Research.
- Labroo, A.A. & Lee, A.Y. (2006). Between two brands: A goal fluency account of brand evaluation. *Journal of Marketing Research*, 43, 374-385.
- Lee, A.Y. & Labroo, A.A. (2004). The Effect of conceptual and perceptual fluency on brand evaluation. *Journal of Marketing Research*, 49, 151-165.
- Lévy, C., MacRae, A. & Köster, E. (2006). Perceived stimulus complexity and food preference development. *Acta Psychologica*, 123, 394-413.
- Mandler, G., Nakamura, Y. & Van Zandt, B.J.S. (1987). Nonspecific effects of exposure on stimuli that cannot be recognized. *Journal of Experimental Psychology: Learning, Memory and Cognition* 13, 646-648.
- Milliman, R.E. (1982). Using background music to affect the behavior of supermarket shoppers. *Journal of Marketing*, 46, 86-91.

- Mitchell, D., Kahn, B. & Knasko, S. (1995). There's something in the air: Effects of congruent or incongruent ambient odor on consumer decision making. *Journal of Consumer Research*, 22, 229-238.
- Morrin, M. & Ratneshwar, S. (2003). Does it make sense to use scents to enhance brand memory? *Journal of Marketing Research*, 40, 10-25.
- North, A.C. & Hargreaves, D.J. (1998). The effect of music on atmosphere and purchase intentions in a cafeteria. *Journal of Applied Social Psychology*, 28, 2254-2273.
- Reber, R., Schwarz, N., & Winkielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? *Personality and Social Psychology Review*, 8, 364-382.
- Reber, R., Winkielman, P. & Schwarz, N. (1998). Effects of perceptual fluency on affective judgments. *Psychological Science* 9, 45-48.
- Schwarz, N. (2004). Metacognitive experiences in consumer judgment and decision making. *Journal of Consumer Psychology*, 14, 332-348.
- Spangenberg, E., Crowley, A. & Henderson, P. (1996). Improving the store environment: Do olfactory cues affect evaluations and behaviors? *Journal of Marketing*, 60, 67-80.
- Spangenberg, E., Sprott, D., Grohmann, B & Tracy, D. (2006). Gender-congruent ambient scent influences on approach and avoidance behaviors in a retail store. *Journal of Business Research*, 59, 1281-1287.
- Sullivan, S. & Birch, L.L. (1990). Pass the sugar, pass the salt: Experience dictates preference. *Developmental Psychology*, 26, 546-551.
- Turley, L. & Milliman, R. (2000): Atmospheric effects on shopping behavior: A review of the experimental evidence. *Journal of Business Research*, 49, 193-211.
- Winkielman, P. & Cacioppo, J. (2001). Mind at ease puts a smile on the face: Psychophysiological evidence that processing facilitation leads to positive affect. *Journal of Personality and Social Psychology*, 81, 989-1000.
- Yalch, R.F. & Spangenberg, E.R. (1990). Effects of store music on shopping behavior. *Journal of Consumer Marketing*, 7, 55-63.
- Zajonc, R.B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology Monographs* 9, 1-27.
- Zajonc, R.B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, 35, 151-175.

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The Simple (and Complex) Effects of Scent on Retail Shoppers: Processing Fluency and Ambient Olfactory Stimuli

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ABSTRACT

Although ambient scents within a retail store have been demonstrated to influence shoppers, extant research has not provided an adequate theoretical explanation for observed effects. The current research addresses this issue by exploring the role of processing fluency in olfactory cue effects. Across two field experiments and in support of a fluency explanation, we demonstrate that scent complexity impacts shoppers' response to a scented retailer. In comparison to a control condition, simple or more fluent scents led to positive customer responses (including increased spending), while more complex scents had no effect on shoppers. Results also indicate that affective responses to the environment mediate observed effects. Implications for theory and practice are provided.

EXTENDED ABSTRACT

Research in marketing suggests that customers within a retail store can be influenced by ambient scents. Unfortunately, there have been few theoretical explanations offered for observed effects. The major goal of this paper is to explore how ambient scent impacts expenditures and the extent to which specific characteristics of the olfactory cue itself plays a role. In particular, we propose that the ease with which olfactory cues are processed (i.e., processing fluency) will affect how such cues influence customer behavior. According to processing fluency, stimuli that are easier processing will trigger positive affect, which in turn will result in greater liking of a stimulus and other positive outcomes (e.g., increased spending in the presence of such a cue). In this research, we examine the perceived ease of processing of a simple versus complex olfactory cue, such that ease of processing effects are significantly stronger for simple, rather than for complex, scents (stimulus complexity is a traditional manipulation of processing fluency).. To provide insights in the underlying process and support a processing fluency explanation, we explore the mediating role of affective responses on the observed effects.

In this research, two pretests were conducted for stimuli selection, followed by two experiments designed to explore the major issues of interest. In pretest 1 ($N = 208$), we tested different scents varying in terms of complexity (or processing fluency), but that did not differ along other theoretically relevant dimensions. In cooperation with a commercial scent supplier, experimental stimuli contained only one a single scent for the simple scent condition or multiple scents for the complex condition. Participants rated scents (provided in an opaque vial) regarding stimuli complexity, pleasantness and congruency with the retail store. A significant complexity by scent interaction emerged for the selected scents but, as intended, no interactions emerged with regard to perceived congruency or pleasantness of the scent. In pretest 2 ($N = 156$), the complexity of scents selected from the first pretest were examined in a real-world setting by diffusing the scents in a retail store. Shoppers were stopped randomly and asked to fill out a questionnaire. Using the same measures as first pretest, we obtained a significant effect on perceived complexity as expected.

In study 1 ($N = 186$), customers were exposed to simple and complex ambient scents diffused within a retail store, or to no scent at all (in the control condition).

After passing the cash register, customers were asked to indicate their spending and complete a short survey. As expected, results indicated a significant impact of ambient scent on sales, but only for simple scents. In particular, shoppers spent more money when exposed to a simple ambient scent, as compared to a complex ambient scent or no scent at all. Sales between the complex and no scent conditions did not differ. To understand the postulated underlying processes of fluency, we explore in study 2 the psychological process underlying observed effects.

In study 2 ($N = 220$), customers were exposed to simple or complex scents, or no scent at all, within a retail store. Additionally, we assessed customers' affective response. Results of this experiment were nearly identical to those of study 1. Given the similar result, the mediating role of affective reactions was tested via OLS regression. These results showed that the direct effect of the simple ambient scent on spending was significantly mediated by consumers affective responses, such that when consumers' affective reactions are included in the model, the relationship weakens to non significance.

Nearly all prior research on scent has applied the S-O-R model to explain the effects of scent on customers. In our research, we demonstrate the theoretical importance of processing fluency by demonstrating stronger effects for simple (versus complex) ambient scents on sales. One of the most intriguing findings of the current research concerns our demonstration that processing fluency can be applied to olfactory stimuli, something that has yet to be shown in the fluency literature. The results of the current research are not only of theoretical interest to those in marketing and psychology, but also have important managerial implications by indicating the nature of scents that should be employed by firms and marketing managers. In particular, firms would be well served to consider the actual nature of scents and to consider employing scents that are simpler and therefore easier to process by consumers.

INTRODUCTION

The effects of sensory cues on consumers have long been explored in the context of marketing. While music has been historically the most commonly studied cue (Milliman 1982;), much recent work has focused on the effects of olfactory stimuli on consumers and their responses to those cues (Bone and Ellen, 1999; Bosmans, 2006; Mitchell, Kahn, and Knasko, 1995; Morrin and Ratneshwar, 2003; Spangenberg, Crowley, and Henderson, 1996). One sees little empirical evidence, however, regarding the effects of scent beyond proximal dependent variables—in other words, few researchers have looked at effects of olfactory cues on actual purchase data (Chebat and Michon, 2003; Spangenberg, Sprott, Grohmann, and Tracy, 2006 for exception). Unfortunately, the lack of demonstrated effects on market-relevant outcomes (such as purchase behavior) limits the potential impact of the extant literature.

The current work addresses this shortcoming in two field studies wherein the effects of olfactory cues are demonstrated with regard to actual retail sales. Of equal or perhaps greater importance, is the fact that a cohesive theoretical explanation for the demonstrated effects of olfactory cues on consumers is lacking. While existing research has demonstrated olfactory cues to have an effect on attitudes and identified some boundary conditions, a dearth of empirical evidence regarding theoretical processes suggests that we are not much further than suggested by Bone and Ellen's (1999) statement that "...conventional wisdom does not allow researchers or retailers to reliably predict olfaction effects." Several conceptualizations have been suggested, but little empirical support in the form of process evidence confirms postulations emerging from earlier research. Further, there is little correspondence in the literature regarding explanations for observed findings. Thus, while we know that we can use olfactory cues to impact consumer reactions to a variety of stimuli including products and the retail environment, we do not know why such effects occur from a theoretical perspective. From a managerial perspective this leads to the open question which systematic characteristics of a scent have to be considered when it comes to creating a new scent for the customer context. To put it differently, concrete hints for designing a scent that maximizes the positive influence on consumer behavior are still missing.

To bridge this gap, we propose that the metacognitive construct of processing fluency can be applied in the context of scents and might explain a lot of contradictory findings within this research tradition. Furthermore, the processing fluency account allows to derive hypotheses about which specific characteristics of a scent are important for shaping the consumers' evaluation and should thus be focused on in creating scents. Processing Fluency is derived from cognitive psychology and defined as the metacognitive experienced ease of processing a stimulus (Schwarz, 2004). In other words, this approach suggests that people monitor the cognitive effort they spend to process a stimulus and experience a corresponding feeling of ease or difficulty. Feelings of ease elicit positive affect which is accompanied by an increase in approach behavior which in turn makes processing fluency a relevant construct in the consumer behavior context (Lee and Labroo, 2004). Another important aspect of this approach is that it makes clear-cut predictions about stimulus properties that increase or decrease processing fluency and thereby also the positivity of affect elicited by that stimulus. For example, complexity, prototypicality, and familiarity are stimulus properties that increase ease of processing and should therefore also increase positivity of affect (Reber and Schwarz 2006).

In the present research, we focused on the effect of scent complexity on affect and buying behavior because this is the only described stimulus characteristic that is independent of individual experience with the stimulus and that can be measured and/or manipulated in objective terms. The remainder of this article is organized as follows: we first summarize existing insights in the field of scents in a consumer behavior setting. Next, we describe the processing fluency account in more depth and explain how it can be applied to scents. The empirical part of the paper is composed of two studies that show the impact of fluency of processing a scent on real purchases in a shopping environment and the mediating role of affect for this relationship. We conclude with a general discussion of our empirical findings and derive theoretical as well as practical implications of our findings.

BACKGROUND

Although olfactory effects on consumer responses have been the subject of several publications over the last two decades in marketing and related fields, there is little convergence with regard to accurately predicting the effects of scent. Much published research regarding effects of olfaction on consumer behavior relies on the stimulus-organism-response (S-O-R) paradigm, the core of which suggests that pleasant scent (S) triggers a positive affective state in the consumer (O), thereby evoking approach behaviors (R) (for a review see Spangenberg et al., 1996). While this literature has shown that pleasant olfactory stimuli should enhance consumer responses and interestingly, increase positivity of evaluation for unfamiliar brands (e.g., Morrin and Ratneshwar, 2000; 2003), it lacks theoretical specification as to how scents influence actual behavior and why some scents show an impact on consumer behavior and others do not. Research since the mid 1990's, however, has examined some moderating attributes of scents and proposed theoretical explanations for observed effects although process evidence for said are lacking. Presence of scent has been shown to increase cognition (Bone and Jantrania, 1992), findings regarding affective responses are equivocal.

Although process evidence is lacking, authors have postulated post hoc explanations for their findings. Included among possible explanations for observed effects are the appropriateness or congruity of product scents (Mitchell, Kahn, and Knasko, 1995; Bosmans, 2006) and ambient store scents (Spangenberg et al., 2006) as boundary conditions to the effects of scent on attitudes and behavior. While intriguing, this research does not clearly detail how and which characteristics of a scent are more (or less) likely to alter behavior.

Perusal of the literature on olfaction in marketing contexts suggests that the notion of fluency is a heretofore untested, yet plausible theoretical explanation for much of what we find. The Gulas and Bloch (1995) model of influence of scent on consumer response includes many of the aspects of cues (e.g., congruity, acuity, age) that are things which vary with ease of processing. That scents congruent with product offerings or environments lead to greater liking and increased processing time (e.g., Mitchell et al., 1995) as well as more holistic processing and increased satisfaction (Mattila and Wirtz, 2001) with regard to respectively evaluated entities are results

easily interpreted through this lens: it could simply be that “congruent” scents are more “fluent” scents for consumers to process. Lending credence to our expectation is the peripherally related finding that an unobtrusive congruent cleaning solution scent elicits thoughts of cleaning as well as caused those people exposed to the cue to keep their work areas cleaner (Holland, Hendriks, and Aarts, 2005); this result suggests a fluency mechanism eliciting actual behavior. As a further example, even though apparently complex from a scent composition standpoint, the Christmas scent in the Spangenberg et al (2006) article was more consistent and therefore more “fluent” from a consumer processing perspective than the spring flower scent with which it was compared. In addition, increased liking or memory of unfamiliar brands paired with pleasant scents (e.g., Morrin and Ratneshwar, 2003) at first blush may seem counterintuitive. However, if a pleasant scent is a simple or recognized one, it may be that it causes “more fluent” processing to occur which leads to greater preference of unfamiliar brands. Also consistent with our proposition, DeBono (1992) found the presence of scent to be related to heuristic processing while more systematic processing was associated with evaluations in the absence of scent.

When thinking in an S-O-R framework, the construct of processing fluency can be located in the organism and represents a metacognitive experience that is triggered by processing a given stimulus. That is, there are specific stimulus characteristics (e.g., complexity, prototypicality, congruence, familiarity, figure-ground-contrast) that determine the demand that is putted on the cognitive processing of that stimulus (Reber and Schwarz, 2006). For example, the more complex a stimulus is the more information has to be processed and therefore the more difficult it feels to process the given stimulus. It was shown that ease of processing triggers positive affect (Lee and Labroo, 2004) which is in accordance with an evolutionary explanation because ease of processing signals familiarity and security which has been important markers in our evolutionary past (Halberstadt and Rhodes, 2003). The elicited positive affect may trigger a need to attribute it to a likely source which might be the stimulus (in our case the scent) that was processed and shape its liking (c.f., feeling-as-information; Schwarz, 2004). But it can also be misattributed to some other stimulus configurations that are present at the same time like the general environment or more salient stimuli like products in a shop. In the case of scents this especially likely because visual stimuli are generally considered with more attention and might

be regarded as a better source of the experienced positive affect than a subconsciously perceived scent. It is also possible that no likely source can be identified and a general approach behavior tendency is triggered which is also a possible effect in a shopping environment. The elicited positive affect may thus impact the behavior of the consumer due to liking of the shop in general, some specific products or a general approach tendency which closes the circle of the S-O-R framework.

Besides the elicited positive affect and its consequences for stimulus evaluation there are some other known consequences of increased fluency that might become importance in the consumer behavior context. First, people implicitly associate ease and familiarity with importance and personal relevance (Schwarz, 2004). As a consequence, stimuli that are easy to process are also regarded as more functional, more self-relevant, and in sum more important for achieving individual goals (Bornstein, 1989, Schwarz, 2004). And second, fluency as a result of easily processed stimuli is associated with a perception of truth, thereby leading to a stronger likelihood of persuasiveness of the stimulus (Schwarz, 2004).

The positive effects fluency can have with regard to stimulus evaluation have been shown in several contexts. The mere exposure literature introduced by Zajonc (1968) set the stage early for the idea of fluency as an implicit determinant of liking. He showed non-Chinese speaking participants a set of Chinese ideographic characters at varying frequencies, finding that liking was highest for those characters participants saw most often. Similar effects have been observed regarding a variety of stimuli including the appeal of faces (Zajonc, 1968), line drawings, abstract paintings, pictures (Reber, Winkielman, and Schwarz, 1998), and advertising (Labroo and Lee, 2006), to name a few. Thus, the mere exposure is not only a very robust phenomenon that can be demonstrated in multiple contexts but also an effect that can be explained very parsimoniously with the fluency account (e.g., Reber, et al, 1998). In subsequent studies, evidence from research aimed at understanding fluency leads to the proposition that implicitly, subjectively experienced ease of processing is a central determinant of liking. Positive feelings caused by ease of processing are used heuristically to come up with a judgment of liking.

Besides the mere exposure effect which describes the processing history of an individual observer with a given stimulus, there has been done much research on the effect of specific stimulus characteristics and their influence on consumers in general. A closely related stream of research investigated for example the impact of food complexity on liking (Levy, MacRae, and Köster, 2006) and builds the foundation for our study. From a practical point of view, this approach has special relevance because it allows to derive concrete implications for an adequate level of stimulus complexity to achieve the highest amount of liking. From a theoretical point of view it is interesting to get to know whether scents are processed in a similar fashion as visual, auditory and flavor stimuli and whether the effect elicited by ease of processing are strong enough to impact actual buying behavior.

HYPOTHESES

Research has demonstrated that positive affect can directly influence behavior (e.g., Cohen and Areni, 1991) and that ambient scents can similarly influence how consumers behave. In the context of theoretical predictions derived from the metacognitive construct of fluency, one can reasonably predict that triggering consumers' implicit affect with a simple and therefore more fluent cue should make that a more effective retail cue. We propose:

H1: A fluent or "simple" ambient scent leads to an increase in actual customer spending compared to a disfluent or "complex" ambient scent or to no scent at all.

To test the fluency assumption and to capture the underlying affective mechanism was a second goal of our studies. The positive feelings arisen by ease of processing is explained to be the mediating mental construct of behavioral tendencies. This leads us to our third hypothesis:

H2: The impact of scent fluency on sales is mediated by affective responses.

STUDY 1

A field experiment was conducted to assess the effect of scent complexity on customer behavior within an actual retail store. Procedures largely followed prior research in the marketing literature (e.g., Spangenberg et al., 1996). Scent complexity was varied with a single scent representing the simple scent condition and the combination of multiple scents constituting the complex scent conditions.

Scent Development and Pretesting

Scent Development. Development of scents used in the fields studies and procedures for pretesting these scents were adapted from prior research focused on determining the complexity of non-olfactory stimuli (Lévy, MacRae, and Köster 2006). While fluency can be operationalized in a variety of ways (e.g., varying the contrast between figure and ground or altering complexity as the number of elements to be processed), research suggests that varying the complexity of a stimulus is an important determinant of processing ease or fluency (Reber et al., 2004). Thus, for the purpose of this research, scent fluency was operationalized by developing scents that varied in terms of complexity, with the rationale being that more complex olfactory stimuli contain more information that needs to be processed and decrease the ease of processing, as compared to simple, single scents. Following Lévy et al. (2006), we started with a single scent and developed complex variations by adding very small quantities of different scents. Such an approach served to develop stimuli that objectively varied regarding complexity. It is important to have a common reference for both the simple and the complex scents in order to cover the same category of scents; thus, the scent we used as a simple scent was the base for the complex scent, which was then subsequently created by the addition of other scents. Scent development was done in cooperation with a commercial aroma supplier who prepared scent compositions by using scents that are currently used in stores.

Pretest 1. Pretest participants included 208 customers intercepted at two retail stores. The stores were the same as those used in two of the field studies, so as to make sure pretest scent ratings matched with customers' scent perceptions. Pretesting followed Spangenberg, et al. (1996), participants evaluated one scent each at several seven-point semantic differential scales. To avoid possible measurement

effects, participants randomly choose 1 of 10 opaque and randomly labeled vials. The vials contained a cotton ball with 20 to 25 drops of the essential oil. Participants were allowed to sniff the vial as many times as they wanted while responding to questions about the scent's pleasantness, familiarity congruity with the store, and complexity.

To increase the generalizability of the empirical field work, two different sets of simple and complex scents were selected from this pretest. In particular, the two simple or fluent ambient scents included "lemon" and "orange" essential oils, while the two complex or disfluent scents included combined oils of "basil-lemon" and "basil-orange and with green teas." Results of the pretest regarding these four scents are provided in Table 1.

The hedonic properties of the pretested scents were assessed with items from Fisher's (1974) environmental quality scale. All four scents were perceived as equally pleasurable (positive/negative, pleasurable/unpleasurable, like / dislike, attractive / unattractive; $\alpha = .92$) on a seven-point scale. Also, the 4 selected scents chosen for the main studies did not differ according to perceived familiarity given on a seven-point scale ranging from "not at all familiar" (1) to "highly familiar" (7) ($p > .69$).

TABLE 1
Descriptive Statistics for Pretest 1

Dependent Measures	Means and Standard Deviations for Selected Scents			
	Orange (<i>n</i> = 22)	Lemon (<i>n</i> = 20)	Basil-Lemon (<i>n</i> = 20)	Basil-Orange Green Tea (<i>n</i> = 20)
Pleasantness	5.33 _a (1.05)	5.58 _a (0.82)	5.65 _a (1.50)	5.10 _a (1.03)
Congruency	4.88 _a (1.36)	4.47 _a (1.81)	4.50 _a (.46)	4.75 _a (1.86)
Complexity	2.95 _a (1.43)	2.82 _a (1.18)	4.62 _b (0.96)	4.77 _b (0.97)
Familiarity	3.50 _a (1.26)	3.64 _a (1.15)	3.15 _a (1.69)	3.60 _a (0.82)

Note. Standard deviations in parentheses. Based on $N = 82$. The possible range of scores for the listed variables is 1 to 7, with higher values indicating more positive responses. For each dependent variable, means not sharing a common subscript differ at $p < .001$.

As prior research has revealed that congruency of a scent with a particular environment can be a potential moderator, we assessed the construct by asking participants about the appropriateness for the scent for the store (Morrin & Ratneshwar, 2003). Answers were given on a seven-point scale ranging from “not at all appropriate” (1) to “highly appropriate” (7). Scents chosen for the main field study were perceived to be appropriate as ratings were significantly above the scale midpoint (all $ps < .01$) and did not differ from one another according to an ANOVA model including the four scents as one factor ($p > .91$).

To validate the scent complexity manipulation, participants rated the perceived complexity of the scents using items adapted from Levy, Mac Rae and Köster (2006). The items (measured on 7-point semantic differential scales) included measures of complexity (simple - complex), heterogeneity (homogeneous - heterogeneous) and elaborateness (pure – differentiated) of the scents ($\alpha = .88$). Results of the pretest indicated that the two simple scents did not differ from one another in terms of complexity ($p < .73$), nor did the two complex scents ($p < .62$). As expected, each of the complex scents differed from each of the simple scents ($p < .001$). Given the results of the pretest, the simple scents and complex scents are

aggregated (for analytic and reporting purposes) in the main studies as simple and complex scent conditions, respectively.

Pretest 2. The complexity of the scents selected after the first pretest was tested further in a real-world setting by applying the ambient scents in a retail store. In particular, the simple scents (orange; lemon) and complex scents (basil-lemon; basil-orange and with green tea oils) were diffused in a small clothing store over a period of 2 weeks. Shoppers ($N = 156$) were randomly stopped while shopping and asked to fill out a short questionnaire using the measures reported in the first pretest (pleasurable/ unpleasurable; simple / complex, congruent / incongruent, unfamiliar / familiar). Consistent with the first pretest, the scents did not differ in terms of pleasantness, familiarity, and congruency. The scents did differ in terms of complexity, however, such that the two simple scents differed from the two complex scents ($p < .01$). But, as demonstrated in the first pretest, the two simple scents did not differ from one another, nor did the two complex ambient scents. These results provide further support for collapsing the scents within the complexity manipulation for the main field experiments.

Method

Design, Participants and Procedure. Study 1 used a between-subjects design: simple scent (orange; lemon) and complex scent (basil-lemon; basil-orange with green teas). Conditions were randomly assigned to days of the week, during a 15-day period in which the study was conducted. The sample consisted of 186 customers who made purchases in the store during the time of the field experiment and who were willing to complete the survey, these included 73 customers who were exposed to the simple scent condition, 75 to the complex scent condition and 38 customers in the control condition where no scent was present. Data was not collected from shoppers who did not buy anything. The amount of time in the store was monitored in order to ensure that customers had an opportunity to be impacted by the ambient scent. Data was collected from those who spent at least five minutes in the store; time was monitored by interviewer and double checked with the customer once they had completed the survey. Data collection took place on all days of the week, from 10am to 7pm during the weekdays and Saturday from 10am to 5pm, for adequate representation. Data were not collected for at least one day after changing

scents in order to allow the previous scent to dissipate and the new scent to diffuse throughout the store

Upon making a purchase at the store, customers at the cash register were contacted by a trained interviewer who was blind to the study's hypothesis and asked to fill out a short, self-administered questionnaire about the store. There was no reference to ambient scent and no customers mentioned scent in the open-ended question at the completion of the survey. In exchange for participation, participants were entered in a lottery for a coupon at the store and were debriefed and thanked afterwards.

The field experiment took place in a typical decoration store that offered all kinds of in-home products (e.g., plates, candles, baskets, curtains, etc.). Scents were diffused throughout the entire store at a moderate intensity level using a commercial retail scent diffuser. The intensity and concentration of the ambient scents was monitored to ensure that the scents would be perceived by shoppers, but not be so intense as to be bothersome. There were no aggressive, exogenous odors in the retail store and all efforts were made to reduce the effect of any extraneous odors during the study (e.g., the interviewers were instructed not to wear perfume, aftershave, or other scents). During the data collection period, the retailer ensured consistent advertising, pricing, and product availability in order to reduce promotional effects on the observed results.

As noted in the pretest section, the two simple scents (orange; lemon) were combined into a single simple scent condition for analytic purposes; similarly the two complex scents (basil-lemon; basil-orange and with green teas) were combined into a single complex condition. Analyses support aggregating the data in this manner, given that there were no significant differences between the two simple scents regarding the dependent variable ($p > .54$), nor did any differences emerge between the two complex scent conditions ($p > .53$). The type of scent did not interact with the complexity manipulation ($p > .38$).

Measures. In-store sales served as the primary dependent variable. The survey instrument included an open-ended question that asked respondents how much money they had spent in the store during the shopping trip. Accuracy of participants' self-

reported expenditures were checked against sales receipts by the trained interviewer. The sales variable was highly dispersed and non-normally distributed sales, thus a logarithmic transformation was used to achieve a normal distribution (Fox, 2008). The survey also asked customers' about the characteristics of the ambient scent including: scent complexity (simple / complex; Levy et al, 2006), scent familiarity (unfamiliar / familiar Morrin & Ratneshwar, 2003), scent-store congruity (Spangenberg et al, 2006), and scent pleasantness (pleasant / unpleasant Spangenberg et al, 1996).

Results

Manipulation Check. The complex ambient scent condition ($M = 4.69$) was perceived to be more complex than the simple ambient scent condition ($M = 3.70$), $t(153) = 3.60, p < .01$. The simple scent condition did not differ from the complex scent condition in terms of familiarity, $t(154) = .45, p = .65$, congruity, $t(154) = 1.30, p = .20$, or pleasantness, $t(154) = 1.00, p = .32$. Overall the manipulation was successful.

Sales. An ANOVA model was estimated, including the 3 experimental conditions (simple vs. complex vs. control); log-transformed sales served as the dependent variable. Results indicated a significant impact of ambient scent on sales, $F(2, 182) = 8.08, p < .01; \eta^2 = .082$ (medium effect). As proposed, shoppers spent more money when exposed to a simple ambient scent ($M = 3.95$), versus a complex ambient scent ($M = 3.50$), $t(146) = 3.21, p < .01$, Cohen's $d = .53$ or no scent at all ($M = 3.37$), $t(108) = 3.84, p < .001$, Cohen's $d = .80$. Sales between complex and no scent conditions did not differ, $t(110) = .75, p > .45$.

Discussion

In support of H1, the results of study 1 support our proposition that a simple or fluent ambient scent leads to increased sales for shoppers in the presence of such a scent, as compared to a complex ambient scent or a non-scented retail setting. As anticipated, a simple ambient scent yielded increased sales, as compared to both the complex scent and the non-scented control condition. It is important to note that the only perceived difference between these scents was complexity and that the scents did not differ in terms of familiarity, congruity, or pleasantness. This research is the

first to provide empirical evidence that fluency can be applied to the context of olfactory stimuli. To understand the postulated underlying processes of fluency, we explore in study 2 the psychological process underlying the observed effects.

STUDY 2

A second field experiment was conducted in order to extend the findings described thus far, and to test for the underlying affective mechanism assumed with a fluency explanation of our findings. As proposed, we expect that affective responses to mediate the observed effects.

Method

Design, Participants and Procedure. The study utilized the same between-subjects design used in study 1 which included three conditions: simple scent (orange; lemon); complex scent (basil-lemon; basil-orange with green teas); and a no-scent control. The study took place in a different, but comparable, store to those used in the first field study, with similar size, product offerings, and target segment. The sample consisted of 220 shoppers; 77 customers were exposed to the simple scent, 90 customers to the complex scent and 53 customers were in the control condition when no ambient scent was present.

Measures. Customer expenditures and perceptions of the stores were collected, as in the first two studies. The pattern of the distribution of spending was the same as in study 1, thus the same transformation was applied. In addition, shoppers were also asked to provide their affective response or reaction towards the store to serve as the process variable. This mediator was assessed on a 4-item scale (unpleasant / pleasant; negative / positive; unattractive / attractive; ugly / beautiful (Crowley, 1993; Fisher, 1974; Spangenberg et al., 1996 measured on a seven-point Likert-type scale (Cronbach's Alpha = .91).

Results

Manipulation Check. The complexity manipulation was successful. In particular, the complex ambient scent condition ($M = 4.81$) was perceived as being more com-

plex than the simple scent condition ($M = 4.25$), $t(147) = 2.21$, $p = .03$. The simple scent condition did not differ from the complex scent condition in terms of familiarity, $t(147) = 1.83$, $p = .07$, congruity, $t(147) = 1.60$, $p = .11$, or pleasantness, $t(146) = 1.78$, $p = .08$.

Sales. An ANOVA demonstrated a significant effect of ambient scent on sales, $F(2, 198) = 3.86$, $p < .05$; $\eta^2 = .038$ (small to medium effect). Shoppers spent more money when exposed to a simple ambient scent ($M = 3.63$), as compared to a complex ambient scent ($M = 3.24$), $t(149) = 2.74$, $p < .01$, Cohen's $d = .53$ or no scent at all ($M = 3.25$), $t(117) = 2.15$, $p < .05$, Cohen's $d = .80$. Sales between the complex and no scent conditions did not differ, $t(130) = .04$, $p > .95$.

If affect either partially or fully mediates the observed effects of scent on sales, the inclusion of affect as an additional independent variable in the analysis of sales should result in a reduction of the main effect of the simple ambient scent, in contrast to the control condition (Baron & Kenny, 1986). Thus, the mediating role of affective reaction in the preceding effects was tested via OLS regression: Results reveal that the conditions to establish mediation are met: (1) the independent variable (simple ambient scent vs. no scent control) had a statistically significant effect on the mediator (affective response) ($b = .69$, $p < .001$), and (2) the mediator (affective response) had a statistically significant effect on the dependent variable (spending), controlling for the effects of the independent variable ($b = .29$, $p = .01$). The direct effect of the simple ambient scent on spending ($b = .38$; $p = .03$) was significantly mediated by consumers affective responses, such that when consumers' affective reactions are included in the model, the relationship weakens such that the b coefficient decreases and becomes non significant ($b = .17$, $p > .35$). The Sobel test reached statistical significance ($p = .03$). A similar set of models were also conducted for the complex scent (in comparison to the control condition), and there were no effects among the variables included in the model.

Discussion

The results of study 2 provide support for hypothesis 2 by demonstrating that the effect of a simple scent on customer spending is mediated by affective reactions of the shopper. As expected from the fluency literature, consumers' affective reactions

fully mediated the relationship between the fluent ambient scent and customer purchase behavior.

GENERAL DISCUSSION

Research has clearly demonstrated that olfactory cues can influence the perceptions and behaviors of consumer markets. Extant literature also reports that congruency of a scent with product offerings and or the retail environment itself can moderate observed effects. Further, technological progress and application with regard to use of scent in the marketplace is evident. Despite this increased commercial interest, however, research investigating the impact of scent on actual behavior, and identifying theoretical underpinnings or process evidence for observed effects is limited. Indeed, nearly all prior work has merely relied upon, or assumed, the rather simplistic S-O-R model of environmental psychology rather than push for more thorough theoretical explanation. Our research begins to address this dearth of explanation by identifying and presenting empirical evidence for fluency as a theoretically meaningful concept. The notion of fluency can be used to help explain prior demonstrations of olfactory effects found in the literature. Consumer attitudes toward a real store, its actual products, and their intention to loyally patronize the store, as well as actual consumer purchases, were significantly impacted by scents varying with regard to fluency. Simple or more fluent scents led to more positive responses from customers. Less fluent scents had no effect on retail patrons as compared to the scents considered more fluent. As predicted, the consumers affective reactions fully mediated the effects of scent on purchase behavior.

Both practical and theoretical contributions emerge from the two field experiments reported with our findings serving to contribute to both the fluency literature and the literature on atmospherics. First, we provide empirical evidence that complexity—an objective method of manipulating the stimuli based on processing fluency—of ambient scent moderates the effect of scent on consumers' responses within a retail store. Further, we show that the effects of scent are mediated by affective reactions of shoppers. Results of study 1 show that, contrary to the conclusions drawn by many retailers attempting to implement the findings of earlier work on olfactory

retailing stimuli, not just any pleasant ambient scent will impact consumer cognitions and behaviors as firms might desire. While simple and complex scents may be similar in terms of congruency with a given retail setting (or product category), we find that a simple, or experienced fluent, ambient scent is best for eliciting positive consumer responses. Complex scents may be just that—too complex to allow fluent consumer processing and therefore, these scents do not elicit the responses from consumers that are desired by retailers, namely greater sales. Further, we see in our second study that, consistent with the literature on fluency, consumers' affective reactions to a cue fully mediate the relationship between a fluent (or simple) ambient scent and customer purchase behavior. Thus, our work moves beyond the (now demonstrated inaccurate) conclusions of earlier research suggesting that any pleasant, congruent scent should positively impact (from the retailer's perspective) customer behavior. Thus, this work encourages consideration of future research employing the unique stimulus manipulation of fluency and its potential explanatory power within the field of environmental psychology.

Our work is of further practical importance in that, while conventional wisdom holds that scents influence bottom line outcomes in the market, there is little evidence that this is the case. The effect of ambient scent on actual sales is rarely seen in the literature (see Spangenberg et al., 2006 for exception) in an actual retail environment with actual shoppers. This work provides real-world evidence, suggesting that practitioners may feel more confident in using such manipulations and findings than those of some earlier published work.

REFERENCES

- Bone, Paula Fitzgerald and Pam Scholder Ellen (1999), "Scents in the Marketplace: Explaining a Fraction of Olfaction," *Journal of Retailing*, 75 (Summer), 243-62.
- Bornstein, Robert F. (1989), "Exposure and Affect: Overview and Meta-Analysis of Research, 1968-1987," *Psychological Bulletin*, 106 (September), 265-89.
- Bosmans, Anick (2006), "Scents and Sensibility: When do (In)congruent Ambient Scents Influence Product Evaluations," *Journal of Marketing*, 70 (July), 32-43.
- Chebat, Jean-Charles and Richard Michon (2003), "Impact of Ambient Odors on Mall Shoppers' Emotions, Cognition, and Spending: A Test of Competitive Causal Theories," *Journal of Business Research*, 56 (July), 529-39.
- Cohen, Joel B. and Charles S. Areni (1991), "Affect and Consumer Behavior," in *Handbook of Consumer Behavior*, Thomas S. Robertson and Harold H. Kassarian, eds. Englewood Cliffs, NJ: Prentice Hall, 188-240.
- Fox, John (2008), *Applied Regression Analysis and Generalized Linear Models*. Thousand Oaks, CA: Sage Publications.
- Goldstein, E. Bruce (1996), *Sensation and Perception*, 4th ed. Pacific Grove, CA: Brooks/Cole Publishing.
- Halberstadt, Jamin B. and Gillian Rhodes (2003), "It's Not Just Average Faces That Are Attractive: Computer-Manipulated Averageness Makes Birds, Fish, and Automobiles Attractive," *Psychonomic Bulletin and Review*, 10 (March), 149-56.
- Hirsch, Alan (1995), "Effects of Ambient Odors on Slot Machine Usage in a Las Vegas Casino," *Psychology & Marketing*, 12 (October), 585-94.
- Labroo, Aparna A. and Angela Y. Lee (2006), "Between Two Brands: A Goal Fluency Account of Brand Evaluation," *Journal of Marketing Research*, 43 (August), 374-85.
- Lee, Angela Y. and Aparna A. Labroo (2004), "The Effect of Conceptual and Perceptual Fluency on Brand Evaluation," *Journal of Marketing Research*, 49 (May), 151-65.
- Lévy, C. M., A. MacRae, and E. P. Köster (2006), "Perceived Stimulus Complexity and Food Preference Development," *Acta Psychologica*, 123 (November), 394-413.

- Milliman, Ronald E. (1982), "Using Background Music to Affect the Behavior of Supermarket Shoppers," *Journal of Marketing*, 46 (April), 86-91.
- Mitchell, Deborah J., Barbara E. Kahn, and Susan Knasko (1995), "There's Something in the Air: Effects of Congruent or Incongruent Ambient Odor on Consumer Decision Making," *Journal of Consumer Research*, 22 (September), 229-38.
- Morrin, Maureen and S. Ratneshwar (2003), "Does It Make Sense to Use Scents to Enhance Brand Memory?" *Journal of Marketing Research*, 40 (February), 10-25.
- Reber, Rolf and Norbert Schwarz (2006), "Perceptual Fluency, Preference, and Evolution," *Polish Psychological Bulletin*, 37 (1), 16-22.
- Reber, Rolf, Piotr Winkielman, and Norbert Schwarz (1998), "Effects of Perceptual Fluency on Affective Judgments," *Psychological Science* 9 (January), 45-48.
- Schwarz, Norbert (2004), "Metacognitive Experiences in Consumer Judgment and Decision Making," *Journal of Consumer Psychology*, 14 (4), 332-48.
- Spangenberg, Eric R., Ayn E. Crowley, and Pamela W. Henderson (1996). "Improving the Store Environment: Do Olfactory Cues Affect Evaluations and Behaviors?" *Journal of Marketing*, 60 (April), 67-80.
- Spangenberg, Eric R., David E. Sprott, Bianca Grohmann, and Daniel L. Tracy (2006), "Gender-Congruent Ambient Scent Influences on Approach and Avoidance Behaviors in a Retail Store," *Journal of Business Research*, 59 (November), 1281-87.
- Zajonc, Robert B. (1968), "Attitudinal Effects of Mere Exposure," *Journal of Personality and Social Psychology Monographs*, 9 (2, Pt. 2), 1-27.

Informationen über die Mitarbeit der Ko-Autoren

Die vorliegenden Artikel wurden hinsichtlich der Idee, Ausführung und schriftlichen Verfassung in wesentlichen Teilen selbständig von Friederike Haberland erstellt.

Die Ko-Autoren haben den Forschungsprozess begleitet, in dem sie Input und Anregungen geliefert haben im Hinblick auf die Erstellung des experimentellen Designs sowie die methodische Auswertung.

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