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Research note

Odors and consumer behavior in a restaurant

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Abstract

Several studies have shown that odors have an effect on human behavior. Consumer's behavior is also affected by odors. An experiment was carried out in a restaurant where lemon and lavender aromas were diffused and compared to a no-aroma control condition. Results showed that lavender—but not lemon aroma—increased the length of stay of customers and the amount of purchasing. The hypothesis that lavender produces a relaxing effect is offered to explain the results.

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1. Introduction

Various experimental studies have showed that aromas have a positive impact on human behavior, emotions and cognition. Baron and Bronfen (1994) achieved an increase in the performances of difficult cognitive tasks when diffusing a pleasant perfume. Following aromatherapy, Diego et al. (1998) found that subjects performed more rapidly a math computation task. Baron and Kalsher (1998) found that pleasant fragrance enhanced some aspects of driving performance when participants

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performed a simulated driving task with an ambient lemon aroma present in the driving room. Physical performance is also affected by odors. [Raudenbush et al. \(2001\)](#) found that peppermint odor affected athletic task performance. In an experiment, athletes undertook various physical tasks (basketball free-throw shots, 400 m dash, etc.) with or without an odorized peppermint adhesive strip under the athlete's nose. Results showed that the peppermint odor condition resulted in increases the running speed, the hand grip strength and number of push-ups but had no effect on basketball free-throw shots.

Helping behavior is also positively affected by ambient aromas. [Baron \(1997\)](#) observed that people in a region of a mall with pleasant food odors (pastry, coffee shop) were more willing to accept a request for change from a male confederate than persons in a zone with neutral odors (clothing shops, etc.). [Grimes \(1999\)](#) has shown that students agreed to spend more time on voluntary work when they were exposed to a vanilla or lavender odor before the request. Also, [Baron and Bronfen \(1994\)](#) showed that subjects exposed to a pleasant odor during a learning task offered their collaboration more easily to the experimenter asking for help at the end of the task. [Guéguen \(2001\)](#) showed that, on a pedestrian walk, a woman confederate who was instructed to drop apparently without noticing a packet of paper handkerchiefs or a glove was helped more often by pedestrians when she wore a perfume.

To date various studies have showed that ambient aromas influence consumer behavior. Scents appear to be relevant to two forms of consumption: product evaluation (for example scent products) and sale's environment (for example ambient aroma). Pleasant scents directly affected the evaluation of a product. In an early experiment, [Laird \(1932\)](#) found that 50% of subjects preferred narcissus scented socks while only 8% preferred the unscented socks. [Haller et al. \(1999\)](#) found that neonatal experience with vanilla influences more than 25 years later, preference for vanilla-flavored foods. [Bone and Janatria \(1992\)](#) found that scent that was appropriated with a product increased product evaluations. [Morrin and Ratnesnar \(2000\)](#) found that a pleasant ambient scent (geranium scent) improved brand evaluations especially for unfamiliar brands. These researchers also found that ambient scent increased recall of unfamiliar brand names.

Odors environment in a sales area seems to have a positive effect on consumers' behavior. [Knasko \(1989\)](#) showed that ambient aroma had a positive impact on the duration of time spent by consumers at a jewelry counter. This result was confirmed by [Lipman \(1990\)](#). Ambient aromas also affect gamblers' behavior ([Hirsch, 1995](#)). During one weekend a slot-machine area in a LasVegas Casino was odorized. The amount of money gambled in this area was compared to the amount of money gambled in the same area before and after odorization. The results showed that during the experimental weekend, the amount of money gambled was greater by an average of 45.1% compared to the weekend before and the weekend after the diffusion of the aroma. [Hirsch \(1995\)](#) showed no difference between the three weekends when comparing the amount of money gambled in a control slot-machine area which was non-odorized. The study also found that when the concentration was higher, larger amounts of money were gambled.

Despite frequent studies that showed that ambient aromas or odor have an effect on consumers' behavior, no studies have analyzed the effect of ambient scents in a restaurant setting. An experiment was carried out where two classical aromas used in many of the studies presented above were diffused in a restaurant in order to test their effect on consumers' behavior. Based on the results of previous studies, we hypothesized that scent would positively influence the length of time and the amount of money spent by the customers.

2. Method

2.1. Subjects

Eighty-eight patrons of a small pizzeria situated in a small town (3000 inhabitants) of Brittany in France. The restaurant where the experiment was carried out was very small (22 place settings) and proposed a small choice of dishes (17 pizzas, 4 meats, 3 fishes and 4 salads). The experiment was conducted from 8 pm to 11 pm during three Saturdays in May. Only one experimental condition was used for each period. The weather conditions were constant during this month. In all the cases the customers were not alone but the groups were not larger than five individuals. Post hoc comparison showed no difference in the group sizes between the three experimental conditions.

2.2. Procedure

The aromas were diffused by the way of three electric fragrance diffusers. The diffusers were placed in three wall sockets that were spread in the restaurant. By this way, the concentration of smell was similar in any point of the room. In each diffuser the same natural oil was applied to the diffuser. Two different aromas were used: natural essential oil of lavender and of lemon. Lavender is considered as a relaxing odor whereas lemon is considered as a stimulating odor (Diego et al., 1998).

3. Results

The length of time and the amount of money spent in the restaurant were the two dependent variables in our experiment. The means obtained in the three experimental conditions are presented in Table 1.

A one-way ANOVA was conducted to analyze the difference between the three conditions. With the means of length of time, an overall difference was found ($F(2/87) = 10.89, p < 0.001$). Post-hoc comparison showed that lavender condition was different than no-odor control condition ($t(59) = 4.25, p < 0.001$) and of lemon condition ($t(57) = 3.98, p < 0.001$) whereas no difference was found between lemon condition and the no-odor control condition ($t(57) = 0.38, ns$). With the amount of money spent by the customers, an overall difference was found ($F(2/87) = 20.14,$

Table 1

Mean length of time and amount spent under the two aroma conditions and the control condition

	No-odor ($n = 30$)	Lemon ($n = 28$)	Lavender ($n = 30$)
<i>Length of time spent in the restaurant (in minutes)</i>			
Mean	91.3	89.8	105.7
SD	14.9	15.4	13.1
<i>Amount of money spent (in Euros)</i>			
Mean	17.5	18.1	21.1
SD	2.40	2.21	2.35

$p < 0.001$). Two by two comparisons revealed the same pattern of results. The lavender condition appeared to be different than the no-odor control condition ($t(59) = 5.87$, $p < 0.001$) and the lemon condition ($t(57) = 4.83$, $p < 0.001$) but no difference was found between lemon condition and the no-odor control condition ($t(57) = 1.15$, ns).

In order to test the statistical relation between the two dependant variables, a Bravais–Pearson's correlation test was conducted. A significant positive relation was found between length of time and amount of money spent ($r(86) = 0.47$, $p < 0.02$). When length of time increased, the amount of money spent increased.

4. Discussion

The results confirmed the hypothesis that scents have an influence on restaurant customers' behavior. The study found that both length of time and the amount of money spent were positively affected by lavender. However, the lemon aroma was found to have no effect on either the above two variables. These results have both theoretical and practical implications. From a practical perspective the study found that aroma affected consumers' behavior in a new consumption environment. Previous studies have found that aroma affected various consumer behaviors like length of time spent in a commercial area (Knasko, 1989; Lipman, 1990) or gambling behavior (Hirsch, 1995). Our results show, for the first time, that scents can also affect the behavior of restaurant customers. These studies taken together support the position that scents could influence many consumption environments.

We suggest that the positive effect that the lavender scent had on the length of time spent in the restaurant was caused by its relaxing effect (Diego et al., 1998). Studies found that lavender increased drowsiness (Buchbauer et al., 1993) and induced sleep (Van Toller, 1988). Therefore lavender seemed to relax people which in return led them to stay longer in the area where this smell was diffused. Perhaps, this relaxation effect, in return, had an influence on expenditures; when relaxing, the customers ordered additional items including alcohol and/or coffee and thus increased the amount spent. However, no such effect was found with the lemon aroma. Unlike

lavender, lemon is considered a stimulating odor (Diego et al., 1998) that did not induce customers to stay longer and, in return, to order more items.

Naturally, this study has some limitations. Only one restaurant was used in the experiment and the sample of customers tested was relatively small ($n = 88$). Therefore at this stage it would be impossible to generalize the results to other restaurants. However, given previous research that showed an effect of scent on customers' purchasing behavior, and if the results of this study would be confirmed in other restaurant studies, it would be advantageous for restaurant managers to use scents like lavender to create a relaxing effect on their customers and increase their expenditures.

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