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THE EFFECT OF CROSSMODAL CONGRUENCY BETWEEN AMBIENT SCENT AND THE STORE ENVIRONMENT ON CONSUMER REACTIONS

Abstract

Previous research found that ambient scents used by retailers should be pleasant and product congruent. This paper proposes that an ambient scent should also be crossmodally congruent with the store environment. Crossmodal congruency refers to the shared crossmodal correspondences (i.e., tendency of a sensory attribute to be associated with an attribute in another sense) of the ambient scent and the store environment. In this study, a scent crossmodally congruent with the store, a scent crossmodally incongruent with the store and a no scent condition were compared. Results revealed that crossmodal congruency between store and ambient scent leads to higher approach behaviour. Furthermore, positive effects were found when comparing the congruent scent with the no scent condition on pleasure, store (environment) evaluation, and word-of-mouth. It is therefore proposed to include crossmodal congruency between ambient scent and store environment as a criteria when selecting an ambient scent.

Keywords: Ambient scent, Crossmodal congruency, Store atmospherics

Track: Retailing

1. Introduction

The effects of an ambient scent is commonly regarded by marketeers in terms of an atmospheric stimulus triggering an affective or cognitive response which could encourage consumers to engage in either approach or avoidance behaviour (e.g., Mehrabian & Russel, 1974; Gulas & Bloch, 1995). Several marketing scholars have further studied the positive effects that an ambient scent might have on store and product evaluations as well as on information processing and variety-seeking behaviours (e.g., Doucé, Poels, Janssens, & De Backer, 2013; Spangenberg, Sprott, Grohmann, & Tracy, 2006). In line with the model of Bone and Ellen (1999), these studies indicated the most important dimensions of an ambient scent are: (1) its presence, (2) its pleasantness, and (3) its congruity with the object under investigation.

The pleasantness of an ambient scent is a necessary but not a sufficient criterion in order to produce the desired consumer reaction. For instance, it has been shown that the presence of a pleasant ambient scent only has a positive effect on consumer reactions when it is congruent with the store and its products (e.g., Spangenberg et al., 2006). Studies indicating positive effects following a congruency between the scent and the product category (Bone & Jantrania, 1992; Bosmans, 2006; Doucé et al., 2013) as well as between the scent and the store's theme (Fiore, Yah, & Yoh, 2000) further highlighted the importance of the scent's congruency with the products offered.

Although scent pleasantness and product congruency might indeed fulfil the criteria to trigger the desired consumer reaction, the importance of congruency with the atmospheric elements and surrounding environment has also been mentioned (Gulas & Bloch, 1995). In this paper it is stated that a third important criterion might be the congruency of the ambient scent with the crossmodal correspondences elicited by a store environment. A crossmodal correspondence refers to the tendency of one sensory modality to be matched with another sensory modality (Spence, 2012). The presence of a sensory cue in the store environment (e.g., the colours used) might trigger an expectation with respect to for instance the tactile sense (e.g., expected temperature). In this study, the view is that if the ambient scent triggers the same expectations as the store environment then the ambient scent and the store environment are crossmodally congruent.

Given that an ambient scent should be pleasant and congruent with the products offered in the store, we examined the importance of crossmodal congruency. In particular, we propose that a crossmodally congruent ambient scent will lead to more positive effects compared to the use of a crossmodally incongruent ambient scent. Congruency effects can be explained by the fact that an ambient scent can function as a prime (e.g., Schab, 1991; Smeets & Dijksterhuis, 2014). Priming refers to incidental perceptual stimulation that improves the accessibility of concepts that will be used for subsequent information processing (Smeets & Dijksterhuis, 2014). On the one hand, a pleasant scent can be an affective prime, which means that the scent can trigger an overall positive consumer reaction. On the other hand, scents can also function as semantic primes (i.e., cognitive priming; Smeets & Dijksterhuis, 2014). When consumers perceive a scent, an automatic knowledge activation process may unconsciously begin (Schifferstein & Blok, 2002). The scent then activates stored knowledge, making certain concepts temporarily more accessible. Semantic priming might lead to conceptual fluency when the information activated by the prime (e.g., scent) fits with the target element (e.g., a store). Conceptual fluency is a particular form of processing fluency, which indicates the experienced ease by which an external stimulus is processed (Schwarz, 2004). In particular, it refers to how readily the stimulus comes to mind and how easily its meaning is grasped (Lee & Labroo, 2004). This means that when a scent which is congruent with the target, primes target-associated concepts and information the target and its meaning are

conceptually fluent and can be processed easier because they are more accessible in the consumer's mind. As a result, they experience a positive affective state that can be accredited incorrectly to the target rather than to the ease of processing (Winkielman, Schwarz, Fazendeiro, & Reber, 2003).

In this paper the following hypotheses are thus tested:

H1: A crossmodally congruent ambient scent will have a positive effect on (a) pleasure, (b) store environment evaluation, (c) store evaluation, (d) product evaluation, (e) approach behaviour, (f) intention to revisit, and (g) word-of mouth compared to when no ambient scent is added.

H2: A crossmodally incongruent ambient scent will have a positive effect on (a) pleasure, (b) store environment evaluation, (c) store evaluation, (d) product evaluation, (e) approach behaviour, (f) intention to revisit, and (g) word-of mouth compared to when no ambient scent is added.

H3: A crossmodally congruent ambient scent will have a positive effect on (a) pleasure, (b) store environment evaluation, (c) store evaluation, (d) product evaluation, (e) approach behaviour, (f) intention to revisit, and (g) word-of mouth compared to a crossmodally incongruent ambient scent.

2. Methodology

2.1. Measuring the crossmodal correspondence index

In order to determine the crossmodal correspondences elicited by the store (i.e., a store selling cooking materials), a first pretest was conducted among 30 customers who were present in the store. They were asked to rate the store on 11 bi-polar items. The choice of which items to include in the crossmodal correspondence index was based upon sensory attributes which were used in previous crossmodal research (e.g., Crisinel, Jones, & Spence, 2012; Crisinel & Spence, 2012) and represented the visual, the auditory and the tactile sense (i.e., a star shape versus a spot shape, bright versus dim, cold versus hot, fragile versus sturdy, high versus low, light versus dark, light versus heavy, loud versus quiet, rough versus smooth, shallow versus deep and soft versus hard). The 11 items were presented by a 100 millimetre Visual Analogue Scale with the (neutral) midpoint of the scale indicated by a vertical line.

Items referring to the taste sense were not included since this sense is not directly used when evaluating a store environment. Items referring to the olfactory sense were also not included because of the nature of crossmodal correspondences (i.e., for this study crossmodal correspondences which are elicited in another sense by an olfactory cue).

2.2. Selection of the ambient scents

A second pretest was conducted to find two pleasant, product congruent, ambient scents: one which is crossmodally congruent with the store and one which is crossmodally incongruent with the store. Sixteen scents (i.e., Apple Pie, Bakery, Banana, Belgian Waffle, Chocolate, Cinnamon, Cinnamon Cookies, Coffee, Cotton Candy, English Drop, Green Apple, Lemon, Peach, Popcorn, Red Berries and Vanilla) were selected from scents available to the researchers based upon their relation to cooking and food. 30 respondents were then asked to rate these 16 scents on the crossmodal correspondence index. In addition, these 30 respondents were asked to rate the pleasantness and arousal of the scent on a 7-point scale.

The scores of the 16 scents were consequently analysed in order to identify the scents that were evaluated equally or more pleasant as well as equally or more arousing than the scale midpoint (i.e., 4). The following 12 scents were selected due to their fulfilment of this criteria:

Apple Pie, Banana, Chocolate, Cinnamon, Coffee, Cotton Candy, English Drop, Green Apple, Lemon, Peach, Red Berries and Vanilla.

A second step was the calculation of the absolute difference between the scores on the bi-polar items of the store on the one hand and of the scent on the other hand. The average of these differences is labelled as the crossmodal congruency score (CMCS; a score between 0 and 100). The scent which resulted in the lowest score (and thus difference with the store) was the scent which was most congruent, while the scent with the highest score was least congruent with the store environment. Based upon the results, the scent of Coffee is the least congruent scent (CMCS = 25.48) while the scent of Vanilla is the most congruent scent (CMCS = 8.46). However, follow-up analyses indicated that these two scents significantly differ from each other on pleasantness (i.e., $F(1;29) = 3.79$, $p = .06$). Further analyses were done so that a best combination of scents could be found (i.e., lowest respectively highest crossmodal congruency score and not significantly different from each other on pleasantness and arousal). The combination which met these criteria was the combination of Coffee (least crossmodally congruent scent: CMCS = 25.48) and Apple Pie (most crossmodally congruent scent: CMCS = 13.15). Coffee and Apple Pie do not significantly differ on pleasantness (i.e., $F(1;29) = .08$, $p = .78$) or on arousal (i.e., $F(1;29) = .63$, $p = .43$).

A last and third pretest was conducted in order to determine if the chosen scents are indeed congruent with the products. Coffee, Apple Pie and four filler scents (i.e., Lemon, Mint, Peach and Red Berries) were presented to a third group of 30 customers present in the store. The participants were asked to indicate on a 7-point scale in which degree they found the scent to be congruent to the theme of the store (Bone & Jantrania, 1992). Analyses showed that Coffee and Apple Pie did not differ significantly from each other in terms of thematic congruency (i.e., $F(1;29) = 1.80$, $p = .19$). Coffee was thus selected to represent the pleasant, product congruent and crossmodally congruent scent, while Apple Pie was selected to represent the pleasant, product congruent and crossmodally incongruent scent.

2.3. Procedure, Participants and Dependent Variables

In the main study there were three conditions: a) no ambient scent, b) a crossmodally congruent ambient scent (i.e., Apple Pie) and c) a crossmodally incongruent ambient scent (i.e., Coffee). In each condition a total of 40 customers (84 % female, $M_{age} = 37.12$) who were present in the store were asked at the end of their visit to complete a questionnaire consisting of seven parts.

By means of 7-point semantic differentials, the questionnaire included following variables: 1) six items related to pleasure (e.g., happy/unhappy; summated scale; $\alpha = .88$; Mehrabian & Russell, 1974); 2) 13-items environmental quality scale of Fisher (1974) and the item of pleasantness as advised by Spangenberg, Crowley and Henderson (1996) and Mattila and Wirtz (2001) to measure the effect on the customer's evaluation of the store environment (mean of 14 items; $\alpha = .94$); 3) five items measuring the customers' overall assessment of the store (e.g., outdated/modern; summated scale; $\alpha = .94$; Spangenberg et al., 1996); 4) eight items measuring customers' evaluation of the products (e.g., unpleasant/pleasant; factor and reliability analysis suggested the deletion of the item low prices/high prices; mean of remaining seven items; $\alpha = .82$; Spangenberg et al., 1996; Bellizzi, Crowley, & Hasty, 1983); 5) eight statements measuring approach behaviour in line with Donovan and Rossiter (1982) (factor and reliability analysis suggested the deletion of the item "I spend more money than originally planned"; mean of remaining seven statements; $\alpha = .84$); 6) a single question directed at measuring the intent of the customer to return to the store (Spangenberg et al., 1996); and 7) three statements with respect to the intended word-of-mouth (e.g., how likely is

it that you encourage friends and relatives to do business with this store; mean of three items; α = .90; Zeithaml, Berry, & Parasuraman, 1996).

3. Results

For each dependent variable in this study a one-way ANOVA was conducted. Results show an overall significant main effect for pleasure ($F(2;117) = 6.57$, $p = .002$) and approach behaviour ($F(2;117) = 3.28$, $p = .04$) as well as an overall marginally significant main effect for word-of-mouth ($F(2;117) = 2.35$, $p = .099$). A comprehensive overview of the results appears in Table 1.

LSD Post hoc tests revealed that the presence of a crossmodally congruent ambient scent leads to more pleasure, a more positive evaluation of the store environment, and a more positive evaluation of the store than when no ambient scent is diffused. Additionally, the presence of a crossmodally incongruent ambient scent also leads to more pleasure, a more positive evaluation of the store environment, and a more positive evaluation of the store than when no ambient scent is diffused. These results support H1a, b, c and H2a, b, c.

For word-of-mouth, only the presence of a crossmodally congruent ambient scent leads to more positive reactions than when no ambient scent is diffused, supporting H1g.

Concerning approach behaviour, the presence of a crossmodally congruent ambient scent has a positive influence on approach behaviour compared to when no ambient scent is diffused. In addition, the presence of a crossmodally congruent ambient scent has a positive effect on approach behaviour compared to the presence of a crossmodally incongruent ambient scent. These results support H1e and H3e.

With respect to product evaluation and intention to revisit, no significant differences are found.

Table 1. Summary of one-way ANOVA's and LSD post hoc tests

Dependent variables	*F*	*p*	*M (SD)*		
			No scent (a)	Congruent scent (b)	Incongruent Scent (c)
Pleasure	6.57	.002	5.45^{bc} (.93)	6.10^{a} (.73)	5.97^{a} (.84)
Store environment evaluation	2.22	.11	5.99^{bc} (.94)	6.27^{a} (.60)	6.31^{a} (.65)
Store evaluation	2.18	.12	6.06^{bc} (1.15)	6.39^{a} (.67)	6.40^{a} (.57)
Product evaluation	1.33	.27	5.83 (.69)	6.08 (.74)	5.94 (.69)
Approach behaviour	3.28	.04	$5.33^{\mathbf{b}}$ (.92)	$5.81^{\mathbf{ac}}$ (1.00)	$5.41^{\mathbf{b}}$ (.75)
Intention to revisit	.70	.50	6.08 (.83)	6.28 (.91)	6.28 (.88)
Word-of-mouth	2.35	.10	$5.78^{\mathbf{b}}$ (1.01)	$6.18^{\mathbf{a}}$ (.80)	6.08 (.81)

Note LSD Post Hoc tests: no correction was used because of a priori hypotheses
Superscripts indicate a significant difference at p < .01 (in bold when p < .05 and in italics when p < .10) with the mean of the respective column

4. Discussion

The aim of this study was to examine whether the crossmodal congruency between an ambient scent and the store environment is a criteria worth considering when selecting an ambient scent. We found that the presence of a pleasant and product congruent ambient scent, whether or not crossmodally congruent with the store environment, has a positive influence on pleasure experienced in the store, store environment evaluation, and store evaluation compared to the absence of an ambient scent. This result indicates that crossmodal congruency does not necessarily lead to more positive effects. However, only an ambient scent that is crossmodally congruent has a positive effect on word-of-mouth and approach behaviour compared to the no scent condition. Moreover, a crossmodally congruent ambient scent also has a positive influence on approach behaviour compared to a crossmodally incongruent ambient scent. Thus, our results reveal that the use of a pleasant, product congruent and crossmodally congruent ambient scent holds some benefits.

The crossmodal correspondence index and crossmodal congruency score presented in this paper are fairly new concepts and are - in this study - based upon 11 items. It is therefore plausible that other items could be more important or be of particular relevance with respect to the dependent variables for which no effects were found in this study. Due to the effects that were found in this study, the further development of the crossmodal correspondence index and crossmodal congruency score is advised and recommended. One possible further development is the selection of additional items and the assessment whether the items included in the index presented in this paper are sufficient to capture the crossmodal correspondences elicited by a store environment. In particular, in the index presented in this paper no items referring to the sense of taste were included. Although certain researchers state that the crossmodal associations concerning taste might be of particular relevance to food product marketeers since an application can be found in the naming, labelling and packaging of food products (Crisinel et al., 2012), it might be expected that for stores that have an affinity with food crossmodal correspondences with respect to taste might also be elicited.

A second recommendation is the exploration of the boundaries of the crossmodal congruency index. Although this index has a theoretical minimum and maximum (i.e., zero and 100), further research might indicate that the expected minimum and maximum of the index are actually closer together and finding a more incongruent scent might not be possible.

A last recommendation is to explore whether the crossmodal congruency index and its application depends on the type of store. It is logical to expect that the importance of crossmodal congruency is dependent upon the store’s theme, its products and offerings and the degree in which the store uses sensory marketing.

Our results have some practical implications. So far, retailers who are considering using an ambient scent or who are considering switching to another ambient scent, have been advised to take into account the pleasantness and scent’s congruency with the products. We suggest that retailers should also beware of the crossmodal congruency between the scent and the store. The degree of crossmodal congruency might have an effect on the approach behaviour and word-of-mouth and therefore be of particular relevance to a retailer.

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