Consumer reactions to olfactory congruence with brand image

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ABSTRACT

Store managers tend to select odors based upon their pleasing nature without taking into account the notion of congruence between the odor and the brand image. Studies have explored the effects of odors, but little attention has been paid to olfactory congruence, and even less to olfactory congruence with the brand image. This study investigates the impact of olfactory congruence with the brand image upon consumers. The results show the positive effect of olfactory congruence upon spending, attitude, pleasure, arousal, and perception of the store atmosphere. In the strong olfactory congruence condition being tested, these reactions are more positive than in the weak congruence and control conditions.

1. Introduction

People are often viewed as belonging to a microsmatic species whose olfactory performance is reduced compared with that of other species. However, it is now accepted that humans are able to discriminate 10,000 odors (Gilbert, 2008), and research indicates that this number could be underestimated. The truth might be closer to a thousand million odors (Bushdid et al., 2014). Therefore, it is difficult to imagine that the fragrant world around us has no effect on our reactions (Herz, 2008) or that these olfactory abilities could be poorly used. Companies are increasingly encouraged to use this extraordinary power of the human sense of smell and the extraordinary powers of odors in their activities, and olfactory marketing is developing in various domains (Krishna, 2013) such as fashion (Abercrombie & Fitch), jewelry (Tag Heuer), and distribution (Hugo Boss).

Practitioners are aware of the role of olfactory congruence in improving marketing performance in different sectors. For example, the Marignan Hotel has adopted an olfactory signature specifically created to enhance the brand image. According to the Los Angeles Times (2014), Hugo Boss has an olfactory signature based on "rich tamboti wood scent" in the stores to enhance clients' visiting experience. Olfactory marketing is also attracting growing interest from the media and consumers. The latter spend an increasing amount of money purchasing scented candles to aromatize their homes (New York Times, 2016).

In practice, however, the use of fragrances has remained mostly intuitive (Mitchell et al., 1995), but its complex setting up and its effects upon employee and customer behaviors call for the analysis of its effectiveness (Teller and Dennis, 2012). Managers should not select odors based on their pleasant quality only; they should also consider the level of congruence between the odor and the other attributes of the brand, including image.

In this regard, published research has shown the value for professionals of considering other criteria such as olfactory congruence with the other components of the brand (e.g. music) for a successful deployment of the olfactory marketing strategy (Mattila and Wirtz, 2001; Spangenberg et al., 2005). Adams and Doucé (2017) emphasize the importance of taking the congruence between odor and other entities (e.g. product category, other atmosphere factors) into account, in addition to the pleasant quality of odors. Consumers need to perceive an odor as corresponding to their view of the brand image. Consumers may be receptive to this feature, which may contribute to their response (whether positive or negative).

In parallel with the development of the aforementioned managerial practices, many studies have investigated the effects of atmospheric stimuli on consumer reactions for more than 30 years (see the meta-analysis of 66 studies and 135 effects (N = 15621) on the atmospheric effects of music, scent, and color conducted by Roschk et al. (2017). Multidisciplinary research has examined the effects of odors upon consumers (Herz, 2008; Ferdenzi et al., 2016; Kivioja, 2017; Amsteus

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et al., 2015; Spangenberg et al., 2006). Marketing research has investigated the impact of odors on consumer reactions through several approaches: the influence of their presence (vs. absence) (Chebat and Michon, 2003), intensity (Spangenberg et al., 1996), complexity (Herrmann et al., 2013), and congruence (Mattila and Wirtz, 2001). Examination of the literature shows that the issue of the influence of the presence (vs. absence) of odors (Doucé and Janssens, 2013; Guéguen and Petr, 2006) is predominant in comparison with other research perspectives, particularly olfactory congruence. Research related to olfactory congruence has focused on the influence of congruence between odor and product (Doucé et al., 2013), odor and music (Spangenberg et al., 2005), odor and gender (Spangenberg et al., 2006) and odor and density (Poon and Grohmann, 2014).

However, although olfactory congruence is examined in several studies and managerial practice in olfactory marketing is developing in terms of olfactory congruence, no studies have examined consumers' perception of the congruence between odor and brand image and the effects of this perception on their reactions. Thus, it is not enough to use an odor that 'smells good' or that is congruent with the product, sensory environmental factors, and gender; it is also necessary that consumers should perceive it as consistent with the brand image. Hence, the influence of olfactory congruence with the brand image requires investigation because we do not yet know how consumers perceive this olfactory congruence and whether this perceived congruence is so effective as to influence consumers' reactions. The present study is the first one seeking to provide empirical answers to these major issues for research and managerial practice.

Consequently, the study contributes to the research domain of olfactory marketing in various ways. First, this study is intended to contribute to existing knowledge on olfactory congruence through an investigation of the impact of olfactory congruence with the brand image upon consumers. Specifically, in line with previous research on store astmospherics (Roschk et al., 2017; Bosmans, 2006, Morrin and Ratneshwar, 2003), including studies on olfactory congruence (Mattila and Wirtz, 2001; Spangenberg et al., 2005), our aim is to verify the stability of the positive effects of olfactory congruence on consumer reactions that have been shown in previous studies but through investigating olfactory congruence with the brand image, not yet explored. Second, a literature review is conducted on the issue of the relationship between odors and consumers, and a conceptual framework is proposed. Third, previous research highlighted the explanatory role of olfactory congruence in consumer satisfaction, shopping, and intention to visit, but we do not have any knowledge of the explanatory role of olfactory congruence with brand image in various consumer reactions. Some hypotheses and dependent variables (e.g. intention to visit, satisfaction) were inadequately investigated previously; others (e.g. attitude towards space) are being examined for the first time in this paper.

In addition to its theoretical contributions, the study contributes to the managerial domain of olfactory marketing in various ways. First, the impact of olfactory congruence with the brand image upon consumers was tested on site, namely in a store, with real customers, and for the first time in the men's ready-to-wear sector. Using a real setting maximizes realism and ensures both external and internal validity. Second, the issue examined in this paper is fundamental for managers who want to associate scents with brand image. This study provides an opportunity to verify the effectiveness of managerial practices based on the use of scents that are congruent with the brand image, and our results show the value of developing an olfactory signature characteristic of the brand image.

Consequently, if practitioners work toward developing an olfactory signature that is congruent with their brand image, they could strengthen the core of their brand image and enhance its memory in the minds of consumers, and positively influence the consumer. This olfactory signature would also enable practitioners to differentiate themselves from the competition, improve their store atmosphere,

reinforce brand identity, and attract consumers successfully in an increasingly competitive market (Ward et al., 2003).

The remainder of the article is divided into three sections: Section 1 presents the theoretical framework and hypotheses, Section 2 outlines the methodology, and the final section presents the results and implications of the study.

2. Theoretical framework and hypotheses

2.1. Odors

An odor refers to "the specific impression some entities produce upon the sense of smell through their volatile fumes" (1880). How do we perceive smells? Which factors influence olfactory perception? Research on olfaction shows the specificities of olfactory perception and in particular the close relation between olfaction and cognition (Herz, 2005; Engen, 1991). This relation is attributable to the connection between odors and memory (Herz, 2008) as is demonstrated by Proust (1988) madeleine experience. Research has also shown people's significant capacities for detecting odors (Candau, 2000). Another specific feature of olfactory perception is that odors can be associated with their source (e.g. a product odor) (Dubois, 2006). Hence, odors operate as signals of the existence of something else than themselves (Dubois, 2006).

This association mechanism improves memorization of odors (Maille, 2001) and of the devices that produce them, and it facilitates discrimination between them. To assess an odor, people may refer to the scented object (e.g. the smell of a flower). A product odor deemed to be pleasant may foster a higher appreciation of the source through an emotional halo effect. Studies show the emotional power of the sense of smell (Herz, 2008; Gilbert, 2008). The sense of smell is essential to people's well-being (Herz, 2008) in the sense that our reactions to odors shape "our emotional, physical, and even sexual lives" (Herz, 2008, cover blurb, para. 2). People's sense of smell may alter their moods (Gilbert, 2008) and engender emotions shared by several cultures (e.g. revulsion, irritation, pleasure). This phenomenon is attributable to the connection between the sense of smell and the limbic system and the hypothalamus, which control people's emotional response system (Herz, 1997).

Studies show that odors may alter emotions (Engen, 1991), which may be rich and positive when they are activated by odors that evoke positive autobiographic memories (Herz, 2016). Odors possess a powerful evocative power and may induce memories (Herz, 2016; Gilbert, 2008). An odor connected to personal memories induces memories that are more emotionally charged and evocative than memories connected to visual or sound stimuli (Herz, 2004); the memories may also be long-lasting, sharp, and specific, owing to the close relation between the sense of smell and memory (Herz, 2008). These olfactory distinctive features incite practitioners to use odors (Herz, 2016) for marketing purposes (e.g. creating olfactory atmospheres that are hedonistic, nostalgic, or sources of escapism).

Studies indicate that olfactory perception is essentially subjective (Ferdenzi et al., 2016; Sorokowska et al., 2015). People are not equal regarding their ability to perceive odors, due to individual profiles and situational variables (e.g. culture, olfactory knowledge, gender) (Ferdenzi et al., 2013; Sorokowska et al., 2015; Gulas and Bloch, 1995), olfactory perception impairments, different perception capacities, and previous experiences (Gulas and Bloch, 1995).

2.2. Relationship between odors and consumers

Odors, whether perceived in isolation or with other entities (e.g. music, products), may induce emotions (e.g. pleasure, stimulation) (Helmefalk and Hultén, 2017; Mattila and Wirtz, 2001). Moods appear to be influenced by odors (Doucé and Janssens, 2013). Odors bring feelings of well-being and soothe anxiety (Naja et al., 2014). Product

odors induce feelings of surprise (Ludden and Schifferstein, 2009). Babin et al. (2004) show the negative effect upon emotions of weak congruence between ambience factors (e.g. music, odors, colors). Odors influence positively the evaluation of ambience (Bouzaabia, 2014), an evening, music (Schifferstein et al., 2011), products (Bosmans, 2006), and service (Naja et al., 2014). Odors influence positively the identification and recognition of brands (Gaygen, 2013), object memorization (Krishna et al., 2010), time spent (Guéguen and Petr, 2006), product examination (Krishna et al., 2010), spending (Herrmann et al., 2013; Chebat et al., 2009), purchase intentions (Lwin and Morrin, 2012), visit intentions (Bouzaabia, 2014), satisfaction (McDonnell, 2007), social interactions (Zemke and Shoemaker, 2007), and sales growth (Doucé et al., 2013).

2.3. Influence of olfactory congruence on consumers

2.3.1. Definition of congruence

The meaning of the concept of congruence depends upon the context of use, namely common or specialized language, particularly in the marketing literature (Maille and Fleck, 2011). The term congruence comes from Latin "*congruentia*", meaning conformity, the act of corresponding or adjusting to the characteristics of a situation, and by extension "to be relevant to", "to be consistent with". The term congruent is said of an element which is related to and agrees with another. Conversely, the term incongruent reflects the idea of an inappropriate combination.

The marketing literature suggests several conceptions of congruence: a two-dimensional approach and a general approach (Maille and Fleck, 2011). The definitions of this concept differ depending upon the authors and the field of research, and there is no consensual definition (Maille and Fleck, 2011). It is the overall approach, based on the idea of coherence/relevance, which is finally retained in our paper, and we define congruence as "the fact that two (or more) entities go well together" (Maille and Fleck, 2011), which entails a judgment of the relationship of coherence between entities (Park et al., 1991; Maille and Fleck, 2011).

2.3.2. Theories of congruence
2.3.2.1. Theory of cognitive balance.
Cognitive balance refers to "a harmonious state in which the characteristics of the state and the feelings it arouses are in perfect concordance" (Heider, 1958). The theory posits that people prefer harmonious or balanced (vs. unbalanced) situations (Gosling and Ric, 1996) and organize the information issuing from the environment in such a way as to establish and maintain cognitive equilibrium (Fischer, 2015). Two opposite scenarios are presented: cognitive imbalance and cognitive balance (Fischer, 2015; Heider, 1958). Cognitive imbalance occurs when people perceive information that they find unsatisfactory because it contradicts their cognition, whereas cognitive balance occurs when the information is deemed to be coherent and consistent with cognition and expectations (Fischer, 2015; Heider, 1958). When faced with imbalance, people try to avoid it (Heider, 1958) or to restore balance and coherence (Fischer, 2015).

The theory of cognitive balance is relevant to this study insofar as we need to know whether strong congruence (vs. weak congruence) with brand image can be judged as a very balanced situation that consumers could expect and would appreciate in a store context, one that could provoke approach (vs. avoidance) reactions. Conversely, weak olfactory congruence with the brand image could be judged by consumers as a dissonant/unpleasant situation, which could induce avoidance (vs. approach) reactions.

2.3.2.2. Theory of processing fluency.
Processing fluency refers to "the metacognitive experience related to the ease of performing some mental action" (Herrmann et al., 2013) or the ease (vs. difficulty) of processing a stimulus (Schwarz, 2004). This metacognitive experience may take many forms such as retrieving information stored in memory (Herrmann et al., 2013) and developing attitudes and preferences. The theory posits that stimulus processing may depend upon various parameters not necessarily linked to its contents (Reber et al., 2002). The stimulus characteristics (i.e. simplicity, clarity, order, symmetry, rapidity) may facilitate or hinder information processing (Schwarz, 2004). Rapid and accurate stimulus processing may have a positive effect (Reber et al., 2002) and engender a preference and positive affect (Hsu, 2009).

The theory of processing fluency is relevant to this study because it suggests that strong olfactory congruence (vs. weak congruence) with branding could be perceived by consumers as a simple, clear, and easily treatable contextual attribute and thus generate positive reactions. Hence, it is possible to assume that this fluidity of treatment could cause approach (vs. avoidance) reactions. Conversely, weak olfactory congruence with brand image would be judged by consumers as a less simple, less clear, and less easily treatable situation, which could provoke negative reactions.

2.3.3. Relationship between olfactory congruence and consumers

Studies indicate that odors that are congruent with products may influence positively donation intentions (Bonini et al., 2004), product evaluations (Krishna et al., 2010; Bosmans, 2006), the process of decision making (Mitchell et al., 1995). Studies show that odors that are congruent with products may influence positively purchase intentions (Lwin et al., 2016), sales, approaching and purchasing congruent products (Doucé et al., 2013), spending (Haberland, 2010), and emotional reactions (Maille, 1999). When odors are incongruent, product evaluations are negative (Ludden and Schifferstein, 2009). Congruent music and odors influence positively emotions, atmosphere assessments (Spangenberg et al., 2005; Mattila and Wirtz, 2001), impulse purchasing, satisfaction (Mattila and Wirtz, 2001), and visit intentions (Spangenberg et al., 2005). Olfactory congruence with the gender of the target clientele influences positively visit duration, emotions, spending, visit intention, and store and product assessment (Spangenberg et al., 2006).

Research results also indicate the positive influence of olfactory congruence on sales (Kivioja, 2017; Herrmann et al., 2013). Babin et al. (2004) show the effects of olfactory congruence with music and decor on the perception of product quality, emotions, and shopping value. Adams and Doucé (2017) emphasize the importance of considering the congruence between odors and other entities (e.g., product class, other atmosphere factors) in addition to the pleasant quality of odors. Chebat and Michon (2003) indicate that olfactory atmosphere can be beneficial for the brand if it is judged in harmony with the commercial context.

Parsons (2009) suggests that an odor should be consistent with the store type to induce positive reactions and that the use of a pleasant but store incongruent odor may have negative effects on consumers. The author argues that any situation of incongruence may provoke negative emotions and behaviors. In contrast, store-congruent odors may facilitate the memorization of the space and help practitioners develop a sustainable competitive advantage. In addition, Goldkuhl and Styvén, (2007) argue that practitioners can use pleasant, congruent odors to improve service offerings and enhance their competitive advantage. However, some studies have observed the absence of a significant effect of olfactory congruence on sales (Kivioja, 2017; Amsteus et al., 2015), mood (Mitchell et al., 1995) and the evaluation of the images tested (Knasko, 1995).

2.4. Model and hypotheses

In line with these theoretical foundations, we postulate the general hypothesis that an odor that is more congruent with the brand image may generate approach rather than avoidance reactions. In other words, we posit that an odor that is strongly congruent with the brand image (as opposed to a weakly congruent odor and the absence of odor)

would be more effective for managers who wish to adopt an olfactory signature. Hence, we hypothesize that the more the odor is strongly congruent with the brand image, the more positive consumer reactions in the store are (see Fig. 1). Therefore, we formulate the following specific hypotheses:

H1. The higher the congruence of an odor with the brand image (strong congruence vs. weak congruence, no odor), the more consumers spend in the store.

H2. The higher the congruence of an odor with the brand image (strong congruence vs. weak congruence, no odor), the more consumers show a positive attitude toward the store.

H3. The higher the congruence of an odor with the brand image (strong congruence vs. weak congruence, no odor), the more consumers experience pleasure.

H4. The higher the congruence of an odor with the brand image (strong congruence vs. weak congruence, no odor), the more consumers experience stimulation.

H5. The higher the congruence of an odor with the brand image (strong congruence vs. weak congruence, no odor), the more consumers evaluate positively the store atmosphere.

3. Research method

3.1. Odor selection

In order to select odors and to guarantee the internal and external validity of the study (Spangenberg et al., 2006), we carried out a pre-test of odors using the scents utilized by professionals in Emosens, a consulting company specializing in ambient scenting of retail and work spaces.

3.1.1. Stimuli, subjects, and procedures

Four odors were selected from among the range of scents used by Emosens, based upon the study focus, previous studies (Doucé et al., 2013; Krishna et al., 2010), and recommendations from professionals and researchers. These were natural essential oils or aromas controlled in terms of toxicity, evocative notes, conformity with the standards of the International Fragrance Association, and environmental and consumer protection. They could produce variance in the data; in other words, these odors could be perceived as strongly congruent (Rock N Roll and Luxury Scent) or weakly congruent (Rose and Raspberry Powder) with the brand image.

Rock N Roll and Luxury Scent are part of the Elegance collection and give out a "woody smell created especially for men and men's ready-to-wear stores"; Rose and Raspberry Powder (a fruity and floral note) are part of the Nature collection, a "smell not associated with men and men's ready-to-wear stores". Rock N Roll and Luxury Scent were viewed as strongly congruent with the image of the brand, which is specialized in men's ready-to-wear, located in Paris, and whose image is based on elegance, masculinity, fashion, and ready-to-wear. Rose and Raspberry Powder were viewed as weakly congruent with the aforementioned brand image by specialists (store manager, store employees, olfactory marketing consultant) and researchers (six researchers: three specialized in sensory marketing and three specialized in consumer behavior and marketing) (see Fig. 2).

These odors possess hedonistic attributes suited to consumers' and professionals' expectations. Consumers were required to smell and assess these odors, as often as they wished, using four 10 ml glass vials (see Fig. 2) and 6 cm-long blotter strips. The vials were identical and showed no distinctive signs. The odors were presented in similar and
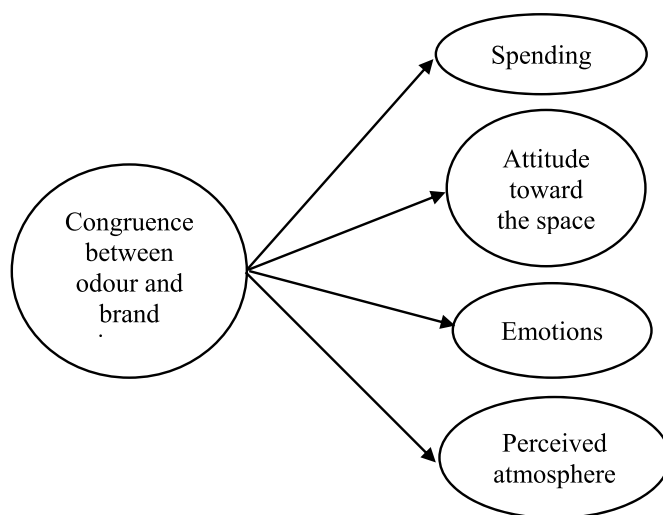

Fig. 1. Conceptual model of the consumer reactions to olfactory congruence with brand image.

Fig. 2. The pre-test equipment.

random fashion to prevent any order bias and coded from A to D (odors A, Rock N Roll; B, Luxury Scent; C, Rose; D, Raspberry Powder). The blotter strips were identical and replaced after each test to avoid the contamination bias. To overcome olfactory saturation, we scheduled a pause and talked with the respondents.

We used an intra-subject replication pre-test, conducted with a matched sample (N = 52). The participants were unaccompanied, not told about the pre-test purpose, not allergic to odors, and diversified in terms of age (M = 30 years old), gender (56.5% women, 43.5% men), and socio-professional categories: students (26.1%), executives and intellectual professions (39.1%), employees (26.1%), farmers (2.2%), intermediate professions (2.2%), unemployed (4.3%). The pre-test face-to-face questionnaire was conducted in a suitable venue; it comprised semantic differential and Likert-type scales emanating from the literature and measuring olfactory attributes (pleasing: "very unpleasant/very pleasant odor"; stimulation: "very stimulating/very relaxing odor"; familiarity: "unfamiliar/very familiar odor"; intensity: "very strong/very weak odor"; complexity: "very complex/very simple odor"; appraisal: "I like this odor" (Herrmann et al., 2013; Morrin and Ratneshwar, 2000; Spangenberg et al., 1996). Olfactory congruence with the brand image (characteristics: elegance, ready-to-wear, fashion, masculinity) was measured using the Heckler and Childers (1992) Likert-type scale (e.g. Odor A goes well with the following ideas associated with the brand). A 7-point scale was used to create variance.

3.1.2. Results

Univariate descriptive (Table 1a) and bivariate analyses (Paired T test) (Table 1b) were conducted with SPSS to compare the pairs of odors in terms of various criteria (familiarity, appraisal, intensity,

Table 1a
Results of the pre-test of odor attributes (univariate descriptive analyses).

Odors	Statistics				
	Pleasing (*M, SD*)	Intensity (*M, SD*)	Familiarity (*M, SD*)	Complexity (*M, SD*)	Appraisal (*M, SD*)
Rock N Roll	4.53 (1.4)	3.66 (1.53)	3.58 (1.71)	3.77 (1.48)	4.25 (1.93)
Luxury Scent	4 (1.74)	3.55 (1.71)	3.49 (1.89)	3.87 (1.42)	3.90 (2.02)
Rose	3.18 (1.77)	3 (1.55)	3.88 (1.97)	3.84 (1.57)	3 (1.87)
Raspberry powder	4.46 (1.86)	4.19 (1.45)	3.56 (1.8)	4.15 (1.56)	3.92 (1.99)

Note: N = 52, *M* (mean score) and *SD* (standard deviation) calculated on a Likert-type and differential 7-point scale (very unpleasant/very pleasant, very strong/very weak, unfamiliar/very familiar, very complex/very simple, I like this odor (strongly disagree/strongly agree).

Table 1b
Results of the pre-test univariate analyses of olfactory congruence.

Variable	Statistics			
	Rock N Roll (*M, SD*)	Luxury Scent (*M, SD*)	Rose (*M, SD*)	Raspberry powder (*M, SD*)
Congruence with elegance	4.08 (1.73)	3.25 (1.91)	2.46 (1.5)	3.79 (1.88)
Congruence with ready-to-wear	4.08 (1.78)	3.25 (1.89)	2.57 (1.45)	3.98 (1.79)
Congruence with fashion	4 (1.72)	3.14 (1.84)	2.39 (1.58)	3.84 (2.09)
Congruence with men	4.29 (1.88)	3.27 (1.91)	2.46 (1.58)	3.82 (2.13)

Note: *N* = 52, *M* (mean score) and *SD* (standard deviation inside parentheses) calculated on a 7-point Likert-type scale, odor A goes well with the following ideas associated with the brand (elegance, ready-to-wear, fashion, masculinity) (strongly disagree/strongly agree).

pleasingness, stimulation, complexity). Each odor was compared with the others to establish the significant differences. We selected the two odors that were significantly different in terms of congruence (strongly congruent vs. weakly congruent) but homogeneous in terms of the other dimensions (preference,[1] familiarity, complexity).

The results shown in Tables 1a and 1b indicated that Rock N Roll and Rose were not significantly different (*all p* > .05) in terms of familiarity (paired t RockNRollvsRose = −0.717 (*df* = 47), *p* = .477), complexity (paired t RockNRollvsRose = −0.068 (*df* = 48), *p* = .946), intensity (paired t RockNRollvsRose = 1.876 (*df* = 48), *p* = .067) and preference (paired t RockNRollvs.Rose = 0.369 (*df* = 48), *p* = .714). These odors were perceived as almost similar in terms of these attributes. Results showed significant differences in terms of congruence with the image (elegance (paired t RockNRoll = 4.08 vs. *t* Rose = 2.46, *p* = .000), ready-to-wear (paired t RockNRoll = 4.08 *vs.* *t* Rose = 2.57, *p* = .000), fashion (paired t RockNRoll = 4.00 *vs.* *t* Rose = 2.39, *p* = .000), masculinity (paired t RockNRoll = 4.29 *vs.* *t* Rose = 2.46, *p* = .000). The Rock N Roll odor had the highest mean congruence scores compared with the other odors, and the Rose odor had the weakest congruence scores. These results showed that the two odors could be used in the experiment. The mean scores for the perception of other attributes confirmed that diffusion would be risk free. Particular attention was paid to the intensity settings to ensure constant and non-aggressive diffusion.

3.2. Field experiment

3.2.1. Design, subjects, and procedure

We used an inter-subject experimental design with one factor and randomized (odor strongly congruent "Rock N Roll, *n* = 74", odor weakly congruent "Rose, *n* = 54", and control "no odor", *n* = 75). The purpose of the test was to determine whether the presence of an odor that is strongly congruent with the brand image (the RockNRoll odor diffused in the store) generates more positive consumer reactions than in the control condition (no odor in the store, "no odor"), and the

condition of weak olfactory congruence with the brand image (the Rose odor diffused in the store). Following the experimental plan (one factor, "olfactory congruence with the brand image", divided into three conditions: "strongly congruent odor, weakly congruent odor, no odor"). The experimental units were randomly distributed over the three conditions to obtain quasi-balanced groups with comparable characteristics and to ensure internal validity (Cook and Shadish, 1994).

The experiment was conducted all other things equal (days, times of data collection, other external variables identical for all experimental conditions). The experiment was carried out in three stages. Each of the three conditions was organized during 15 days by respecting the same days (Monday, Tuesday, Wednesday, Thursday, Friday) and the same times (10 a.m.-1 p.m., 2 p.m.–7 p.m.). Precisely, the smell strongly congruent with the brand image was diffused the first week (Monday, Tuesday, Wednesday, Thursday and Friday). The weakly congruent smell with the brand image was diffused the second week (Monday, Tuesday, Wednesday, Thursday and Friday). No odor was released the third week (Monday, Tuesday, Wednesday, Thursday and Friday). We did not mix conditions in the same week to avoid a possible olfactory mixing bias between the strongly congruent odor and the weakly congruent odor. A period of interruption of one week between the different experimental conditions was respected to avoid a possible bias of contamination.

Situational exogenous variables, that could introduce a confounding effect, were neutralized by keeping them constant so as to neutralize the confounding effect and ensure internal validity. These variables are constant throughout the study: attractiveness, odor intensity, marketing-mix, atmosphere (decor, layout, colors, lighting, sales force), and temperature. The space was regularly ventilated. Special attention was paid to controlling the confounding effect of odor intensity and pleasing, and the researcher and the professionals worked on the intensity level to make it suitable to the situation (Spangenberg et al., 2006). The study was conducted outside of specific periods (e.g. stock-taking, peak times, sales). Unaccompanied customers were questioned but not told about the odor diffusion to avoid the expectation and rationalization biases. The weather conditions were similar during the three conditions.

The sample (Table 2) was diversified. To ensure realism and increase the external and managerial validity of the study, the experiment was conducted over four weeks in the selected store (i.e. a single French

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[1] Factor score calculated by aggregating the items of attractiveness and appreciation perception (Morrin and Ratneshwar, 2000). This measure is reliable and appropriate ($\lambda_{i = .898}$, $\alpha = 0.75$, *Rinter-items* = 0.612).

Table 2
Sample characteristics.

Characteristics		Statistics
Gender	Women	82.8%
	Men	17.2%
	Total	100%
Age	18–24	11.9%
	25–35	49%
	36–46	20.3%
	47–57	14.9%
	Over 57	4%
	Total	100%
Profession	Executives and intellectual professions	54%
	Farmers	0%
	Artisans, retailers, company managers	13.4%
	Intermediate professions	1.5%
	Employees	20.8%
	Workers	0%
	Pensioners	0.5%
	Students	8.9%
	Unemployed	1%
	Total	100%

Fig. 3. Equipment for releasing odors during the final experiment.

brand of ready-to-wear store), located in the Opera district of Paris, very popular with male clients before or after work, representing a high-end brand specializing in men's ready-to-wear. Odors were diffused with a diffuser (Fig. 3). Diffusion was programmed for duration and constant, average, non-aggressive intensity between 8 a.m. and 8 p.m. Diffusion was also interrupted for ventilation and cleaning purposes so as to prevent odor commingling.

3.2.2. Measures

The measures (Tables 3a, 3b, 3c) were inserted into the questionnaire. The measurement scales used in previous studies were used in this research. These scales concern the overall attitude towards the store (Cronin and Taylor, 1992), the evaluation of the store's atmosphere (Rieunier, 2000), the emotions experienced (Rieunier, 2000), the amount of money spent (open declarative question). A 7-point scale was used to create variance.

The tests of the measurement model were based on the procedures of Churchill (1979) and Anderson and Gerbing (1988) and were performed using an exploratory and confirmatory factor analysis (EFA, CFA) and the maximum likelihood method of structural equation modeling (Bentler, 1995). We used Churchill (1979) approach to define the measurable conceptual domain, the generation/selection of items, the collection of data, the examination of psychometric qualities (reliability "α Cronbach, ρ Joreskog", validity "ρvc"), and the dimensionality of the measurement scales of the construct. The approach recommended by Gerbing and Anderson (1988) made it possible to check the quality of adjustment of the empirical data and the validity of the measurements. The usual purification criteria were used:

- Deletion of variables whose communalities are < 0.5 and correlated to two dimensions.
- Retention of the variables with the loadings λi high and correlated with one dimension.
- Eigenvalue of Kaiser-Guttman > 1 to obtain the dimensions summarizing the information, as well as the percentage of variance explained > 60%.
- Satisfactory reliability (α Cronbach and ρ Joreskog ≥ 0.70) (Fornell and Larcker, 1981).
- Satisfactory validity (ρ convergent validity ≥ 0.50) (Fornell and Larcker, 1981).
- Quality of adjustment of the measurement model, which must be adequate.

The results indicated that the measurement models were reliable and valid. The items were correlated with the construct. These measurements were used for the final test of the hypothesis model examined below.

4. Results

4.1. Manipulation check

The non-parametric variance comparison test (Kruskall-Wallis Anova for K samples) was used instead of the Parametric Anova Variance Analysis test since the congruence variable data do not respect the normal distribution law as shown by the Kolmogorov-Smirnov and Shapiro Wilk test results (all p < .05). In the case of the violation of the distribution normality condition (highly asymmetric distribution), the non-parametric and free distribution test Kruskall-Wallis Anova for K samples should be preferred (Kinnear et al., 2004). This test provides more robust estimates. It is based on the calculation of the chi-square (X^2) statistic, its significance, and the estimation of average rank differences of the experimental conditions being compared. The results (Table 4) of the Kruskal-Wallis test show that the experimental manipulations are fruitful since the mean score differences are significant ($X^2 = 11.778$; $p < .001$; AverageRank$_{highercognruence(odorRockNRoll)} = 73.60$ vs. AverageRank$_{weakcongruence(odorRose)} = 51.03$).

4.2. Results

The results (Table 5) of the Kruskal-Wallis Anova tests with a K sample factor show the main significant effect of olfactory congruence

Table 3a
Measurement model.

Variables, authors of the scales	Indicators	Statistics				
		M (SD)	Min	Max	Skewness	Kurtosis
Attitude toward the store (Cronin and Taylor, 1992)	The attitude toward the space is very negative vs. very positive (7-point scale)	5.73 (1.073)	1	7	-.977	1.523
Spending	How much did you spend in the store today? (open answer)	89.3561 (125.37)	0	700	1.867	4.575

Note: *M* (average score) and *SD* (standard deviation), *Min* (minimum value), *Max* (maximum value).

Table 3b
Measurement model.

Variables, authors of the scales	Indicators	M (SD)	Com	Λi EFA	Λi CFA
Atmosphere (Rieunier, 2000)	The atmosphere of this space is stimulating (7-point scale)	5.80 (.813)	.525	.724	.522
	The atmosphere of this space is energising (7-point scale)	5.08 (1.117)	.922	.960	.998
	The atmosphere of this space is pleasant (7-point scale)	5.80 (.813)	.525	.724	.522
Total variance	79.07%				
Reliability					$\alpha_{Cronbach}$ = .86 $\rho_{Joreskog}$ = .89
Validity					ρ_{vc} = .74

Note: *M* (mean score), *SD* (standard deviation) based on a Likert-type scale (ranging from 1 "strongly disagree" to 7 "strongly agree"), *com* (communality), *Λi* EFA (loading of the exploratory factorial analysis), *Λi* CFA (loading of the confirmatory factorial analysis).

upon spending (X^2 = 5.894 (2); p < .05), attitude toward the store (X^2 = 5.394 (2); p < .10), pleasure (X^2 = 8.23 (2); p < .05), arousal (X^2 = 7.009 (2); p < .05) and perception of the atmosphere (X^2 = 7.127 (2); p < ,05). In the high olfactory congruence condition, spending is higher than that in the weak congruence and control conditions (AverageRank$_{highcognruence(odorRockNRoll)}$ = 112.86 vs. AverageRank$_{weakcongruence(odorRose)}$ = 89.97 vs. AverageRank$_{control\ (no\ odor)}$ = 98.66). In the high olfactory congruence condition, attitude towards the store is more positive than that in the weak congruence and control conditions (AverageRank$_{highcongnruence(odorRockNRoll)}$ = 112.91 vs. AverageRank$_{weakcongruence(odorRose)}$ = 90.92 vs. AverageRank$_{control\ (no\ odor)}$ = 97.91).

In the high olfactory congruence condition, pleasure is higher than that in the weak congruence and control conditions (AverageRank$_{highcognruence(odorRockNRoll)}$ = 116,6 vs. AverageRank$_{weakcongruence(odorRose)}$ = 89,04 vs. AverageRank$_{control\ (no\ odor)}$ = 95,57). In the high olfactory congruence condition, stimulation is higher than that in the weak congruence and control conditions (AverageRank$_{highcognruence(odorRockNRoll)}$ = 115,66 vs. AverageRank$_{weakcongruence(odorRose)}$ = 91,13 vs. AverageRank$_{control\ (no\ odor)}$ = 94,97). In the high olfactory congruence condition, atmosphere perception is more positive than that in the weak congruence and control conditions (AverageRank$_{highcognruence(odorRockNRoll)}$ = 114,28 vs. AverageRank$_{weakcongruence(odorRose)}$ = 87,02 vs. AverageRank$_{control\ (no\ odor)}$ = 99,45).

Moreover, the results show that the statistical differences of the reactions are small between the conditions of weak olfactory congruence with the brand image and the absence of odor. This finding inspires two observations. The first one concerns the small differences in the average ranks of the individual reactions between the two experimental conditions mentioned above. One possible explanation is that perhaps the experimental manipulation of the condition of weak olfactory congruence with the brand image (Rose odor) and the control condition were not strong enough to create enough variance (dispersion) in the dependent variables. The second observation concerns the slightly more positive effects of the control condition (vs. weak olfactory congruence). Specifically, although the average ranks of the individual reactions are slightly different between these two conditions, we find that consumer reactions are slightly more positive in the control

Table 4
Results of the Kruskal-Wallis variance comparison related to the manipulation check between groups MCs.

Variable	Conditions	Average rank
Olfactory congruence	Strong congruence (RockNRoll odor)	73.60
	Weak congruence (Rose odor)	51.03

Note: p < .001, .05, 10.

condition when compared to the reactions recorded in the condition of low olfactory congruence with brand image. A potential explanation, which must be verified in future investigations, can be formulated: it might be the case that it is more effective and adequate to provide customers with an unscented store (control condition) than one that is scented with a less relevant scent. Finally, the results show that in the situation of strong olfactory congruence with the brand image, consumer reactions are more favorable. Hence, Hypotheses H1, H2, H3, H4, H5 are validated.

5. Discussion

The study results validate the main hypothesis of the positive influence of high olfactory congruence with the brand image upon consumers. They confirm that high olfactory congruence with the brand image enhances consumers' reactions. Consumers show more positive reactions when the odor being diffused is deemed to be highly congruent with the brand image as compared with the conditions of weak congruence and no odor. Results thus show empirically the effectiveness of high olfactory congruence with the brand image as compared with weak congruence and no odor. These results are accounted for by the psychosocial theories examined previously: cognitive balance (Heider, 1958) and processing fluency (Reber et al., 2002).

One of the possible explanations of the results is that strong olfactory congruence appears to be consistent with cognitive representations, the beliefs stored in memory, and consumers' pre-existing expectations, so that it may generate approach (vs. avoidance) reactions (Mehrabian and Russell, 1974). Another likely explanation is that consumers' positive reactions in the case of strong olfactory congruence

Table 3c
Measurement model.

Variables, authors of the scales	Indicators	M (SD)	Com	ΛiEFA Pleasure	ΛiCFA Pleasure	ΛiEFA Stimulation	ΛiCFA Stimulation
Emotion (Rieunier, 2000)	Today, in this space, you feel happy (7-point scale)	5.69 (.903)	.808	.830	.947		
	Today, in this space, you feel calm (7-point scale)	5.73 (1.013)	.857	.962	.683		
	Today, in this space, you feel full of energy (7-point scale)	5.18 (1.179)	.974			.994	.972
	Today, in this space, you feel dynamic (7-point scale)	5.20 (1.179)	.991			.989	.998
	Today, in this space, you feel energetic (7-point scale)	5.20 (1.176)	.993			.991	1
Total variance	68.11%			21.73%		70.72%	
Reliability				$\alpha_{Cronbach}$ = .78 $\rho_{Joreskog}$ = .80		$\alpha_{Cronbach}$ = .99 $\rho_{Joreskog}$ = .99	
Validity				ρ_{vc} = .68		ρ_{vc} = .98	
Fit model	X^2/df = 1.005, CFI = 1, RMSEA = .005 (.00,.106), SRMR = .004						

Table 5

Results of the Kruskal-Wallis variance comparison test related to the influence of olfactory congruence upon consumers.

Path	X^2 K–W (df)	Sig. (P_{value})	Mean ranking		
			Strong congruence (Rock N Roll odor)	Weak congruence (Rose odor)	No odor
H1. Olfactory congruence-spending	5.894 (2)	.052	112.86	89.97	98.66
H2. Olfactory congruence -attitude	5.394 (2)	.067	112.91	90.92	97.91
H3. Olfactory congruence -pleasure	7.009 (2)	.030	115.66	91.13	94.97
H4. Olfactory congruence -stimulation	8.23 (2)	.016	116.6	89.04	95.57
H5. Olfactory congruence -atmosphere	7.127 (2)	.028	114.28	87.02	99.45

are attributable to people's preference for situations characterized by balance, symmetry, and order. Strong olfactory congruence is a stimulus that is easier to process as it is symmetrical, clear, and fast (Schwarz, 2004; Reber et al., 2002). Hence, the smooth processing of strong olfactory congruence may exert a positive influence upon consumers (Schwarz, 2004; Reber et al., 2002).

In addition, the study results suggest that a situation of strong congruence (vs. weak congruence) may appear as obvious, significant (Fleck and Maille, 2010), and expected (Heckler and Childers, 1992). It may play a facilitating role for perceptual processing (i.e. encoding and decoding information) and behavior (Ménard-Buteau and Cavanagh, 1984) since it enables consumers to avoid using resolution strategies (Fleck and Maille, 2010; Meyers-Levy and Tybout, 1989) that are more or less complex depending upon the contexts of cognitive dissonance (Ménard-Buteau and Cavanagh, 1984).

The effects of olfactory congruence with the brand image upon emotions can also be explained by environmental psychology theories (Mehrabian and Russell, 1974) and theories dealing with olfaction and atmosphere models that posit that atmospheric stimuli, including odors, are likely to induce specific emotions (Herz, 2008; Gilbert, 2008; Bitner, 1992). The result is in line with studies showing the effect of olfactory congruence upon spending (Doucé et al., 2013; Haberland et al., 2010), emotions (Spangenberg et al., 2005; Mattila and Wirtz, 2001), atmosphere appraisal (Spangenberg et al., 2005; Mattila and Wirtz, 2001), and attitudes (Krishna, 2012). In contrast, the study results are at variance with studies indicating the lack of effect of olfactory congruence upon consumers (e.g. sales, emotions, evaluations) (Kivioja, 2017; Amsteus et al., 2015; Mitchell et al., 1995).

Our results show that high olfactory congruence with the brand image is far more than just an atmosphere factor and may play a significant role in helping to structure and give value to this image. It could be a means of enhancing the brand image (Bartholmé and Melewar, 2009) and complementing all other factors promoting the image (Van Riel and Balmer, 1997). It may be used to differentiate the brand in an increasingly competitive advantage in the market where the usual marketing mix is not sufficient. It is also a means of increasing the identification and memorization of the brand image in the minds of the target customers.

6. Conclusion

The purpose of the study was to understand the influence of olfactory congruence with the brand image upon consumers. The main assumption was that the more an odor is perceived as congruent with the brand image, the more consumers are likely to display approach (vs. avoidance) reactions. This little investigated research issue is nevertheless important to understand consumers' reactions in stores. The idea is that to have an olfactory experience inside a store is to perceive the congruence between the odor being diffused and the brand image and then display specific reactions. The study validates the positive influence of olfactory congruence upon consumers.

Another theoretical implication concerns the model of hypotheses tested. Several dependent variables retained in this study (e.g. emotions, atmospheric evaluation) have already been used in previous

research focused on the influence of the store atmosphere on consumer reactions (Mattila and Wirtz, 2001; Spangenberg et al., 2005, 2006), but attitude towards the store and spending are variables that have been little investigated in previous research. Moreover, all the dependent variables are examined for the first time in this study regarding the influence of olfactory congruence with the brand image.

A few managerial implications arise from this study. Results show the positive effects of olfactory congruence with the brand image upon consumers' reactions. Practitioners would thus find it worth developing an olfactory signature that is congruent with the brand image as they can derive benefits from this practice. First, the practice brings about a pleasant atmosphere in the store and enhances consumers' reactions: increased spending, more positive emotions, attitude towards the store, and appraisal of the atmosphere. Second, it strengthens other olfactory characteristics (e.g. attractiveness). It is not enough, however, to diffuse a pleasant odor; it must be congruent with the brand image.

Third, the practice promotes the brand image and consumer recall. It is not always easy to put forward the total significance of the brand image through one means only (e.g. advertising). An odor that is congruent with the brand image may be a powerful signal of the brand image. Fourth, the practice helps brands stand out from the competition in an increasingly competitive market that is saturated with similar offerings. Moreover, investing in olfactory congruence with the brand image is feasible (it is easy to diffuse an odor throughout a store) and at little cost in view of the limited number of the necessary diffusers and fragrances in comparison with more expensive practices such as visual merchandising or advertising.

The study does have limitations and points to research avenues. We focused upon olfactory congruence, but other olfactory characteristics need to be examined, such as the attractiveness, intensity, repetition, complexity (vs. simplicity), stimulating (vs. relaxing) nature, or the evocative aspect of odors. This research avenue is all the more important as these characteristics may exert significant effects upon consumers. It may also be worth investigating the interactive effects between congruence and other olfactory attributes upon consumers. The focus of this study is based on the notion of congruence between a sensorial factor (odor) and the brand image without examining the possible interactions or patterns of congruence between the different sensory factors. A number of studies have investigated the combined effects of sensory factors on consumer reactions (Castiello et al., 2006; Mattila and Wirtz, 2001; Spangenberg et al., 2005), but the overall issue of combined sensory effects deserves to be investigated further.

In line with other research findings, it may also be worth examining the combined effects of sensory factors or the general influence of atmosphere upon consumers. For instance, to what extent may cross-modal interactions (Castiello et al., 2006) between odors and other entities such as sound, gustatory, visual (e.g. decor, color, architecture, spatial density), tactile, social (e.g. crowd) stimuli, product, or the general atmosphere influence consumers? Future research on this subject could complement current theoretical and empirical knowledge and contribute to the development of managerial practices in this area.

Our hypothesis model is limited, and many variables and hypotheses have not been examined. Examples include the relations between olfactory congruence with brand image and loyalty, stay time,

immersion, word-of-mouth, surprise, and the number of products/services purchased. Hypotheses relative to moderating effects (e.g. emotional intensity, cognition needs, olfactory preferences, culture, involvement, cognitive profile) upon the link between olfactory congruence and consumers' reactions could also be investigated.

It would be worth exploring whether we can obtain/explain the same effects as those found in this study in different or similar contexts, and whether different effects can be observed in other contexts. If the hypotheses and the research question can be generalized to other contexts, the particularities of the empirical context studied here (male ready-to-wear label, sample size "205 clients") limit the generalization of the results. Replication studies in similar and new contexts based on the same research question and hypotheses would be needed to ensure the external validity of the study.

In order to consolidate external validity, it might be advisable to expand the range of research to other application fields, whether new or already examined (e.g., brands, stores, activity sectors such as leisure, the hotel business, healthcare (dental offices, hospitals), culture (cinemas, live shows, museums), distribution (atmosphere stores, flagship stores, large specialized stores, parking lots), services, or banks). It would be worth re-examining this study through the investigation of other product/service categories, whether original or previously examined, such as ready-to-wear or culture offerings. It is also essential to continue involving real consumers.

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Appendix A. Supplementary data

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