2013•2014
FACULTY OF BUSINESS ECONOMICS
Master of Management

Master's thesis

The effects on customers' reactions of cross-modal (in)congruity between a store and a store atmospheric: a field experiment in a cookware store using ambient fragrance

Promotor :
Prof. dr. Willem JANSSENS

Fiona Baleau

Thesis presented in fulfillment of the requirements for the degree of Master of Management

universiteit hasselt
KNOWLEDGE IN ACTION

Universiteit Hasselt | Campus Hasselt | Martelarenlaan 42 | BE-3500 Hasselt
Universiteit Hasselt | Campus Diepenbeek | Agoralaan Gebouw D | BE-3590 Diepenbeek

universiteit hasselt
KNOWLEDGE IN ACTION

2013•2014
FACULTY OF BUSINESS ECONOMICS
Master of Management

Master's thesis

The effects on customers' reactions of cross-modal (in)congruity between a store and a store atmospheric: a field experiment in a cookware store using ambient fragrance

Promotor :
Prof. dr. Willem JANSSENS

Fiona Baleau
Thesis presented in fulfillment of the requirements for the degree of Master of Management

universiteit hasselt
KNOWLEDGE IN ACTION

FOREWORD

This Master thesis – representing the accomplishment of my studies – was realized with the aim to obtain the diploma of "Master of Management", specialization in International Marketing Strategy, at the University of Hasselt.

First of all, I would appreciate to express the enjoyment I had in writing a thesis dealing with a topic appealing to me, namely scent marketing. Indeed, working on this theme appeared to be extremely pleasant in the sense that this topic has not received considerable attention, although attracting the interest of a growing number of researchers in the past few years. On top of that, carrying out an empirical research and therefore being able to put prior and new findings into practice (i.e.: in a real field setting) was really interesting and agreeable. In other words, I feel proud to terminate my studies on a topic through which I learned a lot and which stimulated my desire to, perhaps, begin my professional life in the sector of scent – or sensory – marketing. It should be underlined that, besides expanding my knowledge thanks to the literature and the empirical research, I also learned a lot from the initiatives I had to take as well as the challenges I had to face and handle with which allowed me to acquire considerable skills.

Secondly, I would like to express my gratitude to some people without whom it would have been impossible to write my Master thesis in an efficient way. To begin with, I thank in particular my supervisor Prof. Dr. Wim Janssens as well as my two co-supervisors Mrs. Lieve Doucé and Mrs. Carmen Adams who supported me through the whole process of this thesis by providing me a real follow-up and ever-relevant advice. Also, I thank Mrs. Sylvie Baert-Mulliez, the manager in charge of the Belgian franchise of the brand "Alice Délice", who provided me the chance to conduct my experiment in one of her stores. In addition, I also want to thank the owners of the scent company "Scents", namely Mr. Johan Delissen and Mr. Patrick Castelain, who have furnished the necessary scents for my pre-tests and my experiment.

Diepenbeek, 2014

Fiona Baleau

SUMMARY

"[…] And scent entered into their very core, went directly to their hearts, and decided for good and all between affection and contempt, disgust and lust, love and hate" *Patrick Süskind*

While sensory marketing has recently attracted a growing interest from marketers and retailers, the predominant senses which have been manipulated in various marketing techniques in order to influence positively the customer's behavior are inevitably the sight and the hearing. Although several scholars addressed those paramount senses in their studies, the effects of the addition of an ambient scent on the customer's reactions have been relatively neglected in the literature. Amidst the scarce studies conducted around this phenomenon, the findings remain somewhat mixed and inconsistent. Furthermore, whereas certain researchers focused on the pretty new concept of cross-modal correspondences that exist between olfaction and the other senses, to the author's knowledge, no prior paper attempted to discover the possible disparities that might exist in the effects on the customer's reactions between ambient fragrances diverging in their cross-modal congruity with the store environment.

The latter objective will be covered in two phases, namely a first phase which will provide an overview of the literature around these concepts so far and a second phase which will demonstrate, through a field experiment in a cookware shop, whether a cross-modally congruent ambient scent is indeed more effective in enhancing higher positive customers' reactions in comparison to both a cross-modally incongruent ambient fragrance and an odorless condition.

Needless to say that sensory marketing has been proven to be able to vivify customers' emotions which in turn create positive behaviors and reactions. Hence, it is necessary to underline that the influence of a sensory marketing stimulus – in this case an ambient scent – on customers' reactions is mapped through the Stimulus-Organism-Response (S-O-R) paradigm of Mehrabian & Russell (1974) which is based on environmental psychology. According to this model, the external stimuli affect internal evaluations which, in turn, influence behavioral responses taking the form of either approach or avoidance behaviors. In this way, atmospheric stimuli such as light, music, color and odor, can possibly influence the customers' behaviors. While several scholars employed this paradigm in their work, ambient scent has not received the attention it deserves. Nonetheless, some important authors have accorded a justified interest in this mysterious atmospheric cue.

Indeed, Gulas & Bloch (1995) developed a model which fits the S-O-R paradigm and posit that the characteristics of an individual will influence the customers' acuity and that together with the objective ambient scent; they will influence the ambient scent as perceived by the customers. As a result, the ambient scent – moderated by other atmospheric cues as well as scent congruity – will have an impact on the customers' affective responses which, in turn, will affect the approach or avoidance behaviors adopted by the customers themselves. Afterwards, this model has been expanded by Davies et al. (2003) and Ward et al. (2003) who provide several possible influences on the dependent variables of the initial model. Additionally, in the meantime, Bone & Ellen (1999) came up with a conceptual model assuming that, besides its capability to influence affective responses, an ambient scent is also able to have an effect on cognitive responses.

Bearing in mind those important discoveries, the author implemented a field experiment in a realistic store environment in order to examine whether or not an ambient fragrance which is cross-modally congruent with the store environment leads to higher positive effects on several dependent variables (i.e.: affective responses, evaluation of the store environment, overall assessment of the store, evaluation of the store's products/offerings, approach/avoidance behaviors, intention to revisit/return to the store, word-of-mouth, and sales) compared to a cross-modally incongruent scent or an unscented store. With the aim to employ the most appropriate ambient scents for the empirical study, several pre-tests were conducted with 16 aromas linked to the art of cooking. At the end, the two selected fragrances retained for the field experiment were the ones who were perceived as pleasant and arousing, rated alike on their congruency with the store's theme but evaluated oppositely regarding their cross-modal congruity with the store environment. As far as the choice of the store is concerned, as Lindstrom (2010) indicates, many studies document that we often eat with our noses. In a similar vein, it would make sense to suggest that, because before we actually eat food a necessary and preceding step is to prepare and cook it, we also cook with our noses. Therefore, it sounds reasonable to assume that, in a store selling cooking materials such as "Alice Délice", the ambient scent smelled by the visitors, if cross-modally congruent with the store atmosphere, will stimulate their desire to cook and therefore might positively affect their affective responses which, accordingly, encourage approach rather than avoidance behaviors.

It is noteworthy that a total of 120 respondents participated to the field experiment through three conditions (i.e.: 40 persons per condition), namely a condition with the manipulation of a cross-modally congruent ambient scent, another with a cross-modally incongruent ambient scent, and a last one in which no fragrance was diffused.

In short, while the hypotheses have been partially confirmed, it can be concluded that an ambient fragrance that is cross-modally congruent with the store in which it is diffused seems to be more efficient in influencing customers' reactions in comparison to a scentless store environment but rarely produces enhanced positive customers' reactions compared to a cross-modally incongruent ambient scent. These findings, hence, make the author believes that cross-modal congruity between an ambient odor and the store under investigation is certainly important, but to a lesser extent, whereas the thematic congruency with the store is still considered as a crucial criterion to respect.

TABLE OF CONTENTS

LIST OF THE FIGURES

LIST OF THE TABLES

PREFACE

In highly saturated and hyper-segmented markets, companies must now find new and outstanding tools in order to provide an added value to their offering as well as distinguish themselves from their competitors. Additionally, as far as the demand is concerned, a clear shift in consumers' behavior and in their values can be observed. Indeed, consuming to "possess" is losing its popularity as consumers are nowadays looking for pleasure and sense. The fact is that consumers have become less loyal, less predictable and less rational and are from now on integrating affective information to their products' or services' evaluation in order to confront these to their personal values and experiences. In this vein, traditional marketing migrates towards a contemporary marketing including experiential, relational and sensorial elements, also called sensory marketing. This importance is supported by Philip Kotler in Lindstrom's book (2010), by stating that distinctive brands require "something more". In other words, consumers expect brands to provide a holistic sensory and emotional experience. For these reasons, the use of sensory marketing should not be neglected because it possesses the power of establishing emotional ties between the brand and the consumer. Put differently, more than ever, in order to be successful in the future or even more importantly to be able to survive in this growing competitive environment, companies will have to stand out and emphasize their distinctiveness and uniqueness, such a challenge that requires to take a close look at sensory marketing (Lindstrom, 2010).

Numerous studies undertaken by researchers have provided support to the considerable impact that the characteristics of a store environment can have on consumers' reactions. Indeed, several atmospheric cues have proven to affect consumers' shopping behavior such as music (e.g.: Milliman, 1982, 1986; Yalch & Spangenberg, 1990; Sweeney & Wyber, 2002), color (e.g.: Bellizzi et al., 1983; Crowley, 1993), lighting (e.g.: Areni & Kim, 1994), crowding (e.g.: Harrell et al., 1980; Hui & Bateson, 1991; Michon et al., 2005), and ambient scents (e.g.: Spangenberg et al., 1996, 2006). As Krishna (2011) underlines, in comparison to our other senses (e.g.: sight and hearing), olfaction is too often incorrectly underestimated in its capacity to contribute to the facilitation of our daily life as – although its role in human survival and progress is less obvious – it allows us to identify and recognize flavors.

The use of scent by marketers has been declined in multiple categories ranging from using scents as a primary product attribute (e.g.: personal fragrances) in which case the customer is motivated to buy the product essentially because of the scent it contains and the crucial role that the latter plays (Schifferstein, 2006; Krishna, 2011), using scent as a secondary product attribute (i.e.: scented products) in which case the product is not predominantly purchased for its scent but on the contrary possesses other primary characteristics at the interest of the buyer, using scent in advertising and sales promotion (e.g.: peel-n-sniff patches, direct mailings), and finally, the use which has doubtless attracted a growing interest, ambient scent (Krishna, 2011), which constitutes the focus of this paper.

More specifically, a growing body of research highlights the psychological and behavioral effects that ambient fragrance can have on consumers' perceptions and behaviors. To cite few, studies report that pleasant ambient scents can positively impact product and/or store evaluations (Chebat & Michon, 2003; Spangenberg et al., 1996, 2006; Bosmans, 2006), variety-seeking behavior (Mitchell et al., 1995), attention to brand and packaging information as well as brand recall (or memory) (Morrin & Ratneshwar, 2000, 2003), intention to revisit the store (Spangenberg et al., 1996), mood (Ward et al., 2007), affective responses and cognitive elaboration (Spangenberg et al., 1996). Whereas the majority of the experiments were run in retail environments or other store-like settings, an increasing number of scholars have investigated such experiments in shopping-mall settings (Chebat & Michon, 2003; Michon et al., 2005).

Documented with its potential, marketers and retailers recognize the importance to diffuse an ambient scent in their stores. Few examples include the famous department store Bloomingdale's which induces maternal instincts by diffusing the smell of Johnson's Baby Powder in their children department or the rivals Sony and Samsung which both spread exclusive fragrances to make their customers feel unaccountably serene (Lindstrom, 2010). In addition, retail owners may desire to embellish and enrich their store environment by creating their own scent which serves as a signature for their brand (e.g.: Abercrombie & Fitch) and therefore helps to differentiate themselves in a highly competitive environment (Krishna, 2011). It goes without saying that in order to create such a distinctive fragrance – which represents the brand perfectly – marketing managers must bear in mind the image that the brand wishes to bring out. For this purpose, they must take numerous elements into consideration such as the atmospheric cues that constitute the cornerstone of the store atmosphere.

In the light of their retail environment, shop owners must pay attention to the lighting, the colors, the design, the layout, the shapes, etc., all these elements that will enable them to come up with an appropriate ambient fragrance for their store. In a similar vein, while remaining inoffensive, cross-modally congruent ambient scents are also believed to possess the ability to represent properly the store in which they are dispersed.

Despite the fact that numerous studies have already attempted to demonstrate the effects of ambient scent on customers' shopping behavior, some practitioners and academics failed to provide support to existing beliefs as far as how this atmospheric cue can positively influence customers' reactions, leading to rather mixed and uncertain findings (e.g.: Morrin & Ratneshwar, 2000; Spangenberg et al., 1996). Among the reasons hidden behind such disparities, the setting in which the experiments were conducted as well as the product ranges that a store environment include might be responsible for these outcomes' divergences (Doucé & Janssens, 2013). Moreover, prior studies were conducted by employing relatively basic aromas but without taking into account the cross-modal correspondences between the scent and the store. Nonetheless, other studies have put the emphasis on the cross-modal correspondences that exist between an odor and the other senses (e.g.: Gilbert et al., 1996; Demattè et al., 2006 a & b; Seo et al., 2010; Ngo et al., 2011; Crisinel & Spence, 2012a; Hanson-Vaux et al., 2013) stating that by smelling a fragrance, people expect something else (i.e.: in terms of other senses). Yet, to the best of the author's knowledge, no research focused on a broader perspective of the customer's shopping experience by considering the cross-modal congruity between an ambient scent and a store.

While research has ventured in other directions and the field of cross-modal correspondences has remained a largely neglected area in the literature, this paper focuses on how ambient odors in the store can impact on customers' affective responses, evaluations, approach behaviors, intention to revisit/return to the store, word-of-mouth generation, as well as on the sales while considering their cross-modal congruity with the store in question. A field experiment divulges that a pleasant ambient fragrance positively influences some of the customers' reactions mentioned before, especially when it was cross-modally congruent with the store environment. Hence, it can be concluded that for marketers, ambient odors represent a fairly affordable and effective marketing instrument to positively affect consumer's reactions.

As a consequence, by manipulating the store environment in a clever manner through the use of ambient scents, retailers can considerably enhance their brand or store differentiation by keeping in mind the necessity to respect the cross-modal congruity between the olfactory stimulus and the store setting.

The remainder of this paper is organized as follows. Firstly, in order to set the background, chapter 1 will introduce the problem statement as well as the research question and the sub-questions it implies. Secondly, chapter 2 will present the concept of sensory marketing and more precisely the importance of olfactory marketing. For this purpose, a literature review will cover the studies which have already been conducted regarding the impact of ambient scent on customers' reactions as well as the scarce research which has focused on the new notion of cross-modal correspondences. Thirdly, chapter 3 will present the empirical research that was conducted within the framework of this paper with an attempt to confirm the hypotheses described in a preceding section. With this aim, the methodology and the results obtained from the experiment will be discussed. On a final note, the limitations of this research as well as the managerial implications it engenders will be explained, together with the possible directions further research could take.

CHAPTER 1: PROBLEM STATEMENT AND RESEARCH QUESTION

Below are presented the problem statement as well as the research question and sub-questions that need to be answered through the literature review and the empirical study.

1. PROBLEM STATEMENT

Marketing has always been an integral part of companies' strategies around products and services. However, nowadays, competition is becoming fiercer than ever, leading firms to adjust their way of operating and doing business. In other words, one could state that traditional marketing is not sufficient anymore in order to create a sustainable competitive advantage. Indeed, with the aim to be ahead of the rivals, organizations have recognized the importance of sensory marketing as a weapon to gain the hearts and minds of their customers. Facing the homogenization of products, companies find sensory marketing as a powerful tool which enables them to position themselves apart from the competitors. Rational elements, such as price, no longer receive the winning prize of inducing customers to make their purchase decision but, on the contrary, it appears that this is the emotional aspect which plays a dominant role in this task. In this vein, sensory marketing has the aim to appeal to one or more of the customers' five senses in order to seduce them while contributing to their well-being by providing them a holistic experience. As it seems crucial to recall, consumers do not buy a product or a brand in itself but are increasingly looking for a sensation delivered by a whole experience. In line with this belief, a growing number of firms are jumping on the bandwagon of sensory marketing which, as the literature review will demonstrate afterwards, has proven to, for example, make customers more willing to spend higher amounts of money and stay longer in the store.

One of the main reasons why sensory marketing deserves such a rising interest is that shopping is a synonym of entertainment for the majority of customers. Even if people do not have the intention to purchase goods, they enjoy the shopping experience. The latter concept is becoming the core emphasis of organizations which have been aware of the customers' need for a return to the reality in a world more virtual than ever. Indeed, by manipulating the different customers' senses, firms have the capability to bring customers back to the real world. As Lindstrom (2010) stresses, the metamorphosis of a brand into a sensory experience, covering much more than visual cues, becomes crucial.

For this reason, the present paper will address sensory marketing and more particularly olfactory marketing by demonstrating the positive influence that ambient scent can exercise on customers' reactions, while integrating the unpopular concept of cross-modal correspondences.

2. RESEARCH QUESTION AND SUB-QUESTIONS

- RQ: "What is the impact of adding a pleasant ambient scent – taking into account the effects of its cross-modal (in)congruity with the store – on the customers' reactions?"

  - Is there an impact on customers' affective responses with respect to the store environment?
  - Is there an impact on the customers' evaluation of the store environment?
  - Is there an impact on the customers' overall assessment of the store?
  - Is there an impact on the customers' evaluation of the store's products/offerings?
  - Is there an impact on the customers' approach/avoidance behavior?
  - Is there an impact on the customers' intention to revisit/return to the store?
  - Is there an impact on the customers' intention to generate word-of-mouth?
  - Is there an impact on the average price of purchases made by the customer?

CHAPTER 2: LITERATURE REVIEW

1. SENSORY MARKETING – EXPLORATION OF THE CONCEPT

Our interaction with the world that surrounds us would be dramatically poor if we had to go without one of our senses. If the sight constitutes a paramount element and possesses a privileged place in people's perception, the fact remains that we also need our other senses. Nowadays, marketing has progressively taken into consideration the sensory importance in doing business and, as the world dematerializes, marketers pay an increasing attention to senses which have been somehow neglected so far. In line with this reality, managing atmospheric cues appears to be crucial and central to numerous firms' strategies giving rise to a new marketing area called "sensory marketing".

The latter is defined by Krishna (2012) as "marketing that engages the consumers' senses and affects their perception, judgment and behavior." This author argues that subconscious triggers – produced by this specific form of marketing appealing to senses – have the capability to illustrate abstract properties of the product as perceived by the customer. Put differently, it sounds reasonable to conclude that in a world overwhelmed with explicit marketing attempts, it is recommended that marketers change their tactics by focusing on an alternative way capable of stimulating customers' basic senses and therefore involving them even more, namely subconscious triggers (Krishna, 2012).

The truth is that, in the 21st century, marketers have faced a fundamental shift from traditional marketing – in which consumers are considered as rational decision makers mostly preoccupied by the functional aspect of the product (i.e.: characteristics, benefits) – to experiential marketing. As Schmitt (1999) states, companies coming from a multitude of diverse industries have gradually get rid of the traditional marketing for adopting another form of marketing aimed at generating experiences for their customers. The implementation of such an experiential marketing is nothing but the outcome of three coinciding progresses in the business environment, namely the omnipresence of information technology, the supremacy of the brand and the ubiquity of communications and entertainment (Schmitt, 1999).

1.1. Traditional marketing

According to Schmitt (1999), traditional marketing does not represent properly the rapidly changing world in which we live nowadays – characterized by numerous technical and market developments – as it has been established with respect to the industrial age. In concrete terms, traditional marketing represents a useful form of marketing – yet relatively limited – as the concepts and methodologies it has developed allow us to, for instance, define the nature of products, depict the customers' behavior, determine the competitive rivalry, etc.

The main characteristics which define best traditional marketing are: firstly, an assumption that customers in diverse markets tend to focus more on functional features which are ranked according to their importance and are afterwards compared for selecting the product which appears to provide the best overall value/efficacy; secondly a narrow vision of competition which is assumed to occur mainly within distinct product classes; thirdly a belief that the decision-making process made by the customers is typically driven by problem solving, and fourthly an emphasis on analytical, quantitative and verbal methodologies (Schmitt, 1999).

However, as Schmitt (1999) rightly points out, what companies should bear in mind is that, today, the principles of traditional marketing are not relevant anymore because any functional aspect of the product (e.g.: quality) or its functional benefits are taken for granted by the customers. Put differently, the latter are looking for products, advertisements, and any marketing instrument that play with their senses by entering the core of their hearts, triggering their minds and delivering them an experience (Schmitt, 1999).

In other words, the issue that arises is that marketers should admit that we have now moved to another business environment and that, hence, a shift from the features-and-benefits approach – popularized by traditional marketing – to experiential marketing is paramount and that, therefore, the success of a company will depend on its ability to deliver a desirable customer experience (Schmitt, 1999).

1.2. Experiential marketing

Needless to say that experience is of huge importance as, according to Schmitt (1999), it offers sensory, emotional, cognitive, behavioral, and relational values which have the potential to substitute the functional features symbolizing traditional marketing. In relation to the sensory aspect, Schmitt (1999) defines sense (or sensory) marketing as "appealing to the senses with the objective of creating sensory experiences, through sight, sound, touch, taste and smell and can be used for diverse purposes such as differentiate companies and products, motivate customers and add value to products". Therefore, conversely to the characteristics of traditional marketing, customer experience lies at the very heart of experiential marketing which focuses on consumption as a holistic experience and views customers both as rational – likewise traditional marketing – and emotional while using varied methods and tools (Schmitt, 1999).

Indeed, as Kotler & Keller (2005) point out, marketers' mission is to create as much as possible a holistic product experience for customers. These authors define the holistic marketing concept as "based on the development, design, and implementation of marketing programs, processes, and activities that recognize their breadth and interdependencies. Holistic marketing recognizes that "everything matters" with marketing – and that a broad, integrated perspective is often necessary" (Kotler & Keller, 2005). Similarly, as Schmitt (1999) documented, retailers should climb on the bandwagon by offering a holistic store experience to their clients. By creating a retail environment as pleasant as possible – taking into account its holistic dimension – through the establishment a cozy and comfortable atmosphere, retailers would be able to keep their customers longer in the store, increasing therefore the possibility for them to make a purchase.

As an example, probably the very first company which understood and integrated deeply the concept of sensory branding and experiential marketing is doubtless Singapore Airlines which has moved far away from traditional branding. Indeed, this firm put the emphasis on strategies focusing on emotional experience of air travel by categorizing themselves as an entertainment company. Particularly, by the end of the 1990s, Singapore Airlines marked this occasion by creating its own fragrance – labeled Stefan Floridian Waters – diffused in its planes, perfuming the air hostesses and embedded in the hot towels at the disposal of the travelers. Needless to say that this patented fragrance has since become an unmistakable and distinct trademark of the company (Lindstrom, 2010).

2. RETAIL ATMOSPHERICS

2.1. Origin of the concept "atmospherics"

It would be senseless to refer to "atmospherics" without mentioning its guru, namely Philip Kotler. Indeed, a large stream of research investigating the atmospheric effects on consumer behavior mentions Kotler (1973-1974) as he was unquestionably the very first author to employ and define in precise terms the word "atmospherics" to designate the deliberate control and organization of environmental cues. By referring to atmospherics as "the effort to design buying environments to produce specific emotional effects in the buyer that enhance his purchase probability", Kotler (1973-1974) has opened up a fascinating body of literature for a concept demanding further research.

Nevertheless, as the literature in this domain became richer, marketing researchers have realized that, as Bitner (1990) argues, such atmospheric planning has the potential to create a business success or, on the contrary, can be the cause of a business failure. Therefore, marketers have increasingly recognized that the development and creation of influential atmospheres represent a crucial marketing tactic given that consumers are predisposed to react according to physical stimuli encountered in a store (Turley & Milliman, 2000).

2.2. Classification of atmospheric variables

According to Berman & Evans (1995), atmospheric stimuli can be classified into four categories, namely: the external variables of the store, the general interior variables, the layout and design variables, and the point-of-purchase and decoration variables. Nonetheless, in order to polish this classification as accurately as possible, Turley & Milliman (2000) found necessary to add a fifth category referring to human variables. This categorization reveals important atmospheric elements that managers should attempt to detect and adapt as adequately as possible with the aim to convey an ideal image or atmosphere of their store taking into account the specific customer segment that should be reached and therefore obtaining the sought-after customers' reactions (Turley & Milliman, 2000). The table in appendix 1 offers each category's list of variables that compose them.

To the author's interest in this paper is obviously one of the general interior variables, namely scents. It appears that from the work of Turley & Milliman (2000), abundant studies were found to deal with these interior variables and more precisely with the music cue (e.g.: Yalch & Spangenberg, 1990, 1993; Milliman, 1982, 1986; Areni & Kim, 1993).

Besides, odor is appealing to a growing number of researchers who find an increasing interest in this domain. Nevertheless, surprisingly, only three studies before the year 2000 have put the emphasis on scents or ambient odors which deserve much more attention as Turley & Milliman (2000) point out. Indeed, additional research, in particular conducted in a real-world setting, is needed in order to generalize the findings on the effects of this schemer variable. In this vein, even if other studies in this area are nowadays available, further research still needs to be conducted through field experiment, which is the purpose of this paper.

2.3. Influence of atmospheric variables on customer's behavior

As Kotler (1973-1974) stipulates, while making a purchase decision, customers do not only create a response to the tangible product or service to which they are confronted but more importantly react to the total product being provided. What is meant by the total product is a combination of several features including – perhaps the most important one – the place where the product is purchased or used. Actually, it appears that the purchase decision is, from time to time, less driven by the product being bought but is, on the contrary, more affected by the atmosphere of the place, leading to an interesting conclusion stating that, sometimes, the atmosphere is the key product (Kotler, 1973-1974). Indeed, it sounds reasonable to admit that marketers' efforts to provide an appealing product is doomed to failure if the consumer is not charmed by the store atmosphere on beforehand.

Originally, the word "atmosphere" is defined by the air surrounding a sphere but has been extended to define the quality of the area around us (Kotler, 1973-1974). Needless to say that people capture atmosphere thanks to their senses. This assertion leads us to state that humans are capable to describe the atmosphere of the encountered environment(s) in sensory terms. However, an important note to take concerns the difference between the intended atmosphere and the perceived atmosphere. On one side, the intended atmosphere is the one that comprises the set of sensory qualities that the marketer tries to implement in order to design a simulated environment. On the other side, the perceived atmosphere might be interpreted differently among several customers as a person's reactions to atmospheric cues are generally already partially acquired (Kotler, 1973-1974).

More importantly to consider is the influence that atmospherics are able to exercise on customers' behavior. For this purpose, the following schema (figure 1) represents what could be called a "causal chain" which connects atmosphere and purchase probability.

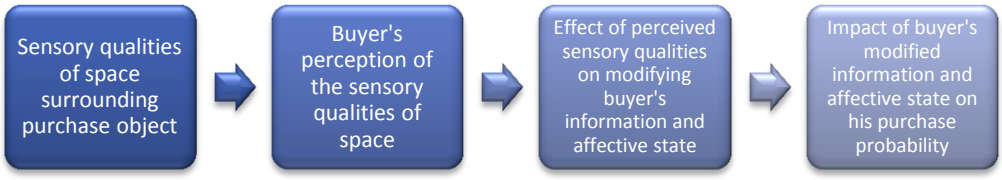


Figure 1: causal chain connecting atmosphere and purchase probability (Kotler, 1973-1974)

It goes without saying that, analyzing this figure more deeply, the atmosphere seems to be of huge importance to retailers as it has the ability to influence purchase behavior in three ways: it may serve as an attention-creating medium (i.e.: differentiator), a message-creating medium (i.e.: convey values) and last but not least as an affect-creating medium (Kotler, 1973-1974). The latter is perhaps seen as the most important one because all the atmospheric cues have the potential to straightforwardly provoke instinctive reactions which positively enhance purchase probability. In other words, with the aim to transform behavioral intentions into actual buying behavior, retailers should use and manipulate smartly their store atmosphere (Kotler, 1973-1974).

Nonetheless, this author highlights that retailers should be cognizant that not every atmosphere is appropriate taking into account the type of industry and market. Therefore, in order to benefit from their store atmosphere, the retailers should carefully consider the target audience and what is looking for in the purchase experience, the adequate atmospheric cues that can potentially influence buyers' beliefs and emotional reactions, and finally the competition against which the company must stand out (Kotler, 1973-1974). Indeed, in a business world more competitive than ever, other marketing instruments are no longer able to distinguish a firm's offerings against its rivals'. As a consequence, marketers should look at atmospherics as a powerful weapon to create a sustainable and differential competitive advantage (Kotler, 1973-1974).

Following on from the concept of atsmohperics and at the core of numerous studies around the effects of atmospheric stimuli on customers' shopping behavior, is mentioned and used the well-known stimulus-organism response (S-O-R) paradigm (figure 2). The latter, investigated by Mehrabian & Russell (1974) and expanded later on to store environments by Donovan & Rossiter (1982), constitutes the basis of environmental psychology. Basically, the very first aim of this framework was to assess the effects of all the elements comprised in an environment on individuals by pinpointing that the resulting forms of behaviors embraced by people are the outcome of environmental factors.

In common terms, this paradigm suggests that, applied to the the retail context, the store environment (S) comprises numerous stimuli – that might be perceived by the customer's senses – which are combined to represent the stimulus that causes and affects a consumer's nonverbal responses taking the form of internal evaluations (O) which in turn provoke some behavioral responses (R), namely approach or avoidance behaviors (Mehrabian & Russell, 1974). Put differently, these contrasting behavioral responses are determined on beforehand by the customer's emotional state created by the environmental stimulus. Approach behaviors are seen as positive responses to a store environment, such as a desire or intention to stay and remain in a store, to explore it as well as its products, a willingness to communicate with others in the environment, higher likelihood to spend money in the store, etc. At the opposite, avoidance behaviors are characterized as negative responses to the store environment, such as a desire to leave the store, to remain inanimate in the environment, to avoid interactions with others in the environment, to spend less time looking or exploring the store and its offerings, to be reluctant to spend money, etc. (Bitner, 1992; Donovan & Rossiter, 1982; Yalch & Spangenberg, 1988, 1990). Relying on this model, several studies centered on the effects of the store atmosphere on the customers' affective responses have found interesting results regarding, for instance, the influence of the wall's color of the store (Bellizzi & Hite, 1992), the level of crowding (Hui & Bateson, 1991), the music (Milliman, 1982), etc.

Figure 2: The S-O-R model (adapted from Mehrabian & Russell, 1974)

This model can similarly be administered to ambient scent (figure 3), where the stimuli (S) is produced by the scent in question to influence customers' internal evaluations (O) such as the affective and arousing qualities of the store's atmosphere in general or more precisely of the store's merchandise (e.g.: assortment, price, quality, etc.). Finally, depending on those evaluations and how the ambient fragrance is assessed internally by the customers, that is whether they like or dislike the presented stimulus, the response (R) stimulates either approach or avoidance behaviors which can be measured through the time spent in the store, the intention to revisit the store, the money spent, the social interaction with the salespeople or other customers, the level of product browsing, etc. (Spangenberg et al., 1996, 2006).

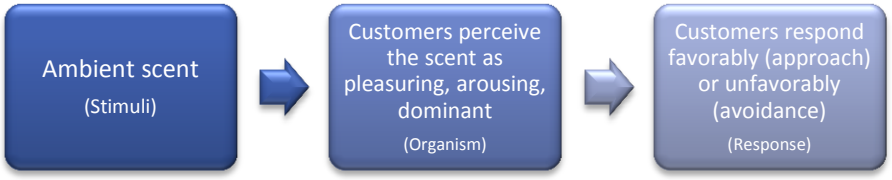


Figure 3: The S-O-R model applied to ambient scent (adapted from Mehrabian & Russell, 1974)

The above model suggests that pleasant fragrances have the capacity to produce pleasant affective states whereas unpleasant scents cause unpleasant affective states. To be absolutely clear, an affective state refers to the emotional response that an individual develops after entering into contact with the surrounding environment (Bower, 1981; in Spangenberg et al., 1996). Additionally, the term "arousal" invokes a psychological feeling state that a person exhibits in reaction to the encountered environment (Mehrabian & Russel, 1974). Therefore, trusting the S-O-R paradigm, an arousing and affectively pleasant (scented) environment should encourage customers to adopt approach behaviors whereas an arousing and affectively unpleasant (scented) environment should provoke avoidance behaviors (Spangenberg et al., 2006). In other words, Mehrabian & Russell (1974) report that any environment will create an emotional state in a person that can be considered using the PAD dimensions, namely pleasure, arousal and, to a lesser extent, dominance. The combination of these three different states determines the approach or avoidance behavior(s) that an individual will embrace. The dimensions can be described more specifically as follows: 1) pleasure refers to an affective response that denotes individuals' feelings of happiness relative to the environment, or more concretely the degree to which a person feels good, happy, joyful or satisfied in a situation; 2) arousal relates to individuals' feelings of alertness, that is the degree to which a person feels excited, stimulated, alert, or active in the situation; and 3) dominance makes reference to the degree to which individuals feel dominant (i.e.: in control) or submissive (i.e.: under control) in the environment (Mehrabian & Russel, 1974; Donovan & Rossiter, 1982). Nevertheless, due to a lack of empirical evidence, researchers using the S-O-R paradigm in either retailing or non-retailing settings tend to neglect this last dimension (Donovan et al., 1994). However, environmental cues were proved to have the capacity to influence not only the emotional state of the consumers but also other internal evaluations such as consumers' cognitive elaboration (Bone & Ellen, 1999).

Therefore, we could conclude that the effects of an ambient fragrance is commonly perceived in terms of an atmospheric stimulus provoking an affective or cognitive response which, accordingly, encourage individuals to engage in either approach or avoidance behavior(s) (Bitner, 1992; Gullas & Bloch, 1995, Mehrabian & Russel, 1974).

Important to highlight is that the S-O-R paradigm also makes reference to the importance of congruency between an ambient fragrance and the store's products/offerings. In this vein, it is believed that arousal complemented with positive affective responses, as a consequence of compatibility between the atmospheric stimulus and the store (i.e.: congruence), should produce approach behaviors whereas arousal combined with negative affective responses, as an outcome of incompatibility between the ambient scent and the store, should diminish any attempt to engage in approach behaviors while augmenting the likelihood to opt for avoidance behaviors (Spangenberg et al., 2006). This statement stresses the importance for retailers to take into account the congruency between the ambient scent they wish to diffuse in their store and their offerings. The concept of congruency will be further discussed in the discussion of the literature review.

3. OLFACTORY/SCENT MARKETING

"Tell me and I will forget, show me and I will understand, make me smell and I will remember"

This old Chinese proverb, adapted by a Belgian sensory marketing company *Emosenses*, speaks for itself by highlighting the importance of olfactory marketing. Indeed, as the writer Patrick Süskind points out in *Perfume: The story of a murderer,* "odors have a power of persuasion stronger than that of words, appearances, emotions, or will. The persuasive power of an odor cannot be fended off, it enters into us like breath into our lungs, it fills us up, imbues us totally. There is no remedy for it." However, this quote suggests that among all our senses, smell is perhaps the one that is the least understandable (Ward et al., 2003).

3.1. Importance of olfactory/scent marketing

Lindstrom (2005) rightly reminds us that "we can close our eyes, cover our ears, refrain from touch, and reject taste, but smell is a part of the air we breathe". This brilliant author also underlines that smell is the only sense we can't turn off as every time we take a breath – that is around 20,000 times per day – we are subject to detect a smell (Lindstrom, 2010).

In other words, smell could be defined as our most direct and basic sense (Lindstrom, 2010) as well as one of our most primal senses that serves as our chemical alert system (Zaltman, 2003). Indeed, the sense of smell functions as a warning that cautions the brain whether the environment surrounding us is safe or hazardous and provokes an immediate and instinctive reaction to it (Zaltman, 2003). Thanks to our nose and the experience we acquire in utilizing odors as signals, we are, for instance, able to detect the danger of a fire or a gas leak, to determine whether or not some food (or beverage) is still edible or not, etc. (Goldstein, 1996).

It is well documented that multitudinous smells that surround us daily can be identified by our extraordinary olfactory system. Indeed, in order to detect among approximately 100,000 diverse odors – including primary odors which have the potential to influence mood and behavior (Lindstrom, 2010) – that come across in the environment, humans can rely on their nasal cavity equipped with over 5 million olfactory neurons (Axel, 1995; Buck, 2004; in Krishna, 2011).

Some authors have therefore characterized olfaction as one of the "chemical" senses as the body assimilates gaseous molecules, perceived on beforehand, and reacts accordingly (Cain, 1988; Scott & Giza, 1995; in Morrin & Ratneshwar, 2000). In this vein, research on the human anatomy has shown that the human body comprises between 6 and 10 million receptor cells situated in the air passages of the nose and that, by using these cells, humans are capable of distinguishing thousands of different aromas (Strugnell & Jones, 1999; in Davies et al., 2003). Nevertheless, as Goldstein (1996) reminds us, the power of human olfaction appears to be poorer in comparison to the capacity of the sheepdog's nose and its 220 million cells. Also, compared to the other humans' senses, especially the sight, the sense of smell seems to be processed rather slowly. In fact, the detection of a visual object requires the minor time of 45 milliseconds but for a scent to be identified, 450 milliseconds (i.e.: 10 times longer) are necessary (Herz & Engen, 1996; in Krishna; 2011). Nonetheless, needless to say that human's sense of smell is powerful as individuals are able to recognize and recall multiple odors that they have smelled in the past (Aggleton & Waskett, 1999; in Krishna 2011). Indeed, a recent research (Bell & Bell, 2007) reported that we possess a high capacity to recall scents as the findings show that people, even after one year passed, can remember odors with about 65% accuracy whereas people's recall of images, this time only after 3 months, is much lower at around 50% correctness.

Moreover, in the *Brand Sense* study run by Lindstrom (2010), the author reports that 37% of the sample surveyed listed sight as the most important sense when evaluating our environment and more interestingly, this was followed by 23% of consumers who listed smell, proving that olfaction is of significant importance. Furthermore, the sense of smell possesses the power of influencing 75% of our emotions (Lindstrom, 2005) and is a paramount determinant of people's primary reactions as they will respond to scents by expressing either a like or dislike (Bosmans, 2006).

Consequently, olfaction – or the sense of smell – is often pigeonholed as *the* emotional sense (Engen, 1982). As a research (Aggleton & Mishkin, 1986) reported: "the primary olfactory cortex forms a direct, anatomical link with the amygdala-hippocampal complex of the limbic system. Only two synapses separate the olfactory nerve from the amygdala, which is critical for the experience of an emotion". In common terms, the odor that humans smell is registered in the limbic system of the brain – defined as the seat for memory and immediate emotions – where the sensorial information is elaborated.

What is remarkable is that olfaction is treated reasonably quickly due the extraordinarily short distance covered by the odor that enters the nose in order to reach its destination, which is the specific part in the brain named limbic system (Davies et al., 2003). Based on this scientific fact and supporting it, later research (Herz & Engen, 1996) emphasizes that an odor is directly and intensively associated to the emotions that humans experience. In other words, the sense of smell can be characterized as the most closely linked to emotional reactions simply because of the direct connection between the olfactory bulb and the limbic system in the brain (Ehrlichman & Halpern, 1988; Hirsch, 1995; Wilkie, 1995). As Pam Scholder Ellen claims: "(with) all of the other senses, you think before you respond, but with scent, your brain responds before you think".

Nevertheless, despite the predominant association between emotions and odors, a physiologic study of the brain – conducted with individuals placed in a scented environment – stipulates that the waves recorded by the electroencephalogram are attributed to a cognitive activity caused by the presence of an ambient odor (Lorig & Roberts, 1990). In the context of marketing, several scholars studied the positive effects that an ambient odor produces on store and/or products evaluations as well as on information processing and variety-seeking behaviors (Spangenberg et al., 1996; Bone & Jantrania, 1992; Mitchell et al., 1995).

Widely acknowledged as a paramount sense, it is not surprising to notice that an increasing number of researchers are paying attention to this mysterious atmospheric stimulus.

3.2. Scented product vs. ambient scent

An important distinction to bear in mind is between, on one side, the scents emanating from an object which are therefore intrinsic to this object's evaluation and, on the other side, ambient scents which have received lately a growing interest from the researchers and constitute the focus of this paper. Concretely, the difference between a scented product and an ambient scent is that the former naturally or artificially originates from the product from which it emanates while the latter does not arise from a specific product or object and is commonly dispersed in an area (Gulas & Bloch, 1995).

On one hand, several objects possess their own inborn scent, such as the majority of foods but also elements of the flora like flowers, which all have a particular odor that is highly recognizable and has not been added somehow. In addition, there also exists what can be called scented products such as a bulk of cosmetics or cleaning products. In this case, a specific scent was brought to the product in order to release a pleasant odor while opening it. A concrete and typical example is the one of natural cosmetics' shops such as "Yves Rocher" or "Lush" which are attracting their customers mainly thanks to the inherent scents of their product lines. Several scholars (e.g.: Laird, 1932; Bone & Jantrania, 1992) have proved the benefits of scented products by pinpointing that, at the opposite of odorless products or products fragranced with incongruent scents, those are able to increase the product's perception of quality as well as its evaluation. As the findings of Krishna et al. (2010) suggest, the non-scented attributes of a fragranced product – compared to an unscented one – seem to be remembered for a longer period. Actually, these authors support the idea that memory for product-related information is better improved throught the use of product scent rather than ambient scent (Krishna et al., 2010). Nevertheless, it is believed that, even if ambient scent is less efficient at facilitating memory for a single product, it could have the capacity to do so for a multitude of objects present within an environment as – because it is diffused in the entire store – its impacts can also be transferred to numerous surrounding objects (Gulas & Bloch, 1995; Krishna et al., 2010). Furthermore, as it will be explained in the remaining part of this literature review, ambient scent has also many other effects than simply enhancing memory for objects. For this purpose, it seems necessary to provide a comprehensive definition of ambient scent, which is, besides, the focus of this paper.

Therefore, on the other hand, ambient scent has been defined by Spangenberg et al. (1996) as "a scent that is not emanating from a particular object but is present in the environment". In addition, as this type of scent does not emanate from a specific product, they can hence be considered as extraneous environmental cues (Bosmans, 2006). What is fantastic with this type of scent is that it has the capability to affect responses to the entire store and its offerings and this holds also true for odorless stores such as bookstores, furniture stores or jewelry stores where products do not enjoy an intrinsic fragrance of their own (Gulas & Bloch, 1995; Parsons, 2009). Indeed, as stated before, marketers are facing a saturated market in which the offers among numerous competitors become somehow identical in their functions, making differentiation harder to reach (Schmitt, 1999). Subsequently, in order to create a strong brand image and to be able to stand out in such an overcrowded market, marketers would be better off if they understand the necessity to adopt an experiential marketing approach (Schmitt, 1999) which is expressed through scent marketing, or more broadly through sensory marketing. By addressing the human senses, here olfaction, customers' perception of, for instance, the product quality will be influenced positively (Lindstrom, 2005).

What is also interesting is that companies, such as the U.S fashion retailer Abercrombie & Fitch, are offered by olfactory marketing agencies the possibility to create their own signature by developing a scent combining different aromatic oils in order to come up with the perfect aroma that reflects a certain feeling and ambiance in their stores. Similarly, an olfactory marketing company *Air Aroma* – which also possesses a distribution office in Belgium – produced specific scents for the well-known fashion brands Scotch & Soda and Zara. By collaborating with such scent marketing firms, fashion retailers expect customers to relate their brand directly with their scent signature, and vice versa.

In Belgium, the trend of scent marketing is bright new and until recently, only few companies have devoted their interest to it. Among the rare ones, the company *Scents*, founded by Patrick Castelain and Johan Delissen, is currently one of the only Belgian companies exclusively dedicated to selling fragrances. This firm states that "the service will be experienced more positive and you will return more quickly. Smell is therefore, with other words, one of the strongest triggers for buying products. *Scents* use fragrances to improve the brand positioning, to strengthen the brand experience, and in the long term to increase the turnover of its customers"[1].

[1] Accessed on the 6th of March 2014 on www.scents.be

This firm possesses a large number of references in diverse sectors such as food, retail, entertainment and many others. Among their references, the cinema Kinepolis enjoyed the benefits of the scent marketing by diffusing an odor of grass during the preview of the concert of the British group U2. It appeared that diffusing a grass fragrance instead of a pop-corn scent was more appropriate and more appreciated for such a "movie" as it gave the impression to the audience to really live the concert on the lawn on which the show took place initially[2]. Similarly, the travel company Neckermann diffused in one of its agency a winter fragrance in order to "warm up" their clients with the intention to influence them to book a ski vacation[3].

Note that ambient scents are not only dedicated to businesses but, on the contrary, become also very popular for personal uses. For instance, the Belgian olfactory marketing company *Imao* developed 9 different types of perfume, each of them associated with their adequate color, which are embedded in a support. This state-of-the-art technology is not comparable to traditional air fresheners as its application is broad: car, dressing, drawer, handbag, suitcase, etc. Customers indeed intend to create pleasant and smoothing environments in their daily life. However, the focus of this paper remains on ambient scents in a retail environment.

3.3. Theoretical models

In line with the S-O-R paradigm propagated by Mehrabian & Russel (1974), several scholars proposed – yet different but closely linked – frameworks in order to fill the gap in the literature around the influence that ambient scent can exert on customer's behavior. For instance, Gulas & Bloch (1995) were the first authors to develop such a model by considering ambient scent as an environmental cue which has the ability to impact on customer's affective responses as well as behaviors. Few years later, it's the turn of Bone & Ellen (1999) to attempt to enrich prior knowledge with a model fragmented into three dimensions of ambient scent, namely the presence/absence of scent, the pleasantness of scent, and the congruity of the scent with the object under investigation. This revolutionary framework takes into account the possible effects of ambient scent on customer's behaviors by reviewing important mediating and moderating variables and stipulates that ambient fragrance is also capable of influencing cognitive responses, besides emotional responses on which the focus has been so far.

[2] Accessed on the 6th of March 2014, Het Niewsblad (2008) via www.scents.be
[3] Accessed on the 6th of March 2014, Het Laatste Niews (2011) via www.scents.be

Finally, Davies et al. (2003) set up a model aimed at completing the Gulas & Bloch's (1995) popular model, enriching it by integrating influences of different variables that appear to be meaningful and important to consider in order to improve the prior framework in which their work found its roots. These models, therefore, deal with the impact that a pleasant shopping environment, created by a scent diffused in a retail setting, exercises on customer's reactions.

In the following section, these three theoretical models mapping the effects of an odor in the retail environment on the customer's reactions will be discussed. This section will first introduce the model of Gulas & Bloch (1995). Secondly, the model of Bone & Ellen (1999) will be presented. Finally, the extension by Davies et al. (2003) of the Gulas & Bloch's (1995) model will be explained.

3.3.1. Gulas & Bloch (1995) model

As mentioned before, the model of Gulas & Bloch (1995) is based on the S-O-R paradigm of Mehrabian & Russell (1974) which specifies that an environmental stimulus (S) – here an ambient fragrance – has an effect on people's internal evaluations (O) which in turn determine whether the person will engage in either approach or avoidance behavior(s) (R). Because this model has already been discussed under the section "influence of atmospheric variables on customer's behavior", the remaining text of this section will not elaborate on it.

Concretely, Gulas & Bloch (1995), building on the environmental psychology model of Mehrabian & Russel (1974), took a close look at a phenomenon deserving greater attention, that is the probable effects of an ambient scent on the customer's behavior. These academics have therefore enriched the literature by building a framework tracing the mechanisms by which an environmental variable (i.e.: ambient odor) influences customer's approach/avoidance behaviors. The purpose of the development of this model is that – as its authors state – while scented products possess the ability to affect customer's reactions towards them respectively, ambient fragrance is able to impact on customer's reactions with regard to a multitude of products – either fragranced or not – presented in a retail environment (Gulas & Bloch, 1995). In other words, the authors strongly believe that the consumption activity is potentially subject to influences exerted by an ambient odor. The structure of this paramount model will be dissected step by step in the following paragraphs.

First of all, here, the emphasis is put on the importance of the perceptions that people have about an ambient scent. It turns out that how customers will perceive the ambient fragrance will certainly depend on the objective ambient odor as well as on the customer's acuity. As far as the latter aspect is concerned, an important point to be aware of is that – because of some influencing variables such as individual characteristics – the acuity levels of the sense of smell diverge very much from a person to another (Gulas & Bloch, 1995).

Secondly, as shown in the below graph (figure 4), customer's affective responses are triggered by a combination of scent preferences and the perceived ambient fragrance. Likewise their influence on customer's acuity of olfaction, individual characteristics such as age and gender might also guide scent preferences (Hirsch, 1992; in Gulas & Bloch, 1995).

Thirdly, the relationship that exists between the perceived ambient odor and customer's affective responses can possibly be moderated by several variables such as scent congruity with the surrounding environment or other atmospheric elements. In this vein, the scholars Gulas & Bloch (1995) refer to atmosphere as "composed of multidimensional and non-scent characteristics of the environment which may influence the level of affective responses that would otherwise result from scent alone". Concretely, Bone & Jantrania (1992) reported that customer's reactions to a product's scent are influenced by the congruity of the latter with its other characteristics. Therefore, it is believed that a similar moderating effect may happen as far as ambient scent is concerned. In other words, whereas an ambient fragrance might be perceived as pleasant, it may not lead to the desired customer's affective responses if the ambient odor is not fitting to other atmospheric cues (Gulas & Bloch, 1995).

Finally, it is expected that customer's affective responses caused by the perceived ambient scent will result in either approach or avoidance behaviors. This literature suggests that how environmental conditions are perceived constitute a critical determinant of the customer's attraction to or repulsion by features of the environment (Gulas & Bloch, 1995). Indeed, several researchers (Milliman, 1982, 1986; Harrell et al., 1980) – inspired by the literature around environmental psychology (Mehrabian & Russel, 1974) – have already demonstrated the effects of different atmospheric elements (i.e.: music, crowding) on the adoption of approach versus avoidance behaviors by customers.

In a similar vein, it sounds logical to believe that an ambient fragrance – also categorized as an atmospheric cue – will produce similar effects and that an odor considered as congruent with the encountered retail setting will increase the customer's willingness to opt for approach rather than avoidance behaviors (Gulas & Bloch, 1995). Besides, as Bitner (1992) argues, because mood shifts – potentially caused by an ambient fragrance – are assumed to affect evaluations of the store setting and its merchandise, the latter, accordingly, constitute another category of approach responses apart from mood changes.

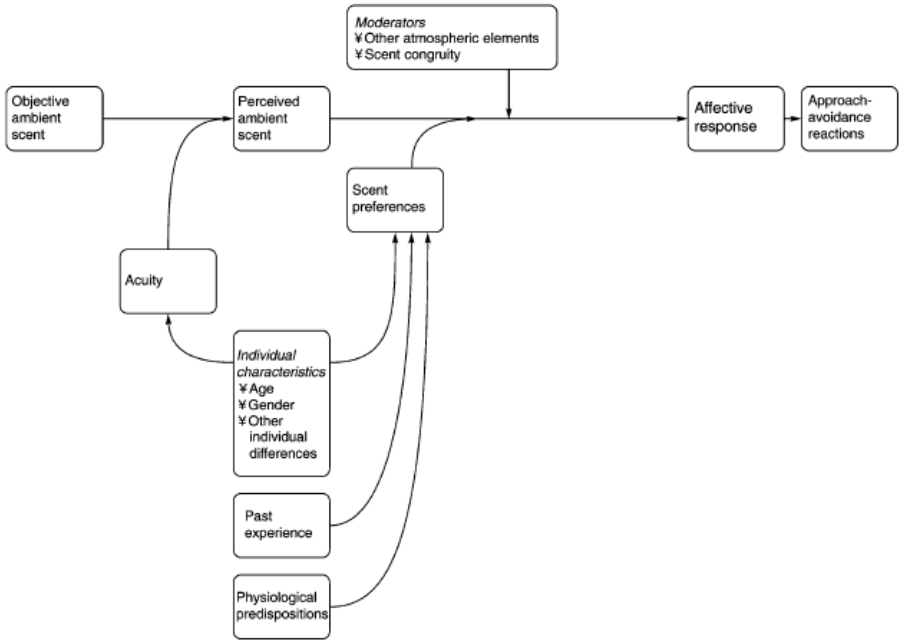


Figure 4: Model of the influence of ambient scent on consumer responses (Gulas and Bloch, 1995:90)

3.3.2. Bone & Ellen (1999) model

Bone & Ellen (1999) pointed out that an odor comes in three dimensions, each of them seeming important and determining the way a specific research will develop, that is, its presence (or absence), its pleasantness, and its congruity with the object under investigation. Likewise Gulas & Bloch (1995), the authors of the conventional wisdom state that scents have the capacity to influence consumer's behaviors (i.e.: approach or avoidance), modify consumer's mood states (i.e.: arousal and valence) and impact on consumer's cognitive effort (Bone & Ellen, 1999).

Therefore, in their model, at the opposite of previous research, the authors not only highlight the influences that ambient scent exercises on affective responses but also stress that ambient scent is similarly able to affect cognitive responses (i.e.: elaboration and evaluation). To clarify things, Bone & Ellen (1999) define affective responses as "like/dislike responses to a stimulus" whereas they describe evaluative (or cognitive) responses to be "more attribute or quality-related".

A summary of this conceptual model is provided in the following paragraphs and the overall model of conventional wisdom is represented by the below chart (figure 5). The three determined odor dimensions of presence, pleasantness and congruity are subsequently delineated by elucidating the impact that each of them can potentially exert on the intervening variables, namely approach/avoidance behaviors, mood states and cognitive effort. Also, consumer's responses to the scent stimulus – mediated by the intervening variables – are briefly discussed. Finally, the moderating variables (i.e.: individual characteristics, task/content effects) are outlined.

- ✓ Scent presence

Bone & Ellen's (1999) review of 22 studies contradicts the myth that the simple presence of an ambient odor is able to influence consumer's approach/avoidance responses by reporting a poor evidence of such effects in addition to a meager 16.1% of tests confirming mood alterations as a result of the presence of an ambient odor. Nevertheless, it appears from the analyzed studies that elaboration effects tend to be more robust although it should be underlined that such impacts are predominantly determined by the type of task the respondents were performing. In addition, the analysis suggests that significant effects on affective responses seem to be more common amidst the various tests revised by the authors with Spangenberg et al.'s (1996) study being the reference on the subject proving that the unique presence of an ambient odor in a simulated store setting increases in a positive manner its overall assessment as well as the rating of its global envrionment. On the contrary, evaluation effects occasioned by the scent presence were mainly null. It is useful to emphasize that both affective and evaluative responses were subject to moderating variables such as gender. Besides, concerning purchase intentions, findings report that an ambient fragrance possesses the advantage of making consumers more likely to revisit the store as well as to purchase certain products.

As far as the behaviors are concerned, it is quite astonishing to discover that positive effects on information-search and choice behaviors are rather scarce and that – by contrast – the presence of an odor diminishes actual time spent in searching for information (Mitchell et al., 1995) whereas it increases the perceived time spent in a store (Spangenberg et al., 1996). This research suggests that the only presence of an ambient scent might not be as powerful as the scent pleasantness and/or congruity concepts (Bone & Ellen, 1999).

- ✓ Scent pleasantness

Bone & Ellen (1999) rightly inform us that odors are characterized by two basic and intertwined dimensions, namely the quality and the intensity. On one hand, the term quality denotes the affective nature of a scent, that is whether it is perceived as pleasant or unpleasant (Harper et al., 1968; Takagi, 1989; in Bone & Ellen, 1999). On the other hand, the term intensity evokes the level of concentration of a fragrance (Takagi, 1989; in Bone & Ellen, 1999). As Henion (1971; in Bone & Ellen, 1999) points out, those two paramount odor characteristics are closely related as the degree of intensity of a scent will determine its pleasantness, that is, the higher the odor concentration is, the lower becomes its pleasantness. In their study, Bone & Ellen (1999) found evidence that whereas mood arousal does not appear to be influenced by scent pleasantness, it is the case for mood valence which increases along with the level of odor pleasantness. Nonetheless, as far as evaluative and affective responses are concerned, the studies' outcomes are rather mixed or not statistically significant. Important to note, however, is that never the authors found that a pleasant scent had a negative impact on consumer's reactions, the reverse case holding true also (Bone & Ellen, 1999).

- ✓ Congruity/fit

Scent congruity, in olfaction research, has received a growing interest from retailers and marketers. The reason hidden behind the emergent attention around this concept is that, as Mitchell et al. (1995) stress, scents that are mismatched with the object studied might produce adverse effects such as leading consumers to process irrelevant information to the detriment of the processing of relevant information. Put differently, the pleasantness of an odor might not be a sufficient criterion in order to produce the desired consumer's reactions. For this reason, Bone & Ellen (1999) highlight that scent appropriateness with the object under investigation is crucial.

Regarding mood shifts, no exhaustive conclusion can be drawn as only one study documented positive changes in mood valence when participants were exposed in a better-fit condition (Ellen & Bone, 1999). Furthermore, in accord with scent presence, scent congruity divulges similar positive effects on elaboration as well as on global product evaluations, yet this significance remains rather weak. Indeed, only Bone & Jantrania (1992) suggest that – compared to non-scented or inappropriately fragranced products – an odor matching the object studied produces higher positive overall evaluations. Finally, perhaps surprisingly, Mitchell et al. (1995) reported unexpected findings by illustrating that although participants spent more time in a congruent situation, they tend to search for information more consistently while opting for lower quality brands as well as displaying a greater willingness to switch from brand to brand.

- ✓ Moderators

As Bone & Ellen (1999) illustrate, greater attention should be paid to several moderating variables, likewise Gulas & Bloch (1995) mentioned earlier in their model. Indeed, the majority of scent effects on diverse dependent variables is generally moderated by several variables like individual differences or task/content effects. For instance, prior studies (Koelega & Köster, 1974; Larsen & Diener, 1987) revealed that women might be more open and sensitive to olfactory marketing as they experience emotions at a higher level than do men and that, in addition, they possess more developed schemas with respect to odors, making gender an important moderating variable to consider. Of course, it goes without saying that other important individual differences apart from gender need to be taken into account and studied in future work.

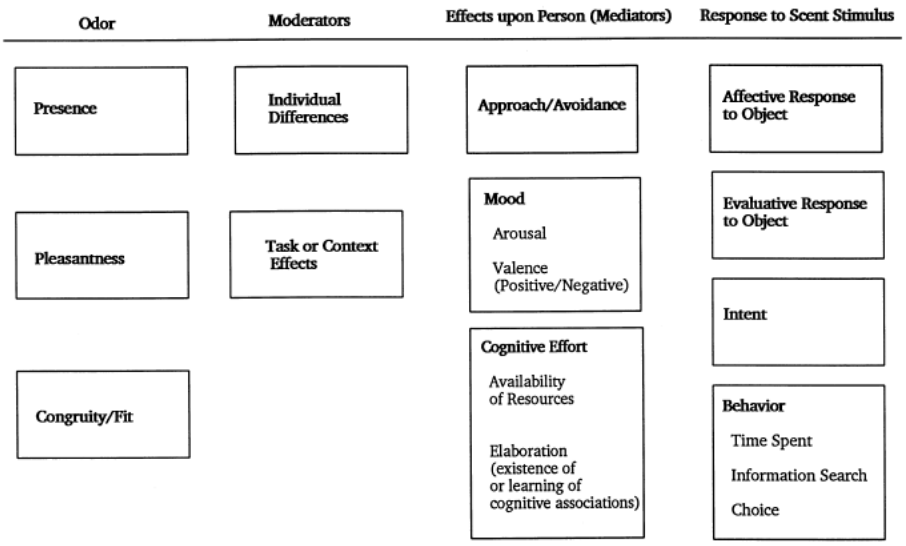


Figure 5: Conventional wisdom view of olfactory effects (Bone & Ellen, 1999)

3.3.3 Davies et al. (2003) model

Davies et al. (2003) extended the model created few years before by Gulas & Bloch (1995) by applying it to retail settings (figure 6). These academics recognize that it is crucial for retailers to devote all the necessary means to, in a first stage, attract customer's attention and, in a second stage, transform them into buyers. Therefore, Davies et al. (2003) reckoned that there was a serious need for retailers to understand the process by which customer's approach behaviors can be guaranteed or augmented and avoidance behaviors spared. In other words, the manipulation of any atmospheric stimulus, including ambient fragrance, in a retail environment represents a meticulous task which requires the retailers to have a clear idea of the message they attempt to convey through such cue. On one hand, shop owners might be interested in generating customers' approach behaviors instantaneously by stimulating their desire to linger longer in the store, search for information, or buy, but may also intent to postpone such favorable behaviors by encouraging customers to revisit the store or buy more in the future (Davies & Ward, 2002). For this purpose, it appears to be paramount to communicate the proper and intended message to the target customers so that they will be able to interpret it correctly and adopt the envisioned behaviors.

To this end, the academics developed several elaborations which clearly denote the difficulty that accompanies the understanding of how an ambient scent is perceived and interpreted by a customer. In their model, Davies et al. (2003) claim that this is by taking into consideration the "perceived ambient scent" (PAS) – instead of taking for granted the assumption that the latter is only influenced by customer's olfaction acuity and therefore individual elements as suggested in the initial model of Gulas & Bloch (1995) – that both conscious and unconscious elements can be integrated, like in their elaborated model (Davies et al., 2003). In other words, these authors suggest that an odor might potentially be seen in a pre-attentive manner, meaning that customers might possibly respond unconsciously to a smell (Lorig, 2001). Hence, another factor which has been added to the original framework is "attention", to which the perceived ambient scent is closely related. In fact, Davies et al. (2003) stipulate that, according to specific scent preferences or simply due to the perceived positive character of the odor (i.e.: quality, pleasantness, etc.), attention will be triggered. In turn, a holistic impression can – in some cases – similarly be enhanced by those hedonic qualities of the scent, and both contribute to produce affective responses that afterwards give rise to either approach or avoidance behaviors (Davies et al., 2003). What sounds intriguingly interesting is that customers might sometimes associate systematically an odor with a place, revealing that those affective responses generated by the customer are the fruits of an emotion memory which links its feelings to a particular place or moment (Davies et al., 2003). Proven to be effective at activating memories of emotions, marketers should make use of scent memory as a powerful weapon. Armed with such knowledge, retailers should focus on triggering pleasant emotions in order to create strong and long-lasting emotional ties between them and their customers, leading to a logical result, that is, an increased loyalty towards their brand/store. However, from the researchers' side, such a model calls prior assumptions into question by suggesting that – instead of being straightforwardly connected to a current event as it has long been believed – affective responses are created according to past experiences (Davies et al., 2003). Moreover, the model embodies that cultural influences (i.e.: socialization and acculturation), psychological state (i.e.: alterations in scent preferences and perception), and scent memory represent considerable citeria that will determine how an ambient fragrance is perceived by different customers.

Finally, Davies et al. (2003) emphasize that, among the various atmospheric stimuli, ambient odor is one of the most efficient one in permitting the formation of a holistic impression of the store, the latter being of significant importance in the determination of the overall brand image, the store identity and the type of behavior in which customers will engage. This belief leads the authors to conclude that – in relation to the concept of "totality" evoked in environmental psychology – the present elaborated model enriches prior research by recognizing that smell, considered within a wider range of stimuli, holds an important role in fashioning a holistic impression of the store and/or its atmosphere (Davies et al., 2003). In addition, as already mentioned previsouly, perhaps the most important aspect of such a holistic impression is its ability to convey what can be called a "sense of place". In this vein, ambient scent plays a crucial function in building a distinctive set of emotions, therefore providing retailers with significant opportunities for standing out in an overcrowded marketplace through, for instance, the creation of their scent signature (Davies et al., 2003).

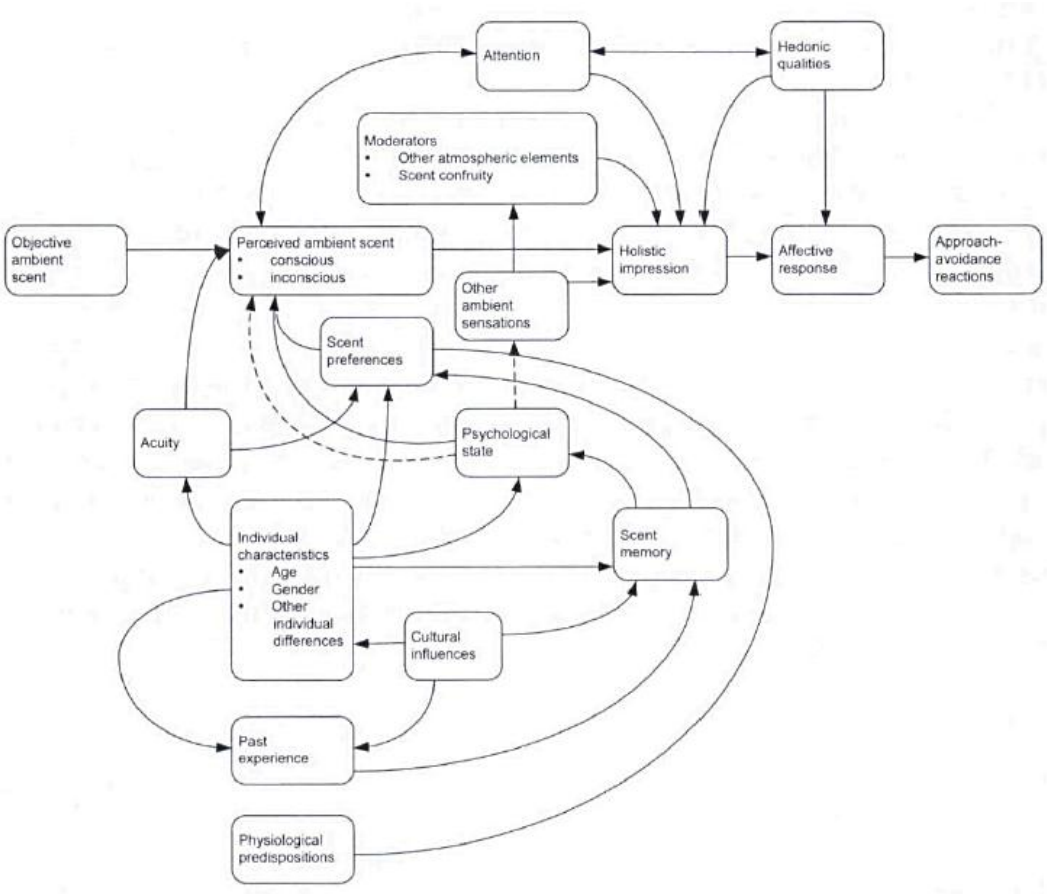


Figure 6: Elaborated proposed model of the influence of ambient scent on consumer responses (Davies et al., 2003)

3.4. Discussion on the influence of ambient scent on customer's reactions

Although Turley & Milliman (2000) pointed out that olfaction appears to be the neglected sense in the field of research and especially in the domain of customer's behavior, some authors have already documented us with considerable knowledge. Indeed, a review of prior research on the effects of scent on customer's reactions enables to understand that this atmospheric stimulus is mainly studied regarding three dimensions. First and foremost, the first dimension refers to the presence of the scent which has been proven to be effective in enhancing cognitive elaboration, affective, evaluation and behavioral responses (e.g.: Spangenberg et al., 1996; Morrin & Ratneshwar, 2000; Doucé & Janssens, 2013). The second dimension denotes the pleasantness of the scent which has been demonstrated to result into positive affective and/or cognitive responses (e.g.: Mitchell et al., 1995; Bone & Ellen, 1999; Morrin & Ratneshwar, 2000). Last but not least, the third dimension deals with the congruency of the scent with respect to the store's products (Bone & Jantrania, 1992; Mitchell et al., 1995; Matilla & Wirtz, 2001).

Due to the confusion that exists between the mechanisms linked to emotions and cognitions, it seems interesting to remind and clarify those two concepts. On one hand, the affective responses – relating to, for instance, mood (i.e.: pleasure and arousal) – have predominantly been mentioned as the most common effects that ambient scents produce. This prevalent association between emotions and odors is certainly due to the fact that the sense of smell is directly linked to the limbic system of the brain – the center of emotions – as explained previously. On the other hand, cognitive responses – referring to, for example, attention, evaluation, information search, and memory – are usually more often associated with the other senses such as sight and hearing. However, as the literature will demonstrate later on, this assumption is erroneous as only few studies to date have reported a positive effect of an ambient fragrance on affective reactions.

Within the framework of this literature review, a summary of the various studies conducted in this field is provided in the following discussion which is divided into the different variables discussed previously in the three theoretical models. Specifically, the purpose of this review is to highlight the important findings of the effects of an ambient scent on the customer's diverse reactions, namely on mood, evaluation, spending, memory, lingering, while also considering the multiple moderators (e.g.: congruency with the store environment, individual differences, etc.).

3.4.1 Mood and affective reactions

Perhaps the weakest effect that scent produces is on the mood states. This poor empirical evidence might be surprising as it has long been believed and assumed that ambient odors have the ability to influence consumer's moods. Indeed, Ehrlichman & Bastone (1992; in Bone & Ellen, 1999) reported that fragrances perceived as pleasant have the capability to enhance pleasant mood states. On top of that, many researchers (e.g.: Baron, 1990; Ehrlichman & Bastone, 1992; Ellen & Bone, 1999) have been convinced that the most important and frequent mediators of the effects of an olfactory stimulus on customers' reactions are inevitably mood and affect shifts. In line with this finding, Ellen & Bone (1999) showed that mood valence becomes more positive in the cases of scent pleasantness and scent congruity. However, in their review of 22 studies on scent, Bone & Ellen (1999) reported little empirical evidence of the effect of scent on mood or psychological arousal as a small proportion of the tests conducted to this end (i.e.: only 16.1%) were statistically significant. Similarly, other authors found results which support this lack of significance (e.g.: Bosmans, 2006; Morrin & Ratneshwar, 2000, 2003; Spangenberg et al., 1996; Teller & Dennis, 2012).

Consequently, as Chebat & Michon (2003) posit, it is probable that ambient scent is processed via an alternative cognitive path and that, therefore, the customers simply allocate the valence (i.e.: pleasant or unpleasant) of the olfactory cue to the object, without perceiving any changes in their mood state. Nevertheless, more recently, some researchers have found positive effects of the presence of a pleasant ambient scent on affective responses and/or mood states (Doucé & Janssens, 2013; Bambauer, 2012). To recap, nowadays, the direct effects of ambient scent on consumers' mood have found little support. Though, further research is welcome to explore this effect in order to confirm or not the prior findings.

3.4.2 Evaluation

As far as the customers' product(s) and store evaluations are concerned, the effects of scent on those aspects appear to be more robust. Perhaps the most cited study in relation to this impact is without any doubt the study investigated by Spangenberg et al. (1996). These authors took the study of Obermiller & Bitner (1984) as starting point because the latter found a direct relationship between the pleasantness of the environment and evaluation of the products contained in it. In a similar vein, Crowley (1993) illustrated that color variation in the environment affects the evaluation of the merchandise style.

Hence, Spangenberg et al. (1996) assumed that, as an ambient fragrance is not unpleasant, its presence would likewise generate approach behaviors with respect to the environment and the surrounding products. Ultimately, the authors' hypotheses were supported and confirmed that, in a simulated store setting, store and product(s) evaluations were commonly improved when an ambient scent was spread. For instance, the store environment is perceived as more colorful, bright, relaxing, motivating, open, positive, etc. while the products are gauged as more modern, of higher quality, etc. More precisely, they state that pleasant ambient fragrances have the ability to influence more positively customers' evaluation of products which are rated as less pleasing compared to well-liked products, such a finding which was confirmed later on by Morrin & Ratneshwar (2000) with a similar result for unfamiliar objects compared to well-known ones. Needless to say that this benchmark study opened up the literature studying the effects of ambient fragrance on customers' evaluations that, in some cases, go beyond the evaluation of the store and the store merchandise (Chebat & Michon, 2003; Ward et al., 2007; Bambauer, 2012; Doucé & Janssens, 2013).While these recent studies are in line with the prior research of Spangenberg et al. (1996), only few asserted the non-significance of such effects (Morrin & Ratneshwar, 2003; Teller & Dennis, 2012).

Concerning the scent congruency, an important moderator which will be further discussed in a following section, research documented that pleasant ambient scents often lead to more positive evaluations, largely due to the fact that consumers tended to rate more favorably the store and its products/offerings when the dispersed ambient fragrance was congruent with the store environment or products that were being evaluated (e.g.: Bosmans, 2006; Spangenberg et al., 2005, 2006, etc.).

Besides the evaluation of the store and its merchandise, few researchers have put the emphasis on the effects of ambient scent on customers' evaluation of the salesperson. Among them, Bambauer (2012) displayed results approving the capability of a pleasant ambient scent to increase customers' mood and overall assessment of the store ambiance which in turn affect positively their evaluation of the salesperson and the merchandise assortment. As Bettencourt & Brown's (1997) model leads to predict, the performance and the satisfaction of the employees on their workplace influence the customers' perceived quality of the services provided. Precisely, because the services are intangible in nature, customers generally turn towards tangible elements with the aim to assess the service before making a purchase decision and to evaluate their satisfaction with the service in question (Zeithaml et al., 2006).

Originally popularized by Bitner (1992), the term “servicescape” refers to various elements of the physical environment where the service is delivered and helps to understand that the store atmosphere affects not only the customers’ behavior and the salesforce’s behavior, but also the social interactions between the two parties. More precisely, a pleasant ambient scent – contributing to a favorable store atmosphere – would improve the performance of the sales people by rending them more cooperative and more inclined to adopt effective strategies in order to better serve the customers (Bitner, 1992). In short, it can be concluded that if an ambient scent is able to make the salesforce perform their job in an improved manner, the customers will enjoy a better service and might therefore engage more easily in approach behaviors and evaluate more positively the store environment, the products, and even the sales people.

Besides the possible positive effects that ambient scent can produce on the vendors’ performance, the reason hidden behind the scarcity of studies dealing with the salesperson evaluation lies perhaps in the fact that the latter is in majority depending on the training of the sales members, their motivation to help customers as well as their professionalism. Therefore, the study undertaken by Bambauer (2012) should be taken with a pinch of salt and, certainly, needs to be replicated in order to confirm the documented findings.

3.4.3 Purchases (money spent)

Probably the effect which has attracted the interest of the retailers is obviously the impact of an ambient scent on the sales revenues. For example, the very first study which illustrated such an effect is the one conducted by Hirsch (1995) who showed that, in a Las Vegas Casino, the amount of money gambled in a slot-machine area in which an ambient scent was added increased by more or less 45.1% compared to the amount of money gambled in the same area before and after the diffusion of a fragrance. As far as the retail environment is concerned, there is a paucity of studies which have reported empirical evidence that an ambient scent is indeed able to increase sales. The reasons behind this rareness are maybe due to the fact that on one hand, few studies have access to actual sales figures (Spangenberg et al., 2006) and on the other hand, because sales might not be a direct outcome that neither scholars nor retailers are looking for but instead expect the ambient odor to positively affect the customers’ approach behaviors which will hopefully, in the long run, increase the sales (Davies et al., 2003).

However, the study run by Spangenberg et al. (2006) was the first to point out that, without a doubt, the diffusion of an ambient scent in a retail setting has the potential to influence positively consumer's spending when the odor released in a specific department of the store matched the type of clothing being offered. More precisely, gender congruency was at the core of this study and revealed that the diffusion of a feminine (masculine) fragrance in the women (men) area increased the money spent towards gender-based products oriented to this clientele. In accord with these outcomes, recent studies showed that only younger (vs. older) consumers spent more while a shopping mall was scented (Chebat et al., 2009) and that a chocolate fragrance increased the sales in a bookstore, especially for thematically congruent books (Doucé et al., 2013). In addition, Morrin & Chebat (2005) informed us that only the contemplative shoppers or the customers who resisted to the temptation of making unplanned purchases were influenced by the pleasant ambient odor dispersed into a shopping mall, ending with a more expensive basket. On the contrary, the more impulsive shoppers revealed not to be sensitive to the pleasant ambient scent whereas they spent higher amounts of money when pleasant background music titillated their ears. An important note that retailers should draw from this finding is that, firstly, it is essential to be aware of the profile of their customers and that, secondly, their senses would be better off not to be overstimulated because a combination of both scent and music decreased the consumers' spending. In contradiction to the above results, some studies have found that the hypothesis regarding the positive impact of ambient scent on sales increases for congruent products was not supported (Knasko, 1989; Schifferstein & Blok, 2002; Teller & Dennis, 2012).

3.4.4 Memory

The exceptional aptitude that scent possesses in improving human memory, although being researched only recently, has been widely supported, notably by the well-known story of Marcel Proust. This French author highlights the power that scent exercises on memory by pointing out that the smell of a madeleine cake revitalized his childhood memories as soaking this pastry in a cup of tea not only triggered the souvenir of this very moment but also brought him back to his childhood. Since only more than a decade, researchers have demonstrated a growing interest regarding this non insignificant effect by reporting that emotional memories are better activated by olfactory cues than by verbal, visual, auditory or tactile stimuli (Herz, 1998, 2000; in Krishna, 2011).

Disapproving the assumption that ambient scents are able to influence customers' moods and/or psychological arousal levels, Morrin & Ratneshwar (2003) highlighted that a plausible reason why pleasant ambient scents have the ability to increase the performance of memory-related tasks is that the scent cue intensifies customers' alterness (i.e.: attention) – reflected by a longer time at exploring brand stimuli – and, as a consequence, generates superior brand recall and brand recognition accuracy for unfamiliar brands but without any mood shifts experienced by the participants. Likewise, Zoladz & Raudenbush (2005) followed closely the previous scholars' intention in digging into the effects of ambient odor on improving cognitive performance. Their results are in accord with prior findings by identifying that some scents, here cinnamon and peppermint, increased the respondents' scores in performing activities associated with attention, virtual recognition memory, working memory, etc.

As a conclusion, it appears that the use of ambient scent is a non expensive marketing instrument for enhancing brand memory that marketers should consider to include in their toolbox in order to complement their traditional strategies such as advertising, product placements, sponsorships, and much more. Indeed, not surprisingly, Vlahos (2007) instructs that, because humans' likelihood to remember something – including brand, store, products, etc. – is increased by up to 100 times when smelling, compared to when seeing, hearing, or touching, ambient scent constitutes a powerful marketing tactic.

Nonetheless, as already mentioned before, the capability of ambient scent at facilitating memory for product-related information has been undermined by Krishna et al. (2010) who stipulate that product scent is more effective to this end and precise that, although Morrin & Ratneshwar (2003) found empirical evidence of such effect, the use of ambient odor is – according to the former authors – only adequate if the intended impact is targeted towards a collection of objects comprised in an environment and not to a single product.

3.4.5 Information search, choice, and time spent

As far as the consumers' decision-making process is concerned, the first two behavioral measures (i.e.: information search and choice) resulting from the spread of an ambient scent will be further dealt under the "congruency" section. Besides, Mitchell et al. (1995) reported that consumers spent more time for making their purchase decisions and were more willing to engage in a variety-seeking behavior when shopping in an environment diffusing a congruent rather than an incongruent scent.

This finding is in agreement with prior research who documented that ambient fragrance affected positively the length of time spent by consumers at a jewelry counter (Knasko, 1989). Guéguen & Petr (2006) obtained a similar result by reporting that the duration of time was positively affected by lavender – a fragrance recognized for its relaxing quality – in a restaurant setting. Also, a pleasant ambient scent has been proven to increase the time taken by the respondents to evaluate the products (Knasko, 1995; Morrin & Ratneshwar, 2000, 2003). In contrast, Spangenberg et al. (1996) documented that a pleasant ambient fragrance, yet increased the number of times the products were examined and improved the perceived time spent but did not lengthen the actual time spent. In agreement with this negative effect, Ward et al. (2007) found that dwell time in a retail environment was actually shorter in the scented condition. These contradictory findings suggest that the impacts of an ambient odor on actual time spent and the perception of the elapsed time in an environment are conflicting and require future work to clarify those effects.

3.4.6 Intent to return/revisit the store and purchase intentions

In their review of 22 studies, Bone & Ellen (1999) reported that intentions to revisit or return to the store and buy several products were positively affected by the presence of a scent in 43% of the tests which studied this effect. For instance, Spangenberg et al. (1996) demonstrated that subjects showed a stronger intention to revisit the store while they were exposed to the scented condition. More recently, in light of past research, some scholars pinpointed similar results that showed that the presence of a (pleasant) ambient scent does indeed exerts an influence on customers' intent to revisit or return to the store as well as their intent to make future purchases (Doucé & Janssens, 2013; Bambauer, 2012). As far as the purchase intentions are concerned, Fiore et al. (2000) signal that a product display – complemented with a pleasant and congruent ambient fragrance – allows for an increase in customers' purchase intentions with respect to the products as well as an improved willingness to pay higher prices for the products.

3.4.7 Moderators

As Gulas & Bloch's (1995) model stipulates, the effects of a fragrance on the customer's behavior may vary due to some moderating variables which exercise an influence on this relationship. The following paragraphs sum up the findings of previous studies which have already documented some moderators such as scent congruency, individual differences (e.g.: age, gender, etc.), and environmental factors.

a) Scent congruency

Unquestionably, scent congruency is by far the moderating variable on the relationship between the ambient scent and its effects on consumer's reactions which has deserved a growing attention by researchers. Specifically, Bone & Jantrania (1992) were among the first researchers to emphasize the importance of congruity between a scent and the object under study. Indeed, in their research, product evaluations and quality ratings seemed to be more positive when product-based scents were congruent with the product per se (e.g.: a lemon scent fitting the cleaning solution). Since then, scent congruency has been explored in various ways.

Notably, several authors focused on scent congruency with regard to the the product category. For example, Mitchell et al. (1995) conducted a research aimed at examining the effects of scent (in)congruity on cognitive variables embedded in the consumer decision-making process. Their conclusion is straightforward: when subjects are confronted with an odor (e.g.: a floral scent) which is congruent with the product class (e.g.: floral arrangements), cognitive enrichment or increased cognitive flexibility may arise. Indeed, the findings highlight that in the case the ambient scent matched with the product category, the participants spent more time processing the data, were more likely to search for extra information, expressed a greater willingness to dispatch their choices more consistently across product choice alternatives and adopted a variety-seeking behavior. In addition, Bosmans (2006) illustrated through her study that even when an ambient scent becomes salient, if the latter matches the product class, it has still the ability to affect customers' product judgment/evaluations, and it does so in a positive way.

In light of prior research, Parsons (2009) stressed that the simple presence of a pleasant ambient fragrance is not enough but should, on the contrary, be supported by congruency with the product category. The results confirmed that shoppers browsed in a more thorough manner, perceived and actual sales increased while customers' evaluation of the store remained unchanged between the scented and unscented conditions. Finally, in contradiction to prior research, Morrin & Ratneshwar (2003) revealed that the congruency of the ambient scent with the product class does not appear to have an influence on brand memory or recall while the simple pleasantness of an ambient fragrance has the ability to produce such effects.

As far as thematically congruent ambient scents are concerned, the study run by Fiore et al. (2000), as already mentioned before, also underline the importance of a pleasant ambient scent being congruent with the store's theme, or in this case with the product display. What is more is the recent study revealing that approach and buying behaviors towards thematically congruent books (i.e.: cookbooks and romantic literature) were enhanced when a chocolate scent was diffused in a bookstore (Doucé et al., 2013). At the opposite of those positive findings, Schifferstein & Blok (2002) specify that an ambient fragrance (e.g.: sunflower odor) does not increase the sales neither for thematically congruent products (e.g.: personal care and women's magazines) nor for thematically incongruent products (e.g.: animal/nature magazines).

Furthermore, as already stated earlier, Spangenberg et al. (2006) looked into scent congruency with respect to the gender-based type of product being purchased. The study's outcomes showed that, inevitably, in the presence of an ambient fragrance suiting the gender-based products, the customers' evaluation of the store and its merchandise were more positive and that their likelihood to express approach behaviors (e.g.: money spent) increased. Additionally, Mattila & Wirtz (2001) were interested in fragrance congruency by taking into account the arousal level of background music. The study's outcomes elucidate that the combination of a fragrance with a low arousal level and music with a slow pace seemed to lead to a better evaluation rather than when a fragrance with a high arousal level were used. Last but not least, in a similar vein, Spangenberg et al. (2005) investigated scent congruity with the seasonality of background music. The authors concluded that the congruity between a Christmas fragrance and Christmas music led to better evaluations of the store and its products as well as to an increased intention to return to the store.

Out of these numerous studies, a conclusion can be drawn: favorable evaluations and approach behaviors are better enhanced when scent congruency – coming into multiple nuances – is taken into account.

b) Individual differences

In addition to the scent congruency, individual differences have been mentioned years ago by Gulas & Bloch (1995) in their famous model, emphasizing that those divergences should deserve greater attention for further research.

Among these individual differences, gender has been mentioned as an important moderating variable by Koelega (1994) who stressed that women are potentially more sensitive to odors, as explained previously. In addition, impulsivity (Morrin & Chebat, 2005) and age (Chebat et al., 2009) have been found to moderate the effects of ambient scent on customer's reactions. For instance, Chebat et al. (2009) demonstrated that the ability of ambient scent to enhance customer's expenditures in a shopping mall was found to diminish significantly among older shoppers because their olfactory acuity weakens as time goes on. Nevertheless, despite being interesting to research, few authors have taken into account in their studies other individual differences which might act as significant moderators. Among few ones, Doucé & Janssens (2013) have tempted to fill this gap by providing a research aimed at emphasizing the moderating effects of the shopper's motivation as well as the shopper's affect intensity. The results showed that the ambient fragrance present in the retail setting was more likely to influence the reactions of participants who scored high on "affect intensity". Accordingly, the subsequent outcomes took the form of improved positive affect, evaluations, and approach behaviors. Nonetheless, as far as the shopping motivation is concerned, it was reported that shoppers whose motivation tended to be more hedonic were not affected by a pleasant ambient scent whereas shoppers demonstrating a more utilitarian shopping motivation reported greater positive evaluations and increases in pleasure due to the addition of a pleasant ambient fragrance (Doucé & Janssens, 2013).

c) Environmental factors

The crowding in a store has a direct moderating impact on customer's cognition (i.e.: perceptions of the store) and emotions which therefore influences indirectly the customer's shopping behavior. For instance, Michon et al. (2005) documented that high retail density diminishes the pleasure that customers might enjoy through the shopping activity. Indeed, when exposed to such crowding, customers might experience greater stress because their personal space becomes suddenly limited and uncomfortable which prevents them to enjoy freedom in their shopping activity (Stokols, 1972; Brehm, 1966; in Michon et al., 2005). The result is that customers will inevitably adapt their shopping behavior by, for instance, reducing the time accorded to the shopping activity while also delaying purchases and exploring fewer products (Harrel et al., 1980; in Michon et al., 2005). Interestingly, Michon et al. (2005) reported a positive effect of ambient scent on customers' perception of the store environment (i.e.: cognition) in the medium retail density condition whereas a small amount of visitors in a store or an overcrowded store both have a negative impact on the variables studied.

3.5. Discussion on cross-modal correspondences between olfaction and contingent features

Our senses constitute unquestionably our most powerful tool in order to acquire information about the environment in which we live (Gibson, 1966) and are, consequently, overwhelmed with a large amount of information which is sometimes consistent across various sensory modalities. With the intention to treat this information properly, it is important to deviate from the traditional belief that the human senses should be treated as separate entities. In everyday life, people are constantly facing numerous and complex sensory signals encountered in the environment surrounding them (Spence, 2011). Subsequently, in order to provide a meaningful understanding of the environment as well as to create a uniform representation of it – with the aim to react appropriately to the opportunities and threats and control actions occurring within it – it is crucial to consider our senses as interacting entities and to coordinate and integrate the information originating from the various sensory inputs (Schifferstein & Tanudjaja, 2004; Castiello et al., 2006; Spence, 2011). Indeed, because individuals are constrained by the restricted resources they possess for processing those sensory features, there is a need to rely on effective strategies to tackle the existing information as quickly and accurately as possible (Crisinel & Spence, 2012a). While people can progressively learn how to associate odors and tastes or other dimensions across sensory modalities (i.e.: associative learning) – as, for instance, associating the color red with a hot temperature and the color blue with a cold temperature – other matchings are more difficult to make (e.g.: between odors and auditory features or geometrical shapes) (Deroy et al., 2013). The main challenge, at the interest of many researchers, remains to know how the brain discerns which stimuli to combine.

In other words, with the intention to solve the cross-modal binding problem – defined by Spence (2011) as "the capability of knowing which of the multiple stimuli that are perceived through different sensory modalities at a certain time should be bound with each other" – cross-modal correspondences between numerous sensory systems should deserve a growing attention.

Despite such evidence, the sources from which those pairings arise as well as the convergence of them among people are quite uncertain. Commonly, scholars have been divided on what causes the foundation of cross-modal correspondences which appear to fall into one of the three main following mechanisms. The first assumption is grounded around the belief that those cross-modal associations might be innate and therefore come from the peculiarities of the neural systems used to process sensory information (Spence, 2011).

The second supposition stipulates that they possibly occur via perceptual learning involving a constant learning of associations of sensory stimuli encountered in our environment (Spence, 2011). Last but not least, the third statement is that cross-modal associations may possess a semantic origin, meaning that they occur only after being translated into common linguistic terms employed to define the stimulus (Schifferstein & Tanudjaja, 2004; Spence, 2011).

Relying on Marks (1978) and Spence (2011), Deroy et al. (2013) opine that those matchings may possibly and logically come from the organization of the perceptual system defined by Gibson (1966) as "integrated sets of sensors and effectors by which the organism controls its interaction with information in the environment". In common terms, cross-modal correspondences can be characterized as "a tendency of a stimulus' feature, attribute, or dimension to be systematically matched or associated with a sensory feature, attribute, or dimension belonging to another sensory modality" (Spence, 2011), or simply put, by the fact that when people perceive "something" – that is a scent within the framework of this study – they expect "something else" to be compatible with the previous perception, here a property related to another sense. It should be highlighted that some associations appear to be made more frequently and commonly across people compared to other matchings and that the latter are often missing a clear explanation from individuals who are unable to justify the reason or provide the source of the associations they make (Deroy et al., 2013).

As Spence (2011) stresses in his review, it is important to establish the distinction between two terms commonly employed. On one hand, some researchers have been referring to synaesthetic correspondences or associations in order to describe a perceptual phenomenon in which "the stimulation of one sensory modality spontaneously induces another perception in a second sensory modality" (Baron-Cohen & Harrison, 1997) as well as to define the correspondences only occurring between non redundant sensory dimensions (e.g.: between auditory pitch and visual hue). On the other hand, other scholars have used the increasingly well-known terms of "cross-modal correspondences" or "cross-modal associations", which look at correspondences in a broader view by not only comprising synaesthetic correspondences but also correspondences between features that possess the characteristic to be perceived via diverse sensory modalities (Spence, 2011). Certain academics (e.g.: Martino & Marks, 2001; Sagiv & Ward, 2006; Ward et al. 2006), claim that the mechanisms underlying cross-modal correspondences are actually nothing but a weaker form of what is called "synaesthesia".

This view has been supported by several authors such as Martino & Marks (2001) who reasoned that all individuals are synaesthetes, although they recognize that the degree of synaesthesia varies from weak to strong across individuals. Regardless of the unresolved debate around which view is the most appropriate, Spence (2011) postulates that there are similarities – besides the important divergences – between synaesthesia and cross-modal correspondences and that the latter term tends to be preferred against the former one as it appears to be more general and as well as more appropriate. No matter which view is the right explanation, both research fields complement each other and contribute to the understanding of human perception. To be absolutely clear, the author will employ the terms “cross-modal correspondences” or “cross-modal associations” interchangeably in the following discussion.

It should be noted that scholars lean towards the assumption that cross-modal correspondences are common among a large group of people with the belief that some of those cross-modal associations might even be universal whereas other authors have demonstrated that some cross-modal associations vary from one culture to another (e.g.: Spence & Deroy, 2012; Bremner et al., 2013). What is more is that, as far as the consistency is concerned, it should be recognized that many cross-modal correspondences studied between odors and other contingent features were unfortunately not being retested after a certain period of time.

Among the exceptions, Gilbert et al. (1996) have documented that some cross-modal associations between specific odors and particular colors are relatively stable as they appear not to vary over time, in this case 2 years after the initial test. Therefore, it can be concluded that, although not being frequently subject to a retest, cross-modal associations seem to have the ability to remain constant over a long period of time, which is of crucial importance for the researchers and the marketers as it will be demonstrated later on.

While representing a relatively new concept, cross-modal correspondences have received a growing attention from researchers in the past few years. As it will be described afterwards, Köhler (1929) initiated this field with a study opening up the literature on sound and shape symbolism.

Notwithstanding the various studies conducted around the phenomena of cross-modal associations between many different sensory modalities such as between audition and touch (e.g.: Yau et al., 2009), vision and touch (e.g.: Martino & Marks, 2000; Simner & Ludwig, 2009; Walker et al., 2010), tastes/flavors and sounds (e.g.: Bronner, 2011; Crisinel & Spence, 2009, Simner et al., 2010), audition and vision (e.g.: Marks, 1987; Gallace & Spence, 2006; Evans & Treisman, 2010), olfaction is doubtless the sense which has not been studied extensively in past and recent papers.

Nevertheless, according to Deroy et al. (2013), olfactory experiences denote a field rich in cross-modal correspondences and have therefore retained the attention of several researchers who have pointed out cross-modal correspondences between olfaction and audition (e.g.: Belkin et al., 1997; Crisinel & Spence, 2012a), vision (e.g.: Gilbert et al., 1996; Kemp & Gilbert, 1994, 1997; Schifferstein & Tanudjaja, 2004; Demattè et al., 2006b), shape and sound symbolisms (Seo et al. , 2010; Hanson-Vaux et al., 2013), taste (e.g.: Stevenson & Boakes, 2004; Urdapiletta et al., 2006), and touch (e.g.: Urdapilleta et al., 2006; Demattè et al., 2006a). According to Spence (2011) and in agreement with the above mentioned studies, it can reasonably be assumed that cross-modal associations can occur between all kinds of combinations of sensory modalities.

Besides the theoretical perspective, because cross-modal correspondences have been proven to be able to affect the individuals' performance (e.g.: task-related activities, information processing, etc.) as well as being created in an automatic way, they possess the potential to influence people's evaluation(s) and perhaps even behaviors (Deroy et al., 2013). In this vein, it is expected that if people are confronted with cross-modally congruent features, they will react in a more positive manner. In the same way, it can be presumed that when smelling an ambient scent which is cross-modally congruent with the store environment in which they are shopping, the customers will be more likely to display positive reactions (Deroy et al., 2013).

To clarify things, as the aim of the present paper is to test whether cross-modal congruity between a store and a store atmospheric, that is ambient scent, will lead to enhanced positive customers' reactions – as described in the previous section – the author will discuss the literature covering the field of research around cross-modal correspondences between olfaction, the center of interest, and the other contingent features, namely sight, hearing, touching, and tasting.

3.5.1 Cross-modal correspondences between olfaction and sight

In everyday life, people commonly associate odors with colors without even being consciously aware of establishing such matchings. For instance, it is very likely that people will describe the odor of freshly cut grass using the color “green” instead of the color “red”. Similarly, while smelling the powerful odor of coffee beans, people will be very likely to employ the color “brown” instead of the color “blue” to define their olfactory experiences. Notwithstanding the clear evidence of such associations between olfaction and vision in day-to-day situations, only few scholars have recently gone deeply into the study of such cross-modal correspondences.

Nonetheless, compared to the other senses, vision is the sense which has received the highest interest in this literature including studies dating from several decades ago which found that olfactory stimuli can be associated with different levels of the visual feature “brightness” (N.E. Cohen, 1934; von Hornbostel, 1931; Schiller, 1935).

Among the recent papers dealing with cross-modal associations between olfaction and vision, Gilbert et al. (1996) were notably interested in a specific aspect of vision, namely the hue. Their experiments’ results reported that participants associated systematically 13 of the 20 odors tested with significant hues. For example, people tended to associate the odor “caramel lactone” with the color “brown” and the odor “pine oil” with the color “green”. Consequently, it can reasonably be assumed that particular odors are matching with specific colors.

These findings contradict prior assumptions which posited a poor likelihood to find any cross-modal correspondences between olfaction and vision due to, notably, the well-known phenomenon called the “tip-of-the-nose” underlying a difficulty for people to name odors (Cain, 1979; Lawless & Engen, 1977; in Gilbert et al., 1996). Moreover, Gilbert et al. (1996) – being among the few authors who have investigated a retest of their study over time – enriched the literature by documenting that cross-modal associations between olfaction and vision (hue) remains stable over time (i.e.: in the present case, 2 years after the first experiment) and, on top of that, appears to be consistent across individuals.

In line with prior studies on cross-modal associations between odors and the visual dimension of "brightness", Kemp & Gilbert (1997) reported that the degree of the perceived intensity of the odor influenced participants while choosing an appropriate color (i.e.: the weaker the odor intensity, the brighter the selected color). Such findings have been confirmed by a recent similar research which suggests that the blackness dimension of a color plays a more important role than the color hue (Schifferstein & Tanudjaja, 2004). Moreover, the results accord well with past research on the important role of odor's pleasantness in odor classification (Engen, 1982) by elucidating the mediating role that emotion plays in this effect, with the pleasure dimension (i.e.: from the PAD dimensions of Mehrabian & Russel, 1974) being the most involved in the odor-color relationship (Schifferstein & Tanudjaja, 2004). These results have recently been supported in a study run by Maric & Jacquot (2011) who illustrated that while selecting the most suitable color patches for the presented odors, respondents were making their choice according to the pleasantness of the odors (i.e.: bright colors for pleasant odors and darker/neutral colors for unpleasant odors) (Maric & Jacquot, 2011). However, the researchers point out that odor pleasantness in certainly not the only factor driving participants' choice of color as it would have led to inconsistent results. Hence, it is believed that cognitions created by the odor smelled also play an important role in color selection (i.e.: the color yellow for the lemon odor) (Maric & Jacquot, 2011).

Another important contribution in this domain was brought by Demattè et al. (2006b) whose findings provided strong evidence of the existence of an odor-color linkage, which has been proven to be consistent as respondents selected odor-color pairings in a nonrandom manner. Not only those results confirm the existence and the robustness of systematic odor-color associations (Gilbert et al., 1996) but also support the idea that those associations possess the ability to positively influence participants' performance in tasks not directly related to the cross-modal matching between an odor and a color. Indeed, the odor-color matchings having a stronger association (i.e.: the color pink with the odor of strawberry) were performed by the respondents in a more rapidly and accurately manner in comparison to odor-color matchings having either a weaker or no association (i.e.: the color pink with the odor of spearmint) (Demattè et al., 2006).

Later on, Demattè et al. (2009) – putting the emphasis on the role that associative learning plays when people attempt to match odors with visual dimensions – demonstrated that the performance of participants – who were asked to perform a speeded odor discrimination task – was influenced by the visual distractors presented to them.

Especially, the discrimination of certain odors was affected – independently – by the color or the shape of the visual distractors, with the color having a higher influence. Similar effects of associative learning were mentioned by Seigneuric et al. (2010) who reported that, specifically, while participants were smelling odors corresponding to the visual objects presented, the latter were explored in a more rapidly and timely manner.

As far as the joint presentation of both olfactory and visual stimuli is concerned, several scholars (Zellner & Kautz, 1990; Zellner et al., 1991; Zellner & Whitten, 1999) documented that the way an odor-color association will be experienced depends on the degree-of-fit between the odor and the color making the combination. More precisely, olfactory identification is simplified through semantically congruent visual dimensions (i.e.: color and shape) (e.g.: Demattè et al., 2009).

Additionally, color – besides easing olfactory identification – if semantically congruent with the odor, has the capacity to influence the intensity of the perceived odor in question (Zellner & Whitten, 1999). Nonetheless, the degree of congruence of the color with respect to the odor counts for a little part in explaining the increase in the perceived intensity of the odor whereas the color intensity plays a bigger role in this effect (Zellner & Kautz 1990; Zellner et al., 1991). On top of that, another study states that the color exerts a priming effect on smell by reporting that the identification of the odor of a wine is directly influenced by its color, leading people to mistakenly employ an olfactory language normally dedicated to red wines while confronted with an originally white wine colored with tasteless red coloring (Morrot et al. 2001). To conclude, this finding confirms that the visual information plays a significant role on the way people verbalize the olfactory information.

3.5.2 Cross-modal correspondences between olfaction and hearing

Belkin et al. (1997) were among the early authors who publicized the existence of cross-modal associations between olfaction and audition. Specifically, in their study employing particular fragrances usually belonging to the world of perfumery, they illustrated that participants consistently associated certain odors to the auditory pitch of a tone (e.g.: the bergamot fragrance with high-pitched notes). The scholars underlined the particularity of such cross-modal correspondences by highlighting that the very reason hidden behind them is the mediating effect of the olfactory stimulus quality instead of the odor intensity or pleasantness, revealing that emotion doesn't play a role in creating such cross-modal associations (Belkin et al., 1997).

The limited responsibility that emotions shoulder in explaining cross-modal associations was later supported by the study of Crisinel and Spence (2012b) who pinpointed that, despite being of relative importance for the choice of the musical instrument, pleasantness does not drive cross-modal matchings between tastes/flavors and musical notes.

Through their study, Crisinel & Spence (2012a) aligns with prior research (Belkin et al., 1997) by confirming that cross-modal correspondences between olfaction and audition – more specifically "pitch" – do exist and are, on top of that, consistent across individuals. What is more is that the authors attempted to discover whether participants also associated specific odors with a particular type of musical instrument. However, the significance of the type of musical instrument playing the note being relatively poor, this aspect was not taken into consideration. Nevertheless, a broad range of synthetic fruity odors tend to be systematically matched with high-pitched notes. These findings are in accord with prior research documenting that the two main tasty characteristics contained in fruits, namely sour and sweet, are consistently matched with high pitch (Crisinel & Spence, 2010). It is noteworthy that these consistent associations between either tastes/flavors or odors with musical notes go against the principle of associative learning previously mentioned as odors and sounds do not logically co-occur in a natural manner (Deroy et al., 2013).

It can be asserted that such cross-modal associations between odors and pitch inevitably drive the way perfumers and wine producers describe their fragrances. Indeed, it is well-common in those domains to borrow auditory terms such as "high notes" and "low notes" to define fragrances, with "high" notes designating the most volatile compounds in a fragrance and vice versa (Turin, 2007; in Deroy et al., 2013).

Regarding the joint presentation of both olfactory and auditory stimuli, it appears then when listening to a pleasant sound on beforehand and during the exposure of an olfactory stimulus, respondents were more willing to appreciate the following odor. Furthermore, in the case the emitted sound was congruent with the odor diffused, the latter was assessed more positively on its hedonic valence – namely its pleasantness – while the odor intensity was influenced to a lesser extent (Seo & Hummel, 2011).

3.5.3 Shape and sound symbolism

The two previous sub-sections elucidated the cross-modal correspondences that exist between on one side, olfaction, and on the other side, sight or hearing. In light of those cross-modal associations, the following paragraphs will expound the shape and sound symbolism effects. As mentioned previously, cross-modal correspondences can be considered as a relatively new concept although its existence has been somehow introduced by early reports of Köhler (1929) who first mentioned the notion of shape and sound symbolism in the field of Experimental Psychology. However, it is only recently that this prior research (Köhler, 1929) has been extended to open up this fascinating literature. In other words, cross-modal associations surely find their roots in the classic research reported by Köhler (1929) whose purpose was to attribute the speech sounds “Baluba” and “Takete” to two visual shapes. It was stated that these stimuli were very often combined by participants in a nonrandom manner, the visual information and auditory information being consistently associated.

More precisely, the soft sounding of “Baluba” was largely preferred to be matched with a curvy, cloud-like shape, usually denoted as rounded, whereas the sharply inflected sound of “Takete” was more favorably associated with a sharp, spiky, star-like shape, commonly referred to angular (see figure 7). The robustness of this relatively simple finding has been demonstrated thanks to other authors who have reproduced and adapted this work using a range of different word stimuli and whose results came up to the same conclusion (e.g.: Köhler, 1947; Ramachandran & Hubbard; 2001; Gallace et al., 2011).

Indeed, in a similar vein, Ramachandran & Hubbard (2001) state in their study that participants tend to associate the word “Kiki” – sounding relatively strident – to the angular figure (on the right side) because the latter possesses a sharp silhouette similar to the sharp phonenetic inflections of the sound “Kiki” as well as the sharp modulation of the tongue on the palate while pronouncing this word, whereas the word “Bouba” – evoking softer tones – is systematically linked to the rounded figure presented on the left because of its generous curves comparable to the smooth auditory character of “Bouba”. The results reported that 95% of people – never been confronted to such particular shapes before – chose the right figure as “Kiki” and the left figure as “Bouba”.

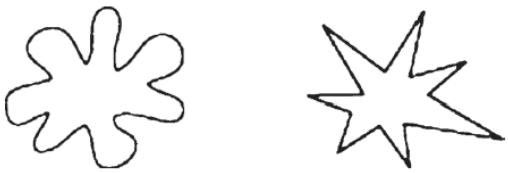


Figure 7: Typical angular (right) and rounded (left) shapes comparable to those employed in Köhler's (1929) initial study

The reason for such associations between a figure and a sound is grounded into two paramount concepts which have retained the interest of some researchers (e.g.: Gallace et al. 2011; Ngo et al. 2011; Spence & Gallace, 2011), namely sound and shape symbolisms. On one hand, as Spence (2012) defines, sound symbolism makes reference to "the name given to the association that people experience between specific sounds (including speech sounds) and particular stimulus attributes". On the other hand, shape symbolism denotes "the similar cross-modal mapping that exists between abstract shapes and other sensory attributes" (Spence, 2012). Remarkably, it appears that such cross-modal correspondances between visually-presented shapes and auditory stimuli tend to be universally shared (Hinton et al., 1994; Bremner et al., 2013). Further explanation on sound and shape symbolism is given in the below section.

a) Sound and shape symbolism effects on food and beverage products

Cross-modal correspondences between speech sounds and the various qualities of objects (hence only presented visually) actually do not date from today and were already investigated by Fónagy (1963) more than 50 years ago who documented a possible cross-modal correspondence between foods on the bitter–sweet continuum and front/back vowel sounds.

To clarify, Spence (2012) reports that the distinction between front and back vowel sounds lies in the position of the tongue in the oral cavity when people pronounce words. Therefore, when the highest point of the tongue is situated in the front of the mouth, frontal vowels – higher in pitch – are produced (e.g.: the pronunciation of "i" in "hit" or "bin"). On the contrary, when the highest point of the tongue is positioned in the back of the mouth, back vowels – lower in pitch – are created (e.g.: the pronunciation of "u" in "bun" or "o" in home) (examples come from Ladefoged, 1993, in Ngo et al., 2011).

In order to provide a concrete example, Yorkston & Menon (2004) performed a marketing research which brought strong evidence to the existence of sound symbolism effects applying to the case of cross-modal correspondences between sounds and tastes/flavors. Interestingly, it came out that the participants' likelihood to consider that an ice cream will have a creamy, smooth and rich taste increased if the product was named "Frosch" instead of "Frisch". Nonetheless, it should be cautiously noted that none of the respondents in this study were instructed to taste/evaluate the products under investigation. As a result, a plausible explanation why participants systematically believed the ice cream to be creamier, smoother and richer in taste if the presumed brand name was "Frosch" is that they basically might have linked the sound (i.e.: "o") present in this invented brand name to the sounds reflected in the words aimed at describing the product characteristics instead of the abstract attributes (Spence, 2012).

Therefore, in order to fill this gap in the knowledge and to provide strong empirical evidence of a cross-modal association between sounds and tastes/flavors, mainly three studies have attempted to extend the prior findings described above by demanding the participants to actually taste/evaluate the products presented to them rather than just assessing their relative names (Spence & Gallace, 2011; Ngo et al., 2011; Gallace et al., 2011).

Indeed, only decades after the initial work of Köhler (1929), Spence & Gallace (2011) reported empirical evidence to demonstrate the existence of cross-modal associations between flavors, visual shapes and (speech) sounds in the food and beverage sector. In their study, the traditional "Maluma-Takete" or "Bouba-Kiki" meaningless words – originally publicized by Köhler (1947) and Ramachandran & Hubbard (2001) in order to explore associations between sounds and rounded versus angular shapes – were protracted to solid and liquid items. As a result, Spence & Gallace (2011) discovered that there is a tendency for people to associate certain food products (i.e.: sparkling/carbonated water, cranberry juice, and chocolate-covered malt honeycomb) with angular shapes and high-pitched nonsense words like "Takete" or "Tuki" whereas, on the contrary, other food articles (i.e.: still water, Brie, and caramel nibbles) were linked to rounded shapes and low-pitched nonsense words like "Maluma" or "Lula". These outcomes appear to be helpful for guiding designers in the creation of product packagings (Spence & Gallace, 2011).

In a similar vein, Ngo et al. (2011) have shown that cross-modal associations existing between foodstuffs – chocolate samples in this case –, sounds, and visual shapes were diverging according to certain product characteristics (i.e.: taste, texture, flavor). In other words, the researchers underlined that the degree of bitterness of the chocolate samples determined their cross-modal association with either angular or rounded shapes. People who participated to this study were furnished with three samples of chocolates differing in their cocoa intensity (i.e.: 30% milk chocolate, 70% dark chocolate, and 90% dark chocolate) which had to be tasted before attributing them a rating. The findings suggest that the lower the cocoa content is (i.e.: sweet milk chocolates), the more likely people would consistently pair up the chocolate sample with rounded shapes and lower-pitched meaningless words like “Maluma” or “Lula” whereas the more intense the chocolate samples are in their cocoa content (i.e.: bitter dark chocolates), the greater the probability is that participants would link them to angular shapes and high-pitched nonsense words such as “Takete” or “Tuki”.

On top of that, the outcomes of this study are also in line with Fónagy’s (1963) idea, previously explained, by pointing out that the frontal vowel sounds contained in the invented words ‘‘Tuki’’ and “Takete” are commonly cross-modally associated with angularity, while, in contrast, the back vowel sounds enclosed in the nonsense words ‘‘Lula’’ and ‘‘Maluma’’ occasion a systematic matching with roundness (Ngo et al., 2011). Besides the important role that the vowel sounds play in driving people’s forming of cross-modal correspondences, the consonants comprised in the meaningless words should not be neglected as they may actually influence people more significantly in determining whether a word tends to be predominantly associated to a rounded or angular shape. In that sense, the pronunciation of the letters ‘‘t’’ and ‘‘k’’, referred as hard consonant sounds, of the anchored words ‘‘Tuki’’ and ‘‘Takete’’ determines their cross-modal associations with angular/sharp shapes and bitter dark chocolates (i.e.: 70% and 90% cocoa content). At the opposite, the phonation of the letters ‘‘l’’ and ‘‘m’’, denoted as soft consonant sounds, of the nonsense words ‘‘Lula’’ and ‘‘Maluma’’ drives their cross-modal matchings with rounded shapes and sweet milk chocolate (i.e.: only 30% cocoa content) (Ngo et al., 2011). Likewise Spence & Gallace (2011), Ngo et al. (2011) recognize that words beginning with or including plosive stops (i.e.: letters such as “t” or “k”) – which denote a sharper sound – are more strongly associated with sourness/bitterness or crispness whereas nasal stops (i.e.: letters such as “m” or “n”) – releasing a smoother sound – are more favorably matched with sweetness or smoothness.

Similarly, in a recent research, Gallace et al. (2011) elucidated that meaningless words were consistently paired with specific tastes, textures, flavors and multitudinous food items. In their study, respondents were attributed an assortment of diverse foodstuffs which had to be rated via 24 different visual analogue scales (VAS), each of them presenting a duo of words such as bipolar adjectives (e.g.: light/dark, salty/sweet) anchored at its extreme points. From the numerous VASs – presented via a computer – three scales of nonsense words (i.e.: "Bouba-Kiki", "Takete-Maluma", "Decter-Bobolo") were aimed at testing whether the sound symbolism effects go beyond prior findings and apply to the flavor and/or oral somatosensory attributes of food products. Unsurprisingly and consistent with previous studies, the research's outcomes emphasize that people reliably associated the hard consonants and front vowels contained in the hard words "Kiki" or "Takete" with bitter items like salt and vinegar crisps as well as chocolate with mint chips and crisps. In contrast, the smooth consonants and back vowels constituting the soft words "Bouba" or "Maluma" were more commonly matched with sweeter products such as cheddar cheese, yoghurt, blueberry jam, and traditional chocolate (Gallace et al., 2011). This empirical evidence of sound symbolism was demonstrated later on by Crisinel et al. (2012) who also included the non-words "Lula" and "Ruki".

For the remaining adjectives anchored at the opposite sides of the VASs, Gallace et al. (2011) selected meaning items popularized by Osgood et al. (1957). In their analyses, the latter authors attempted to measure "meaning" defined as "those cognitive states of human language users which are necessary antecedent conditions for selecting encoding of lexical signs and necessary sub-conditions in selective decoding of lexical signs in messages" (Osgood et al., 1957). The measurement instrument used in this research is the semantic differential which is presumed to be a very general way of getting a certain type of information and a highly generalizable technique of measurement (Osgood et al., 1957).

Osgood et al. (1957) mainly used seven-step scales (defined by linguistic quantifiers like "extremely", "quite" and "slightly") having a bipolar form and defined by adjectives. The authors support the idea of using bipolar scales in the sense that prior research has reported evidence that people naturally think in terms of opposites.

It is assumed that “when a subject decodes a given sign, a complex mediating reaction will occur, consisting of a pattern of these alternative bipolar reactions elicited with varying intensities and that when a subject encodes this semantic state against the differential, it is believed that his/her selection of directions in the semantic space (e.g.: toward good vs. bad or active vs. passive, etc.) is coordinated with the reactions provoked by the sign and that his/her degree of polarization or extremeness in the space is coordinated with how intensely these reactions are made” (Osgood et al., 1957).

Out of their analyses came out that the same three major factors of *evaluation*, *potency*, and *activity* have resurfaced in a wide variety of judgmental situations. Therefore, those three paths appear to be the most representative among all the factors used in Osgood et al.’s (1957) studies. More precisely, it came up that the scale having the purest loading on the evaluative factor is “good-bad”, while the scale having a high loading on the potency factor is “strong-weak” and finally, the scale having a relatively pure loading on the activity factor is “active-passive” (Osgood et al., 1957). Consequently, those meaning dimensions will be integrated in this study following closely other authors (e.g.: Gallace et al., 2011; Crisinel et al., 2012).

In all three studies (Spence & Gallace, 2011; Ngo et al., 2011 and Gallace et al., 2011), participants were confronted to visual analog scales (VAS) on which they were instructed to score each of the objects under study (see figure 8 for an example of the scales and labels used in Ngo et al., 2011). As Gould et al. (2001) document, VASs have been widely used in the social and behavioral sciences to measure a range of subjective phenomena. More commonly, Gift (1989) and Reips & Funke (2008) underline that this type of scale has been extensively used in the domain of psychology in order to measure unpleasant symptoms such as pain, nausea, fatigue, etc. which are, in agreement with Gould et al. (2001), subjective experiences of the patient that require self-report. Needless to say that in the medical sector, in which reliable detection of small changes/differences in status is highly appreciated; VASs constitute the ideal measurement instrument (Reips & Funke, 2008). In other words, VAS is “a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured” (Gould et al., 2001). Concretely, a VAS is aimed at representing a semantic dimension and, for this purpose, takes the form of a line with two verbal elements that reflect contrasting meanings (e.g.: hot vs. cold) anchored at its opposite ends (Reips & Funke, 2008).

Depending on the authors, the length of the line may vary but measures most of the time around 10cm (i.e.: 100mm) with, in some studies, a picture of a crayon placed on its mid-point. Nonetheless, it is up to the authors to include or not a sign representing the center of the scale. With the aim to represent their subjective experience, participants are demanded to draw a vertical line along the VAS which reflects their position with respect to the semantic dimension that is measured afterwards by attributing a score based on the distance between their mark and the anchored adjectives (Hauser & Walsh, 2008).

Among their advantages, VASs allow the respondents to project their subjective experience on any place along the line instead of being constrained by categories or numbers. Furthermore, in contrast to discrete scales, VASs permit a more exact and precise measurement which is able to detect tiny differences (Reips & Funke, 2008). On top of that, respondents require less explanation as the task appears to be relatively simple. In addition, this measurement instrument is perceived as highly sensitive and easy to use which provides reproducible results and can accordingly be applied in a variety of practice settings (Kelly, 1998; Reips & Funke, 2008; Hauser & Walsh, 2008).

Generally, like in these researches, the different VASs are organized as follow: the first scale is aimed at measuring shape symbolism effects and therefore comprises a rounded shape and an angular shape placed at its opposite ends. Also, in order to assess possible sound symbolism effects, the following scales – two in this case – are commonly anchored with the meaningless words such as ‘‘Tuki’’ and ‘‘Lula’’ or ‘‘Maluma’’ and ‘‘Takete’’. It is worth noting that, usually, the nonsense words attributed to the left-hand side or right-hand side do not necessarily correspond to the shape anchored at their respective side. This arrangement is made deliberately so that respondents do not spontaneously associate the shape they favored with the words anchored on the same side of the scale (Ngo et al., 2011). The common procedure respected in these experiments is described as follow: a set of response sheets – containing the exact same VASs – is delivered to the respondents who are asked to taste the items under investigation (here, food/beverage products) and provide an evaluation for each of them by placing a vertical mark along each VAS at the position that, in their opinion, reflects the best the taste/flavor properties of the items they have just savored in terms of visual shapes and meaningless words (Ngo et al., 2011; Spence & Gallace, 2011, Gallace et al., 2011).

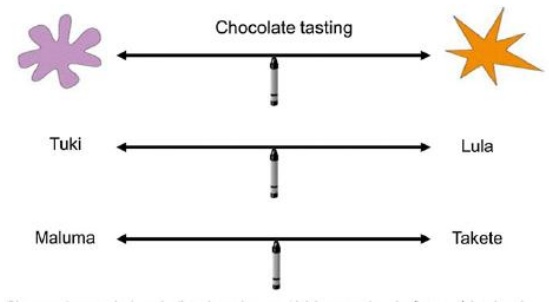


Figure 8: response sheet used in Ngo et al. (2011)

Finally, in a newly published study, Spence et al. (2013) displayed through three experiments that the cross-modal correspondences between shapes and relatively simple food/beverage products that have been conducted lately are also applicable to the case of more complex foodstuffs like aged cheeses, the latter being associated with sharpness based on its taste, smell and to a lesser extent on its texture.

Taken together, the results prove robust cross-modal correspondences between shapes and sounds, in line with the classic literature on sound and shape symbolism propagated by Köhler (1929). As a whole, the findings displayed in the above section advocate the existence of multiple systematic cross-modal correspondences between the various olfactory, gustatory, and oral-somatosensory attributes of food and beverage products and the angularity of abstract shape stimuli together with meaningless words (Spence, 2012). In concrete terms, Spence (2012) summarizes that the literature stream around cross-modal associations between sounds, shapes, tastes/flavors, and oral-somatosensory have enriched our understanding on how people consistently associate certain foodstuffs with particular sensory attributes. Indeed, there is strong evidence that customers cross-modally associate sourness, bitterness, crispness or crunchiness, and carbonation with sharper visual shapes, harder consonants, and higher-pitched frontal vowels present in “hard” nonsense words such as “Takete” or “Kiki”. On the contrary, while confronted with sweet, still, and creamy foodstuffs or drinks, customers generally cross-modally match those solid and liquid items with more curvy visual shapes, smoother or lower-pitched sounds, and back vowels comprised in “soft” invented words like “Maluma” or “Bouba”. From a managerial point of view, these findings have considerable implications in the design of brand logos, product labels and packagings. In that sense, designers can shape the outside visual aspect of a product in order to meet the right customers’ sensory expectations (Spence, 2012).

To conclude, Spence et al. (2013) rightly stress that – as food scientists have already mentioned in the past – it seems to make sense to consider that when a food/beverage product matches customers' expectations, customers are more willing to evaluate it, both immediately and for a long time afterwards, more positively than if their expectations are not met (e.g.: Deliza & MacFie, 1997; Schifferstein, 2001; in Spence et al., 2013).

Therefore, it makes a good reason for marketers and retailers to take into consideration the possible similar effects of an ambient scent – instead of a food or beverage product – diffused in a retail setting. In that sense, if an ambient scent suits, cross-modally speaking, what consumers expect when entering a store, there is a good chance to enhance consumers' approach rather than avoidance behaviors.

b) Smelling sounds and shapes

It can be concluded that the literature around cross-modal correspondences between speech sounds and visual shapes is reasonably well covered. Nonetheless, studies investigating cross-modal associations between odors and visual stimuli are astonishingly scarce and relatively fragmented. Needless to say that, as already explained previously, color constitutes the predominant focus of academics and is widely studied in the context of cross-modal associations between, for instance, odor and color hue (e.g.: Demattè et al. 2006b; Gilbert et al. 1996). While established for odor-color cross-modal matchings, research around the exploration of cross-modal correspondences between odors and shapes is noticeably less extensive (Hanson-Vaux et al., 2013).

Among the few exceptions, Seo et al. (2010) had the objective to draw the possible cross-modal correspondences that might exist between abstract symbols and their corresponding odor. In their experiments, the participants were requested to associate certain odors with an array of different abstract symbols, fluctuating regarding their shape (i.e.: from more rounded to more angular). Interestingly, the studies' outcomes tend to be in line with research involving foodstuffs instead of odors by reporting that respondents matched some abstract symbols with specific odors in a nonrandom manner. Another important finding came up from this research: odors commonly appreciated for their pleasantness (e.g.: vanilla, banana, violet, honey melon, and mint) were matched with more rounded symbols while odors evoking unpleasantness (e.g.: parmesan cheese, truffle, and pepper) were associated with more angular symbols.

On top of that, when the abstract symbol was congruent with the odor presented, the level of pleasantness of the latter was affected. Also, participants' brain reactions appeared to be stimulated in the presence of an odor-symbol combination which increased considerably the speed at which responses – taking the form of attention to and/or detection sensitivity of the olfactory stimulus – are produced (Seo et al., 2010). Importantly, as Deroy et al. (2013) conclude, odors appear to be associated with geometrical or symbolic shapes in another way than the simple matching between the odor in question and the shapes properties of the source from which they come from (e.g.: parmesan cheese is a food usually represented in an angular shape but its matching with angular symbols does not (only) come from its typical shape but rather from its distinctive sour flavor).

Accordingly, more recently, Hanson-Vaux et al. (2013) specified that some sour odors such as lemon and pepper were systematically matched with the famous Köhler's (1929) angular shape although odors categorized as sweeter such as raspberry and vanilla were considerably paired with the well-known rounded shape initiated by Köhler (1929) (Hanson-Vaux et al., 2013).

In a new research, Crisinel et al. (2013) went beyond prior findings by investigating the cross-modal associations between olfactory stimuli and two other sensory modalities, namely visual shapes and musical notes. While being in agreement with the above studies on the clear existence of systematic cross-modal matchings between odors and sounds, the authors supplement our knowledge by revealing that the emotional feelings of pleasantness, happiness as well as the olfactory-gustatory attribute of sweetness and the visual feature of brightness, produced in response to the presented stimuli, lead participants to cross-modally associate odors with higher pitch and a more rounded shape. At the opposite, the level of arousal of the odors – while not affecting the choice for particular pitchs – determined its association with angularity, that is, the more arousing the odor was, the sharper was its corresponding shape (Crisinel et al., 2013).

Remarkably, the findings of these scarce studies accord well with past research around cross-modality focusing on gustation (e.g.: Ngo et al., 2011; Deroy & Valentin, 2011) rather than olfaction. Indeed, Deroy & Valentin (2011) reported in their study the significant linkage between sweet beers and more rounded shapes systematically made by the participants. As Stevenson et al. (1995; in Hanson-Vaux et al., 2013) underline, it is not very surprising to discover that sweet scents such as vanilla or raspberry are evaluated as more rounded odors because – as it will be explained in the following section – odors possess the capability to obtain taste properties without any difficulty.

To recap, the intensity as well as the sourness of the odors will determine whether it is associated with an angular or a rounded shape. That is, the more intense and/or sour the scent is, the greater is the tendency for people to match the odor in question with a more angular shape. At the opposite, the more delicate and sweet the odor is, the greater the likelihood for the present scent to be linked to a rounded shape (Hanson-Vaux et al., 2013). Armed with such evidence, marketers should smartly use those cross-modal matchings in the design of perfume and/or wine bottles, brand logos, labels, etc. Additionally, besides the intensity and taste property of the odor, it appears that its hedonic value plays a significant role in its association with visual shapes. Indeed, unpleasant odors – often assessed as bitter and/or sourer – are matched with a more sharp or angular form (Hanson-Vaux et al., 2013); such an association which confirms that sharpness and angularity are unpleasant (Seo et al., 2010).

3.5.4 Cross-modal correspondences between olfaction and taste

Probably the most evident cross-modal correspondences are those between olfaction and taste. Inevitably, people systematically and unconsciously associate some odors (e.g.: vanilla, strawberry, etc.) with the taste property of “sweetness”. Apparently, “sweetness” is the most commonly term borrowed from our gustative sense in order to describe odors in general, although they might differ widely in their chemical peculiarities (Stevenson & Boakes, 2004). However, it should be highlighted that defining an odor as “sweet” does not necessarily mean that the perceived sensation of sweetness is exactly the same that the one created by a sweet taste (Stevenson & Boakes, 2004). With the aim to understand the reason of such cross-modal associations, one must look at the interactions between our nose and our mouth. In fact, human senses have the ability to detect two different but closely linked types of odor, namely orthonasal odors which are processed through our nose and which in turn produce “smells”, and retronasal odors which are detected by our mouth and, consequently, lead to sensations generally denoted as “tastes” (Stevenson & Boakes, 2004). In common terms, while drinking a strawberry milkshake, our taste receptors interact with our olfactory receptors and give rise to the well-known phenomenon of associative learning. Accordingly, we learn to associate retronasal odors with either sweetness or sourness which will later on enable us to, for instance, link the smell of strawberry to sweetness. Therefore, one can say that due to prior taste experiences, implicit memory effects are generated so that people – relying on their gustatory souvenirs – unconsciously and involuntarily influence their perception of odors (Stevenson & Boakes, 2004).

Relying on Urdapiletta et al. (2006), if not referred to their odorant sources, odors are often named by utilizing and borrowing sensory properties such as taste but also touch, as mentioned in the next section. Indeed, odors can be classified according to their particular properties which fall into distinct categories of taste such as: sweetness, saltiness, sourness, bitterness, freshness, etc. It seems that such a categorization of odors allows for deepening our understanding on the process by which olfactory information is treated. Indeed, participants in this study appear to develop consistent and systematic cross-modal associations between odors and taste properties.

3.5.5 Cross-modal correspondences between olfaction and touch

Last but not least are the cross-modal correspondences that exist between olfaction and touch. In spite of a growing body of research studying cross-modal associations between smell and sight or hearing and a relatively increasing interest in cross-modal correspondences between olfaction and taste, it is quite astonishing to discover a scarcity in the literature dealing with cross-modal interactions between olfactory cues and tactile perception.

Fortunately, Demattè et al. (2006a) conducted two experiments in their study in order to discover whether participants would rate tactile stimuli (i.e.: fabric swatches) as softer or harder in the presence of different odors. The results revealed that the perceived softness of the fabric swatches increased when a pleasant scent (i.e.: lemon or lavender) was present compared to the presence of an unpleasant scent (i.e.: animal-like). Such findings are therefore in line with prior research (Laird, 1932) which documented that women gauged the quality of silk stockings according to the fragrance embedded in the stockings in question. It can be concluded that the tactile perception of fabric softness can be modified through the presence of a scent. Demattè et al. (2006a) developed two plausible explanations for the occurrence of such cross-modal interactions. Firstly, the authors highlight that participants might have associated the olfactory stimuli with the fabric swatches depending on associative learning. Indeed, it is likely that people have learned to match some tactile and olfactory stimuli through everyday situations. Secondly, they admit that the hedonic valence of the fragrance (i.e.: pleasant or unpleasant) might have biased the tactile assessments made by the participants, the latter being under the influence of a pleasant odor which rendered them more inclined to judge the fabric swatches softer than they actually are.

Once again, the cross-modal associations between an olfactory stimulus and a tactile stimulus may originate from participants' associative learning by automatically perceiving a product as of higher quality – and therefore cleaner, softer, etc. – when smelling a pleasant odor (Demattè et al., 2006a).

According to the classification of odors from Urdapiletta et al.'s (2006) study, odors can also be categorized on the basis of their intensity and are therefore systematically cross-modally associated with touching properties such as temperature (hot vs. cold), thickness (thick vs. thin), weight (heavy vs. light), etc. Recently, the robustness of the existence of cross-modal correspondences between the sense of smell and touch has been reinforced through an experiment aimed at discovering the capability of odors to obtain tactile-like somatosensory qualities.

For instance, not so surprisingly, participants evaluated an odor as smelling thicker and sweeter when sampled in a sweet/viscous solution instead of a simple viscous solution or in water (Stevenson & Mahmut, 2011).

CHAPTER 3: EMPIRICAL RESEARCH

Based on the research question and sub-questions (cf. introduction of the paper) and the insights gained from the literature, the below hypotheses have been formulated. The latter will be tested through an empirical research which purpose and procedure are described in the following section.

1. HYPOTHESES AND IMPORTANCE OF THE EMPIRICAL RESEARCH

The following hypotheses are aimed at testing the influence of the addition of a pleasant ambient fragrance in a store environment on the customers' reactions taking into account the effects of its cross-modal (in)congruity with the store.

The first hypothesis will test whether the presence of a pleasant ambient scent which is cross-modally congruent with the store environment will lead to enhanced positive customers' reactions compared to a pleasant but cross-modally incongruent ambient fragrance. The second hypothesis will test similar effects for the pleasant and cross-modally congruent ambient odor but this time against an unscented condition. Finally, because both ambient fragrances used in the experiment are pleasant and congruent with the store's theme (i.e.: cooking), it can reasonably be expected that the cross-modally incongruent ambient scent will lead to enhanced customers' reactions in comparison to an odorless condition. The latter assumption will therefore be tested through the third hypothesis.

Hypothesis 1: The presence of a pleasant ambient scent, cross-modally congruent with the store environment, will result in (a) higher positive affect and/or higher positive arousal, (b) higher positive evaluation of the store environment, (c) higher positive overall assessment of the store, (d) higher positive evaluation of the store's products/offerings, (e) higher approach behaviors, (f) higher intent to revisit the store, (g) higher positive word-of-mouth, and (h) greater sales in comparison to the presence of, yet a pleasant ambient scent, but cross-modally incongruent with the store environment.

Hypothesis 2: The presence of a pleasant ambient scent, cross-modally congruent with the store environment, will result in (a) higher positive affect and/or higher positive arousal, (b) higher positive evaluation of the store environment, (c) higher positive overall assessment of the store, (d) higher positive evaluation of the store's products/offerings, (e) higher approach behaviors, (f) higher intent to revisit the store, (g) higher positive word-of-mouth, and (h) greater sales in comparison to the absence of an ambient scent.

Hypothesis 3: The presence of a pleasant ambient scent, cross-modally incongruent with the store environment, will result in (a) higher positive affect and/or higher positive arousal, (b) higher positive evaluation of the store environment, (c) higher positive overall assessment of the store, (d) higher positive evaluation of the store's products/offerings, (e) higher approach behaviors, (f) higher intent to revisit the store, (g) higher positive word-of-mouth, and (h) greater sales in comparison to the absence of an ambient scent.

1.1. Importance of the empirical research

The importance of conducting a practical research is that prior findings from the literature will be either confirmed or not by taking into account the effects of cross-modal (in)congruity between a store and a store atmospheric, namely ambient odor. Indeed, the literature argues that the spread of a pleasant and congruent ambient scent will lead to positive customers' affective responses, result in positive customers' evaluations about the store environment and its offerings/products, and provoke approach rather than avoidance behaviors (e.g.: a greater intention to revisit the store). It goes without saying that this information is of significant importance for retailers who diffuse an ambient scent in their retail environment with the aim to influence customers' behavior.

The new contribution of this study lies in the fact that the effects of cross-modal (in)congruity between ambient scents and the store in which they are diffused are considered. Indeed, despite a growing body of studies exploring the relatively new concept of cross-modal correspondences, in particular relating to odors, none of them have already tested whether a cross-modally congruent ambient scent would lead to similar results documented in prior research. The present study's objective is therefore to take into account cross-modal associations between a store and ambient scents and to diffuse both cross-modally congruent and incongruent fragrances in order to report their possible effects on customers' reactions, all of this being realized through a holistic field experiment in a real retail setting.

2. RESEARCH DESIGN

2.1. General description

It seems to be more and more difficult to switch on the television and zap without coming face to face with a cooking program. Of course, cookbooks have always been present and cooking programs do not date from today. However, in the past, these programs possessed a didactic aspect whereas they appear nowadays to create a real entertainment for viewers.

Fanatic or not of the art of cooking, numerous customers fall into the trap of these well-theatralized shows which have been able, for the most popular ones, to reach market shares of 30%. According to CIM (Centre of Information on Medias)[4], last year's final of one the most famous cooking shows is ranked at the 10th position on a list of 100 TV programs in Belgium in terms of audience. In other words, the universe of gastronomy creates an increasing interest among customers. Therefore, we might wonder whether this tendency has enhanced customers' behavior towards buying more cooking-related products. The major reason why customers are watching this type of show is certainly because they are looking for a return to basics while nowadays people don't seem to take time to prepare good and healthy meals. Indeed, customers might want to discover (again) the pleasures associated with the cooking activity and are, hence, trying to get inspired through, in particular, cooking shows. Although the absence of any statistical proof, it sounds reasonable to expect such cooking programs to influence customers' purchase behavior, therefore representing a huge opportunity to boost sales for retailers operating in this domain.

Among those retailers, "Art Of Cooking" (in abbreviated form A.O.C) is the organization in charge of the brand "Alice Délice" in Belgium. This relatively new brand appeared in Belgium in 2008 and has grown up to open 7 stores until now. Alice Délice is the brand « par excellence » for cooking fanatics, either experts or beginners. The concept is the following: offering no less than 2.500 to 3.000 references in a store surface of 200 to 350m². Moreover, at the heart of the company's spirit, the stores are organized around five main themes, also called universes, which are represented in appendix 2 together with pictures of the store in which the experiment took place.

[4] Accessed on the 27th of February 2014 on www.cim.be

The first universe refers to cooking tools or materials which comprise ingenious kitchen utensils, state-of-the-art robots, a large panel of saucepans and many others. The second universe is the mini grocer's shop thanks to which the brand expects to tickle customers' taste buds via a variety of grocery products. The third universe is aimed at facilitating customers' life by providing multitudinous clever ideas and practical advices such as how to store and keep aliments, how to make presentable decoration, etc. The fourth theme is built up around a crucial universe without which the store couldn't be complete and credible, namely the library. Through cooking books, Alice Délice offers the customers the possibility to travel worldwide by exploring cooking traditions of every country. Finally, last but not least, the fifth universe is dedicated to the young kitchen hands, the children. Indeed, in this special place, tomorrow's cooks can explore and enjoy the cooking pleasures and can get acquainted with new flavors.

Thanks to its warm colors and easy-going spirit, the French brand Alice Délice fully intends to seduce customers. Like many other retailers, this company recognized rapidly the need to play around the five senses of the customer. Needless to say that a store dedicated to the multisensory art of cooking is duty bound to awaken customers' senses through an appropriate store atmosphere. For this purpose, Alice Délice has already jumped on the sensory marketing's bandwagon by playing with customers' vision through the use of appealing colors (i.e.: dark orange and red) as well as more than 700 spotlights in order to enhance the products. In addition, because the taste and smell are senses that are part and parcel of the cooking experience, the company decided to make, as often as possible, demonstrations in the stores with the aim to deliver a holistic experience to the customers. During these demonstrations, the clients get acquainted with the utensils and practices used by the firm's salespersons and, more importantly, can taste the cooked products (e.g.: macaroons, waffles, etc.). Nevertheless, although smell might emanate from the demonstrations, no ambient scent is currently diffused in the stores.

Keeping in mind the growing customers' interest in cooking and Alice Délice's wishes to create a holistic experience for their customers, it seems to be interesting to implement an experiment around cross-modal correspondences between ambient scents and the other cues. Indeed, the objective of the experiment will be to demonstrate whether the addition of an ambient scent which is cross-modally congruent to what the customer perceives in the store environment (i.e.: sight, hearing, taste, and touch) improves the customer's reactions towards the store and its products.

Important to note is that this store has also been selected with respect to several criteria (Bambauer, 2012). Firstly, the store shouldn't be too large in order to diffuse the ambient scent smoothly and sufficiently. This criterion was respected as the total surface of the store is 250m². Secondly, the store should enjoy a relatively good and manageable flow of clientele per day with the aim to ensure that there will be no perturbation of the normal business activities while administrating the questionnaire to the customers. Again, this criterion was respected as, on average, Alice Délice attracts around 300 to 5000 persons per day. Thirdly, it was necessary to select a store for which dispersing an ambient scent was plausible and appropriate taking into account the product categories. Indeed, a growing number of authors (e.g.: Bone & Jantrania, 1992; Bone & Ellen, 1999; Mitchell et al., 1995; Spangenberg et al., 1996) have put the emphasis on the importance of scent congruity. Their findings suggest that although some odors might be viewed as pleasant, they may also be perceived as inappropriate for a particular store environment. According to Mitchell et al. (1995), incongruent odors might lead to irrelevant information accessed and processed by the consumer, which in turn interfere with the process of relevant information. In this vein, food-related scents were selected for a pre-test, as it will be explained in the remaining part of this paper. Without a doubt, these fragrances seem to be adequate for a store like Alice Délice selling cooking materials. Nonetheless, while all the scents used for the pre-test might be characterized as thematically congruent to the store's offerings, the objective of the study, as already mentioned earlier, is to determine one of these which is perfectly congruent to the holistic store environment and another one which is, inversely, categorized as a "lower-fit" odor taking into account cross-modal correspondences between the scent and contingent features. Fourthly, in order not to compromise and not to create an undesirable combination of odors, it was crucial that the products sold in this store were unscented. Once again, this paramount condition was respected as Alice Délice does not sell any product with inherent scents which can be directly detected in the store environment, therefore making sure that the ambient scent was perfectly isolated. Last but not least, as Fiore et al. (2000) argue, ambient scents work best if the products are viewed as pleasant and have moderate prices, which is the case of Alice Délice's items.

2.2. Pre-tests

As Gulas & Bloch (1995) point out, the selection of an appropriate scent from the approximately 10,000 different odors that the average human can detect is not a small matter. Because most consumer researchers are interested in approach responses, the selection of adequate scents represents a crucial step.

For this purpose, with the aim to perceive positive effects generated by a scent, the latter should be evaluated as pleasant (Fiore et al., 2000), should match the object under study (Bone & Ellen, 1999; Bone & Jantrania, 1992) – in the case of this research the object being a cookware shop –, and should be congruent with a product class in a decision making concept (Mitchell et al., 1995). Indeed, only if those three paramount conditions are respected can ambient fragrances continue to influence customers' reactions, even when those ambient scents come to be salient or when customers are motivated to correct their possible effects (Bosmans, 2006). Therefore, the objective of the pre-tests described in the following section was twofold. On one hand, the first pre-test, divided into three steps, had the purpose of not only identifying ambient scents for the field experiment that were rated as pleasant (and arousing) by the majority of the respondents who participated to this pre-test, but also determining the cross-modal (in)congruity that exist between the store under investigation and those atmospherics. In addition, a further step was taken in order to select a combination of two scents which were judged equally regarding their pleasantness and gauged similarly with respect to their congruency with the store theme. On the other hand, the second pre-test was carried out with the objective to determine appropriate levels of scent to use. Indeed, it is important to find a good balance in intensity as that the scent stimulus must be strong enough so that a bulk of customers is able to detect it (unconsciously), but also low enough in order to be perceived as pleasant because even appealing scents may become unpleasant if they are too intense (Gulas & Bloch, 1995).

2.2.1 Pre-test 1: cross-modal (in)congruity between the scents and the store

a) Selection of the scents

The popular study undertaken by Spangenberg et al. (1996) includes a pre-test aimed at identifying the affective and arousing quality of several olfactory stimuli dispatched into five main categories, namely: floral, spices, woods, citrus and mints.

The findings suggest that the fragrances which were evaluated as more pleasant and arousing than other scents were those classified in the citrus and mint categories. However, regarding the purpose of this study, the researcher paid attention to only include fragrances which seem to be thematically congruent with regard to the type of store being involved in the experiment. Hence, among a list of multitudinous scents available from *Scents* – an olfactory marketing firm located in Belgium –, 16 have been selected as all of them appear to be able to "fit" the theme (i.e.: the art of cooking) of the store environment of Alice Délice.

Therefore, as explicitly mentioned in the literature review, scents which appear not to match the overall theme of the store – such as new car ambient, lavender, conifer, wood, etc. – should be excluded from the selection. Concretely, the fragrances evoking the cooking activity and which were included in this first pre-test are represented in the following table (together with their label letter).

Table 1: Scents (with their respective labels) included in the first pre-test

LABEL LETTER	SCENTS
A	Banana
B	Coffee
C	English Drop
D	Vanilla
E	Cotton candy
F	Cinnamon
G	Belgian waffle
H	Pop-corn
I	Red berries
J	Chocolate
K	Bakery
L	Apple pie
M	Cinnamon/cookies
N	Green apple
O	Lemon
P	Peach

Although the two scents which will be chosen for the experiment will be respectively cross-modally congruent and incongruent with regard to the store environment, one might fears that it doesn't act as a signal. In addition, as Chebat & Michon (2003) mentioned, in order for an ambient fragrance to be effective, the latter should reflect all products in the store rather than simply supporting particular products which sales might increase to the detriment of other products which sales may be endangered. This issue has been investigated by Schifferstein & Blok (2002) who precise that an odor emitted by an object signals the presence of that object and may attract attention to it. Similarly, the authors expected that odors which are not emanating from the objects (i.e.: ambient scent) can also serve as a signal. Indeed, attention to specific products can potentially be enhanced by the diffusion of an ambient scent, the latter providing substantial evidence about the presence and the characteristics of one or more products in the customer's surrounding environment. Hence, the ambient scent functions as a cue that triggers cognitive and affective information about products in the neighborhood (Schifferstein & Blok, 2002). As these authors emphasized through an example, the pleasant smell of freshly baked bread reveals the presence of the focal product which in turn acts as a signal to generate a threefold outcome: it stimulates the appetite for bread, raises the customers' willingness to buy bread and tempt them to reconsider their purchase by triggering their need to buy other bakery products. To sum up, the odor of freshly baked bread can have an impact on the evaluation of the purchasing situation as a whole including both the purchase probability of the flagship product (in this example, the bread) and the purchase probability of associated products (Schifferstein & Blok, 2002). Accordingly, it is expected that the two scents which will be selected through the pre-tests phase will lead to similar effects.

b) Scale and measurement

Before actually running the experiment in the store, a first pre-test was conducted to explore the cross-modal (in)congruity between the store and the olfactory cues as well as to verify the affective and arousing quality of the scents mentioned earlier. Indeed, the objective of this first pre-test was to investigate any associations that exist between odors commonly associated to the art of cooking and visual shape stimuli – namely the angular and rounded shapes classically used in studies of word-shape associations –, nonsense words as well as other bipolar adjectives used in Gallace et al. (2011).

For this purpose, the author let the respondents rating the 16 scents on different items anchored at the end-points of several visual analog scale (VAS) measuring 100mm – therefore leading to a score between 1 and 100. This type of scale, widely used in the field of psychology, has been applied to explore cross-modal correspondences (e.g.: Ngo et al., 2011; Spence & Gallace 2011; Gallace et al., 2011), as explained earlier in the literature review. Through VASs, participants were instructed to rate the different items by drawing a vertical mark – at the position they believe is the most appropriate – on a horizontal line that runs from one extreme of the criterion variable to the other.

It should be noted that although in paper-based VASs a lot of time and effort are required for reading the data – as the exact position of each marking has to be determined by hand – computer-based VASs do not only present benefits. Indeed, in the latter case, respondents are tempted to rate the different items incorrectly as, while rating the latter, an impression of "full and empty" comes up as the participants move the cursor to left or to the right. For this reason, a paper-and-pencil scale was preferred.

As far as the set of items is concerned, in accordance with prior research probed into sound and shape symbolisms either related to foodstuffs or scents (e.g.: Köhler, 1929, 1947; Ramachandran & Hubbard, 2001; Ngo et al., 2011; Spence & Gallace, 2011; Gallace et al., 2011; Crisinel et al., 2012; Spence et al., 2013; Hanson-Vaux et al., 2013), this pre-test included items such as the visual shape dimension followed by sound symbolism dimensions, namely "Lula-Ruki", "Maluma-Takete", "Decter-Bobolo" and "Kiki-Bouba". Note that the first and second scales were both anchored with the rounded words on the left side whereas the sharper and the more angular words were presented on the right side. As far as the third and fourth scales are concerned, as mentioned in the literature review, the arrangement was reversed in order to prevent the respondents from simply associating one side of the scales with a particular quality/attribute (Ngo et al., 2011).

Additionally, it should be noted that cross-modal correspondences between stimuli may also be established at a more abstract level than just be categorized as "amodal" or "modal". In fact, cross-modal associations can also be considered in terms of their pleasantness, cognitive meaning, or activity (e.g.: Osgood et al., 1957). Therefore, besides the sound and shape symbolism dimensions, each response sheet also included meaning scales which have been propagated by Osgood et al. (1957) and explained in the literature review.

To recap, the items anchored at the extreme points of the VASs can be clustered into four main categories, namely the meaning dimensions – selected from the literature of Osgood et al. (1957) (except from "feminine-masculine") –, the dimensions relating to vision, the dimensions with regard to touch and finally the dimensions with respect to the sound symbolism or audition, each of those categories containing bipolar adjectives as items. It should be mentioned that the scales' items from the three last categories reflect pairs of adjectives or non-words taken from Gallace et al.'s (2011) earlier study. Table 2 provides a complete list of the items used in this study.

Table 2: Set of dimensions (and items) forming the VASs

Meaning dimensions	
Bad	Good
Weak	Strong
Active	Passive
Feminine	Masculine
Dimensions relating to vision	
Angular shape	Rounded shape
High	Low
Bright	Dim
Light	Dark
Shallow	Deep
Dimensions relating to touch	
Cold	Hot
Soft	Hard
Light	Heavy
Fragile	Sturdy
Rough	Smooth
Dimensions relating to sound symbolism or audition	
Lula	Ruki
Maluma	Takete
Decter	Bobolo
Kiki	Bouba
Loud	Quiet

Last but not least, as the arousing and affective quality of the scents needed to be investigated, a 7-points semantic differential scale was used, requiring people to rate the scents on a scale ranging from 1 to 7 regarding their pleasantness and level of arousal (i.e.: unpleasant/pleasant and unaroused/aroused).

In other words, each participant had to provide its judgment about the presented fragrances by completing several paper-based visual analog scales (see appendix 3 for the complete response sheets). The respondents were instructed to draw a line on each scale – 19 in total – determined by two extreme anchor points in order to indicate what nonsense words, shape, and other items used for this study they felt best matched the fragrance they had just sniffed. In that sense, the closer the participant's line is to one of the anchor point of a scale, the more his/her judgment or perception of the presented scent is in accordance to this anchor point. For instance, the author informed the respondents that if, in their opinion, an odor was better associated with "Lula" than "Ruki", they should draw a vertical line nearer the "Lula" word, in this case, on the left-hand side of the scale. Note that in the case the participants were torn between two opposite words (e.g.: hot vs. cold) they were told to position a mark in the middle of the line. This procedure was repeated for all the scents demanding each respondent to smell 16 scents and to rate each of them, on separate sheets, along 19 items while also giving their opinion on their pleasantness and arousal level through 7-points Likert-scales.

The difficulty for the respondents was perhaps to be confronted to some abstracts symbols or words that they couldn't relate directly to the scent under investigation. Indeed, smell is nearly impossible to describe in words – which is why we often "borrow" from the wider vocabulary of food and taste to describe a scent (Lindstrom, 2010). This phenomenon, entitled the "tip-of-the-nose" effect, finds its meaning in the difficulty to relate a verbal or semantic label to scents (Lawless & Engen, 1977; in Krishna, 2011). However, no explanation on these items could be provided by the researcher in order to avoid bias and to collect the respondent's very impression about the scent.

Additionally, it should be highlighted that the survey was written in French as the pre-test was carried out in Wallonia (Belgium). Therefore, with the aim to maintain the meaning of the different items used in this pre-test, it was crucial to translate them from English to French in the most appropriate manner. For this purpose, the author received the help of a teacher, Mrs. Baudoux, whose mother tongue is French and who is teaching English and Dutch in secondary school.

c) Procedure of the pre-test 1 – step 1

Subjects were a convenience sample composed of 30 people (80% female) with a mean age of 41 years (see appendix 4), who were approached at different locations by the researcher. Note that with the aim to be in line with the type of clientele which visits the store Alice Délice, a typical customer's profile, namely a women aged between 35 and 45 years old, was provided by the company itself so that the researcher could reach the persons seeming to "fit" best this profile during the pre-test.

None of the participants reported a cold or any other impairment of their sense of smell prior to taking part in the study. Additionally, care was taken not to let people suffering from allergies to participate to the pre-test. Also, they were instructed not to eat, drink coffee, or smoke during the 30 minutes prior to their contribution to the study (e.g.: Crisinel et al., 2012; Hanson-Vaux et al., 2013). The pre-test lasted for approximately 20 to 30 minutes.

Each participant was delivered a booklet constituted of a first page aimed at explaining the purpose of the research and the task required from the respondent, then a second page included general classification measures (i.e.: age and gender), and finally the main body of the booklet was founded of 16 pages (i.e.: one page/scent) including the diverse items presented in the form of VASs as explained previously. Important to underline is that carefulness was taken in assigning randomly the pages containing the scent's evaluation so that each subject rated the different fragrances in a randomized order and systematic classification among them could be avoided.

Also, it should be noted that the different olfactory stimuli were presented in vials instead of being diffused as ambient environmental scents because, as Spangenberg et al. (1996) point out, this is the way retailers would initially choose a scent for use in their stores. Therefore, each olfactory stimulus soaked a cotton ball placed in an opaque vial, the latter precision being of importance in order to reduce the possible influence of color on judgments (Zellner & Kautz, 1990; in Spangenberg et al., 1996; Bosmans, 2006). In addition, with the aim to avoid any awareness or recognition of the scents, the vials were attributed a random letter – as indicated in the table of scents – without any verbal descriptors.

Besides, Krishna (2011) rightly stresses the importance that all the stimuli need to be infused with the scent to the same degree. Therefore, one needs to drop exactly the same amount of essential oils for each stimulus, a paramount technique which was respected in this study thanks to the help of the co-promotor.

Moreover, because the pre-test of this study is dedicated to examine each specific scent selected for the pre-test, it was vital to ensure that when the subjects were given the scent stimulus, the latter was not contaminated by any other olfactory stimuli. The participants were asked to sniff the stimulus and had the possibility to sniff them as many times as they wanted while completing the survey and, actually, the majority of the subjects sniffed the vials' content several times.

In addition, because the 16 scents were evaluated one after one, it was crucial that respondents "cleared" their nasal passage of the previous scent before moving on to the next one. Hence, between two or three successive aromas, participants were demanded to smell coffee grounds to restore their scent palettes. This technique is frequently used in the fragrance industry to neutralize the odors in the nose, preventing contamination from one odor to the next (Krishna, 2011).

2.2.2 Procedure of the pre-test 1 – step 2

The second stage of the first pre-test concerns the replication of the previous phase but this time taking into account the evaluation of, not the scents, but the store environment. The complete response sheet can be found in appendix 5. Subjects were a convenience sample composed of 30 people (80% female) with a mean age of 39 years (see appendix 6), who were approached after they had finished their shopping at Alice Délice, right at the entrance/exit of the store. Similarly to the previous step of this pre-test, consumers were given a booklet, the latter containing the same elements as in the first stage of the pre-test but with the exception of including only one page dedicated to the evaluation of the store environment. Additionally, for the sake of avoiding biased answers, preference for the selection of consumers was accorded to those who were shopping alone and who were not accompanied by friends or relatives.

Likewise the first stage of the first pre-test, the store environment, that is its general atmosphere, was rated on the same items also represented by several visual analog scales. However, a single question was asked to the respondents, which is the following: "at this very moment, how would you rate the store environment on the following items?".

Contrary to the prior step of the pre-test, which was realized outside the store, this second stage took place in the store itself where the experiment will occur afterwards. The pre-test lasted more or less 5 minutes.

With the intention to obtain unbiased and therefore valid results, it was necessary to respect exactly the same conditions under which the experiment would be run. In other terms, the conditions of the second step of this first pre-test and the conditions of the experiment should coincide as much as possible. For this reason, were carefully taken into consideration the following elements: the day(s) at which the second step of the pre-test took place (excluding Monday – being the delivery day of the store) and the elimination of any other atmospheric cues such as music and demonstrations ensuring that only the addition of an ambient scent would influence customers' reactions and that those are not the consequence of other stimuli.

Moreover, the researcher paid attention not to wear perfume during this phase of the pre-test so that participants were not disturbed by any fragrance while completing the survey (e.g.: Spangenberg et al., 1996; Chebat & Michon, 2003).

2.2.3 Results of the pre-test 1 (steps 1 and 2)

In a first stage, the Cronbach's alpha – a measure of internal consistency – was calculated for several items of the second step of the first pre-test (i.e.: in the store). Indeed, the Cronbach's alpha represents how closely related a set of items are as a group. A high value of alpha is often used as evidence that the items measure an underlying (or latent) construct. In this case, as already mentioned before, because the four sound symbolism items (i.e.: Lula/Ruki, Maluma/Takete, Decter/Bobolo, and Kiki/Bouba) and the shape symbolism item (i.e.: angular/rounded shape) have been demonstrated in several studies to be highly correlated, the Cronbach's alpha (see appendix 7) was calculated in order to combine those five items into one, making the data analysis more convenient. However, the alpha coefficient for the five items was .371, suggesting that the items have a relatively low internal consistency. Indeed, a reliability coefficient lower than .70 is considered not acceptable in most social science research situations (Malhotra et al., 2012). Even when the shape symbolism item was removed from the calculation, the Cronbach's alpha remained quite low (i.e.: .421).

As a result, the five items cannot be grouped into one item. Nevertheless, while comparing the mean scores of each item for the second step of the first pre-test (i.e.: in the store), it appeared that the respondents tended to agree that the store design/environment was associated with a rounded shape rather than an angular one, although there was inconsistency regarding the four remaining sound symbolism items. In fact, the mean score obtained for this item was 77.07 on 100 with only one respondent rating the store as rather angular (i.e.: 42 on 100) with respect to this item, revealing a considerable agreement that the store design/environment is indeed allied to the rounded shape. Therefore, only the shape symbolism item was considered while constructing the congruency index dedicated to find the most and least congruent odors, cross-modally speaking, with regard to the store under study. Put differently, each scent was rated on a total of 15 items (i.e.: initially a total of 19 reduced to 15 due to the poor Cronbach's alpha) as well as on two 7-points Likert scales aimed at measuring the scent's pleasantness and arousal.

As mentioned above, in order to find out the most and least congruent scents with respect to their cross-modal correspondences with the store, a congruency index needed to be developed. For this purpose, in a first step, the participants' responses – for each scent's items – were measured using a ruler. As a result, each scent's item was attributed a score ranging from 1 to 100 as the VAS measured 100mm as explained previously.

In a second step, through the software SPSS, each item's score was encoded for each scent (i.e.: 15 items/scent) together with the scores on the 7-points Likert scales determining the scent's pleasantness and arousal. As a result, the p-values reported in this study are based on one-sample t-tests with the scale midpoint as test value (i.e.: M = 4). To begin with, only the scents which were evaluated equally or more pleasant and arousing than the scale midpoint were retained for further analysis. Therefore, the following scents were kept: apple pie (pleasantness: $M = 4.6$, $t(29) = 1.7$, $p < 0.1$; arousal: $M = 4.7$, $t(29) = 2.2$, $p < 0.05$), green apple (pleasantness: $M = 5.6$, $t(29) = 5.7$, $p < 0.01$; arousal: $M = 5.3$, $t(29) = 4.4$, $p < 0.01$), banana (pleasantness: $M = 5.5$, $t(29) = 6.4$, $p < 0.01$; arousal: $M = 5$, $t(29) = 3.2$, $p < 0.01$), red berries (pleasantness: $M = 5.6$, $t(29) = 5.9$, $p < 0.01$; arousal: $M = 5.3$, $t(29) = 5$, $p < 0.01$), vanilla (pleasantness: $M = 5.3$, $t(29) = 4.2$, $p < 0.01$; arousal: $M = 4.6$, $t(29) = 1.7$, $p < 0.1$), English drop (pleasantness: $M = 4.7$, $t(29) = 2.3$, $p < 0.05$; arousal: $M = 4.5$, $t(29) = 1.6$, $p > 0.1$), peach (pleasantness: $M = 6.3$, $t(29) = 14.4$, $p < 0.01$; arousal: $M = 5.3$, $t(29) = 4.2$, $p < 0.01$), cotton candy (pleasantness: $M = 4.7$, $t(29) = 2.3$, $p < 0.05$; arousal: $M = 4.5$, $t(29) = 1.5$, $p > 0.1$), chocolate (pleasantness: $M = 4.3$, $t(29) = 0.7$, $p > 0.1$; arousal: $M = 4$, $t(29) = 0.1$, $p > 0.1$),

lemon (pleasantness: M = 5.5, t(29) = 7.6, p < 0.01; arousal: M = 5.9, t(29) = 11.7, p < 0.01), cinnamon (pleasantness: M = 4.3, t(29) = 0.7, p > 0.1: arousal: M = 4.5, t(29) = 1.3, p > 0.1), and coffee (pleasantness: M = 4.5, t(29) = 1.5, p > 0.1; arousal: M = 4.4, t(29) = 1.1, p > 0.1). However, the following scents were not kept as the results of the data analysis revealed that the participants rated them as relatively poorly pleasant and poorly arousing: bakery (pleasantness: M = 2.5, t(29) = -5.4, p < 0.01; arousal: M = 3.2, t(29) = -2.5, p < 0.05), Belgian waffle (pleasantness: M = 2.5, t(29) = -4.8, p < 0.01; arousal: M = 2.8, t(29) = -3.8, p < 0.01), popcorn (pleasantness: M = 3.3, t(29) = -1.8, p < 0.1; arousal: M = 3.1, t(29) = -2.5, p < 0.05), and cinnamon/cookies (pleasantness: M = 3.4, t(29) = -2.1, p < 0.05; arousal: M = 3.6, t (29) = -1.4, p > 0.1). The complete tables from SPSS can be found in appendix 8.

In a third step, one sample t-tests were conducted (see appendix 9) for the store design/environment with the scale mid-point as test-value (i.e.: M = 50). Subsequently, the congruency index was made up by comparing the 16 scents against the store design/environment. In other words, the index reported the differences between the store design/environment mean scores and each scent's mean scores for all items. Afterwards, these differences have been computed in absolute values in order to eliminate any negative outcome. Finally, the sum of all the differences (ranging between 0 and 1500 as the maximum difference per item is 100 and there are 15 items) – represented in absolute values – was calculated in order to be divided by 15 (i.e.: the number of items) and to end up with a score between 0 and 100. Concretely, the closest the number obtained is to 0, the more cross-modally congruent the scent is with the store design/environment. On the contrary, the closest the number obtained is to 100, the more cross-modally incongruent the scent is with the store design/environment. Therefore, as the purpose of this study is to manipulate a congruent scent and an incongruent scent – taking into account their cross-modal correspondences with the store Alice Délice – both the scent which obtained the closest score to 0 and the scent which obtained the closest score to 100 were picked up for the experiment. So far, it appeared that the scent "red berries" is the most congruent whereas the scent "coffee" is the least congruent, considering their cross-modal correspondences with the store Alice Délice.

Nevertheless, with the aim to obtain a robust decision, in a further stage, the congruency index was calculated in a different way: the absolute differences were summated but only if the store score was higher than 50 and the respective scent was lower than 50 or vice versa.

In other words, the absolute differences were only taken into account when the store and the scent were on the opposite side of the "50-midpoint". Additionally, the same procedure was repeated but, this time, the absolute differences were not taken into account but instead a "1" was attributed if an item was below or above 50 whereas the store score was above or below 50, respectively, otherwise a "0" was computed. Armed with these robust results reported in tables (see appendix 10) also including their ratings on pleasantness and arousal, it seemed that two main combinations of scents were feasible for the experiment, namely "apple pie-coffee" and "red berries-lemon". Indeed, although being evaluated as opposite regarding their cross-modal associations to the store Alice Délice, it was imperative that the two scents being selected for the experiment were equally rated on their pleasantness and arousal. As the statistical results from the paired samples t-test show (see appendix 11), on one hand, "apple pie" and "coffee" report a p-value of 0.778 (i.e.: p-value > 0.1) on their pleasantness dimension and a p-value of 0.433 (i.e.: p-value > 0.1) on their arousal dimension, concluding that both scents do not differ from each other on these items; and on the other hand, "red berries" and "lemon" report a p-value of 0.804 (i.e.: p-value > 0.1) on their pleasantness dimension and a p-value of 0.037 (i.e.: p-value > 0.01), summarizing that both scents do not differ from each other on the pleasantness dimension while being statistically equal (at the significance level of 1%) on the arousal dimension.

2.2.4 Pre-test 1 – step 3

In order to decide which combination out of the two previously mentioned is the most appropriate, a third stage in the first pre-test was conducted. More precisely, the purpose of this final phase was to ensure that within the combination that will be chosen, the two scents are, besides being rated equal on the pleasantness and arousal items, also evaluated similarly on their congruency toward the store's theme (i.e.: the art of cooking). Therefore, selecting two scents which are perceived as equally thematically congruent with regard to the store Alice Délice would prevent to obtain biased results. Indeed, in the case the two scents were not equivalent on this aspect, the possible differences in the results might be due to, not only the cross-modal correspondences effects between the scents and the store environment, but also to the fact that those two scents also differ on their thematically congruency with respect to the store Alice Délice.

Hence, a survey was run in the store itself by demanding 30 clients (26 women, 4 men) – with a mean age of 34.8 years old – to evaluate 6 scents on their compatibility for the store Alice Délice by asking them the following question based on the recommendation of Bone & Jantrania (1992): "According to you, are these scents appropriate to the theme of the store "Alice Délice"?". In the same way than the first step of the pre-test, the customers were asked to sniff the different scents (recognizable by their label letter) one by one, in an order predefined on beforehand by the researcher, namely: mint, coffee, red berries, peach, lemon, and apple pie. Important to highlight is that, in addition to the 4 scents composing the two combinations stated above, two filling scents (i.e.: mint and peach) were added so that respondents were discouraged to make any association between the presented fragrances and the store. Likewise the first stage of the pre-test, coffee grounds were at the disposal of the respondents in order for them to clear their nasal passage of the prior scent before moving to the next one.

The brief survey, also written with the help of the teacher Mrs. Baudoux, can be found in appendix 12.

2.2.5 Results from the pre-test 1 – step 3

From the statistical results (appendix 13) came up that the only feasible combination of scents is the one including the fragrances "apple pie" (M = 5.3) and "coffee" (M = 4.8) as the paired samples t-test reported a p-value of 0.191 (i.e.: p-value > 0.1) meaning that the two scents do not differ from each other and that the null hypothesis stating that the two scents are equal on their thematically congruency with respect to the store Alice Délice cannot be rejected. However, the combination comprising the scents "red berries" (M = 5.73) and "lemon" (M = 4.37) cannot be considered as the paired samples test showed a p-value of < 0.01, concluding that the two fragrances differ from each other and that the null hypothesis claiming that the two scents are equal on their thematically congruency with respect to the store Alice Délice is not supported. It should be reported that in support to these results, in the study of Ward et al. (2007) the ambient scent "apple pie" was also vaporized in the cooker department of an electrical retail store, proving that this fragrance seems to be thematically congruent for cookware shops.

2.2.6 Pre-test 2 – testing for the intensity

As Bosmans (2006) points out, as the salience of the extraneous source augments, customers might come to realize that a source – in this case the odor – other than the store (and its products) can be responsible for their initial reaction and, as a consequence, its effects are usually discredited. For this reason, it is crucial to verify the intensity of the odor. With the aim to do so, the selected scents from the prior pre-test (i.e.: apple pie and coffee) were dispersed at different levels of intensity in the store Alice Délice where the experiment would take place and customers were demanded to answer the following two questions: "did you spontaneously notice a scent in the store?" and "now that I have mentioned the presence of a scent, do you detect it?" (Doucé & Janssens, 2013). The purpose of the first question was directed towards testing whether visitors spontaneously reported scent-related elements. Afterwards, as Doucé & Janssens (2013) already implemented, an adequate intensity of scent for the actual experiment had to be determined. Therefore, the intensity of the ambient odor was diminished until none of the respondents noticed the scent or, in other words, until all visitors responded negatively to the first question and positively to the second one.

2.3. Procedure of the experiment

Effects on customers' reactions of cross-modal (in)congruity between a store and ambient fragrances rhyme with experimentation, the latter being commonly used to infer causal relationships. The term causality applies when the occurrence of X increases the probability of the occurrence of Y. While choosing to conduct an experiment, researchers are confronted with the following two options: pre-experimental design or true experimental design. The latter distinguishes from the prior by using randomization, meaning that the researcher randomly assigns participants to experimental groups and treatments to experimental groups (Malhotra et al., 2012). For the purpose of this study, a "post-test-only control group" design has been chosen, in which the experimental group is exposed to the treatment but the control group is not and no pretest measure is taken.

It may be symbolized as

EG: R X O_1

CG: R O_2

- EG = experimental group
- CG = control group
- R = the random assignment of participants or groups to the treatment (or not)
- X = the exposure of a group to an independent variable also referred to a treatment (here the diffusion of an ambient scent), the effects of which are to be determined
- O_1 and O_2 = the process of observation or measurement of the dependent variables on the test units or group units

Therefore, the treatment effect (TE) is obtained by $O_1 – O_2$.

It should be noted that the author's wish to realize a field experiment finds its roots in the paucity of studies conducted in real retail settings. Indeed, many experiments occurred in either semi-realistic settings or took the form of laboratory experiments, principally taking students as test units (e.g.: Bone & Jantrania, 1992; Mitchell et al., 1995; Morrin & Ratneshwar, 2003; Bosmans, 2006; Spangenberg et al., 1996). As a consequence, while the main benefit of such an approach is that the researcher enjoys a relatively high degree of control over the experimental environment, therefore increasing internal validity, the drawbacks are due to the artificial aspect of such environments which decreases the external validity because the experimental group is limited to students of a specific university and cannot be expanded to other populations (Malhotra et al., 2012).

In concrete terms, the experiments have been conducted through three conditions staggered over several weeks and randomized over weekdays between 10a.m. and 6p.m., such a balance between mornings and afternoons allowing for an adequate representation. Concretely, the three conditions studied over several weeks are the following: the control group condition (i.e.: no scent), the experimental group exposed to the cross-modally congruent scent with regard to the store (i.e.: apple pie) and finally the experimental group exposed to the cross-modally incongruent scent with respect to the store (i.e.: coffee). The choice for conducting and dispatching the three conditions of the field experiment over several weeks is aimed at minimizing as much as possible the biasing effects of environmental factors such as shopper traffic and weather circumstances (see appendix 14). Therefore, by ensuring that the three conditions were studied randomly, interaction effects that might occur could be lessened. In addition, since both the store environment and the products will be assessed, the researcher and the store manager agreed on: keeping the store layout the same during the different conditions, not launching any special promotions or bright new range(s) of products, as well as not to realize demonstrations of recipes.

Also, as several authors have stressed (e.g.: Milliman, 1982, 1986; Yalch & Spangenberg, 1990), music is an important environmental stimulus just like the scent and is capable of exerting an influence on the customers' emotions and reactions. Therefore, with the intention to only investigate the effect of ambient scent on customers' affective responses, evaluations and approach/avoidance behaviors, it has been decided – with the accord of the store owner – not to play music in the shop during the experiment. Indeed, this restriction was important in the sense that a possible disadvantage of playing music is that the effect of the scent stimulus on customers' reactions is not adequately researched. Together, the odor and the music can certainly interact with one another and can, consequently, influence the way customers behave. Besides, the sales force members of the shop have been informed in advance of the procedure of the experiment and were demanded to act as usual. Finally, it should be underlined that no other shops associated with scents (e.g.: coffeehouse, florist, fragrance boutique, etc.) were in the neighborhood of the store. Note that those conditions were the same as during the pre-test phase.

Over the weeks at which the experiment took place, which also included a "no scent" condition, the scents "apple pie" and "coffee" were diffused respectively in the cookware store Alice Délice, and it is only while entering the shop that visitors were influenced by the scent emanating from the dispenser "Classic". This diffuser, available from the company *Scents*, is a compact fragrance appliance that works with the principle of atomization which exercises a strong pressure on the fragrance container. Afterwards, the scented liquid is converted into microscopically fine particles and takes the form of a very subtle evaporation which is dispersed by a powerful fan spreading the fragrance into the room so that consumers (unconsciously) are able to perceive it[5]. Moreover, programmable fan intensity makes it possible to spread the exact desired doses of fragrance in the area and an internal time switch clock allows a precise programming of the appliance. Its properties make it therefore particularly ideal for retail settings. Interesting is the timeless design which fits each room. Indeed, this technological diffuser is capable of scenting an area up to 250m² which is perfectly suitable for the store Alice Délice which possesses a retail surface of about the same size. In line with this surface, the dispenser was located approximately in the middle of the shop ensuring that the fragrance could be scented in the entire store.

[5] Accessed on the 18th of April 2014 on www.scents.be

In fact, positioning the diffuser at the entrance of the shop could have been considered but, as the store Alice Délice doesn't possess (automatic) doors and is widely open, this possibility was rejected as the ambient scent would have disappeared to fast. Note that, as the scenting capacity of the machine is similar or even slightly exceeds the retail surface of the store, the scent sprayed in the shop was detectable by passers-by in the shopping mall, therefore attracting a growing number of customers. It should be highlighted that it wasn't necessary to clean the diffuser between two scented conditions – in order to avoid an undesirable mixture of fragrances – because the scents did not remain embedded in the dispenser. Also, after a period during which an odor has been spread, the latter might still lingers in the store. Nevertheless, as the cookware store didn't comprise any textile products or any other objects in which the dispersed scent might become implanted, this unwanted situation was partially avoided. Additionally, the store under study was equipped of a ventilation system which was turned off during the experiments so that the scents could not escape from the store but which was switched on directly after the completion of one scented condition so that the fragrance was perfectly eliminated before another scented condition could be carried out. Based on those facts, it did not make any difference regarding which condition was performed first, as long as the store was impeccably ventilated between two scented conditions.

Finally, as Spangenberg et al. (2006) emphasized, it was crucial to constantly control the intensity of the fragrances along the two scented conditions. Also, joining Bosmans' (2006) recommendation, customers were not aware – at least consciously – of the presence of an ambient scent. Put differently, the respondents were not informed that a fragrance was dispersed in the store but were interrogated about it via an open guessing question at the end of the survey (e.g.: Spangenberg et al., 2006).

In all three conditions, as the customers were leaving the store, they were intercepted by the researcher and asked: "if you are finished with your shopping at Alice Délice, I would like to invite you to answer some questions about your shopping" (adapted from Chebat et al., 2009). For the clients who accepted to participate, they were requested to complete a questionnaire dealing with their affective reactions, evaluations, and approach behaviors (e.g.: intent to revisit the store, amount of money spent in the shop) with respect to the store environment and its offerings/products. At the end of the survey, the participants were asked to specify some personal information such as age and gender.

2.4. Data collection and sampling

The research took the form of an empirical study implying that respondents were asked to complete a questionnaire. It should be noted that the latter has been adapted several times, with the help of professors, in order to avoid ambiguities and mistakes in the wording of the questions and in the creation of the scales. For this experiment, a convenience sample has been chosen as these respondents are readily available and can therefore be reached in an easy way. In other words, the selection of sampling units was left primarily to the researcher. This method of data collection has the advantage that it is not expensive, not time consuming and the sample units are accessible, easy to measure and cooperative, allowing the obtaining of a higher response rate (Malhotra et al., 2012).

The research units were men and women who entered the store Alice Délice whether or not they have made a purchase. Concerning the gender of the respondents, no specific restriction was applied although it appeared from the pre-tests that 80% of the customers visiting the store were women. Accordingly, caution was taken to respect as much as possible this percentage during the experiment. Also, it should be emphasized that prior research documented that women score higher on affect intensity than men (Larsen & Diener, 1987; Moore, 2004; in Doucé & Janssens, 2013), demonstrating that sensory marketing and in particular olfactory marketing would be more appropriate for stores targeting mainly a female clientele, which is the case of the cookware shop Alice Délice. What is more is the age of the participants which has been proven by Chebat et al. (2009) to be of high importance. Indeed, previous studies investigated in the field of sensory perception and physiology specified that divergences are also existent between older and younger people in terms of the acuity of their sense of smell (e.g.: Murphy, 1995; in Chebat et al. 2009). In the study run by Chebat et al. (2009), results indicated that ambient scent diffused into a mall environment caused the amount of money spent by shoppers to rise, but only for younger shoppers. On top of that, the authors also reported that, again, only younger shoppers demonstrated increased perceptions of scent appropriateness in the case a scent was emitted, concluding that senior shoppers presented a lower capability to detect the ambient scent when it was present. Armed with this paramount information and based on several previous studies (e.g.: Spangenberg et al., 2004; Ward et al., 2007; Doucé & Janssens, 2013) which have used a sample aged between 16 and 65 years old, the author decided to survey customers aged in this range.

It is important to underline that, as the experiment was operated via the use of a convenience sample, the acuity of olfaction between the participants in the three conditions seemed to be relatively similar, therefore ensuring that while comparing the different conditions, no bias would be indicated in the results.

By performing analyses based on the data obtained from the questionnaires, the author's objective is to determine the effects on customers' reactions of cross-modal (in)congruity between the store Alice Délice and olfactory stimuli. The different experimental conditions together with the distribution of respondents are summed up in the below table.

Table 3: Distribution of the respondents

	Experimental conditions			Total
	No scent	Cross-modally congruent scent (i.e.: apple pie)	Cross-modally incongruent scent (i.e.: coffee)	
Completed surveys	40	40	40	120

The number of 40 respondents per condition is estimated to be sufficient to carry out the analyses in order to test the hypotheses as the number of participants required for a 2x2 factorial design is 30 per condition leading to a total of 120 respondents, the same amount of participants than in the present study. In conclusion, in total, 120 respondents (101 women and 19 men) aged between 17 and 65 years old participated to this study. The descriptive statistics can be found in appendix 15.

2.5. Experiments' survey in the store "Alice Délice"

2.5.1. Scales and measurement of the questionnaire

The first question of the questionnaire (see appendix 16) was aimed at measuring the affective responses of the consumer with respect to the store environment. From the literature review, it came up that the variables "pleasure" and "arousal" from the PAD model of Mehrabian & Russell (1974) are commonly employed to measure the customer's affective state as a response to environmental stimuli. To cite few, Mattila & Wirtz (2001) and Doucé & Janssens (2013) relied on Mehrabian & Russell's (1974) scales in order to measure the emotional and behavioral responses of the consumers in reaction to the retail environment.

Within the framework of this paper, several items from both the “pleasure” dimension and the “arousal” dimension taken from the scale of Mehrabian & Russell (1974) were used. As a whole, the customers’ affective responses toward the store environment (i.e.: Alice Délice) were measured through a 12-items 7-points semantic differential scale. In order words, on one hand, under the “pleasure” dimension, the following six items were employed: happy/unhappy, pleased/annoyed, satisfied/dissatisfied, contented/melancholic, hopeful/despairing, and relaxed/bored. On the other hand, under the “arousal” dimension, the following six items were used: relaxed/stimulated, calm/excited, frenzied/sluggish, dull/jittery, sleepy/awake, and aroused/unaroused.

The second question of the questionnaire investigated the consumers’ evaluation of the store environment. The measurement of the evaluation of the retail environment was done by making use of Fisher’s (1974) 13-items environmental quality scale. Relying on Spangenberg et al. (1996) – who applied the complete Fisher’s (1974) 13-items 7-points semantic differential scale to measure the effect of scent on consumers’ evaluation of the store environment – the author decided to opt for the full scale by also including the item “unpleasant/pleasant” likewise Spangenberg et al. (1996) and Matilla & Wirtz (2001). Moreover, 6 items taken from the literature (Briand & Pras, 2010) were added, namely: unstressful/stressful, impersonal/intimate, narrow/spacious, outdated/modern, disordered/well ordered, and low end/upmarket.

The third question of the questionnaire assessed the overall assessment of the store based on and adapted from Spangenberg et al. (1996)’s study. Concretely, this question comprised 5-items 7-points semantic differential scale (i.e.: bad/good; unfavorable/favorable; negative/positive; outdated/modern; and nice/not nice).

In addition, the fourth question of the questionnaire referred to the customers’ evaluation of the store’s offerings/products. Spangenberg et al. (1996) used the 7-points semantic differential scale propagated by Bellizzi et al. (1983) to measure the customers’ evaluation of the store’s offerings/products. Precisely, this scale consists of the following four items: merchandise style (outdated/up-to-date), merchandise selection (inadequate/adequate), merchandise prices (low/high), and merchandise quality (low/high). Moreover, for the evaluation of specific products, the following 7-point scales were employed by Spangenberg et al. (1996): bad/good, unpleasant/ pleasant, unfavorable/favorable, low quality/high quality – similar to Bellizzi et al.’s (1983) item of merchandise quality –, unattractive/attractive and poor value/good value.

However, in this study, the store's offerings/products are considered as a whole and not as separate ranges available in the store. Therefore, all the items from the above two scales (i.e.: Bellizzi et al., 1983; Spangenberg et al., 1996) were retained except the item that handles the merchandise selection (i.e.: inadequate/adequate).

The fifth question of the survey was aimed at measuring customers' approach and avoidance responses. For this purpose, relying on Donovan & Rossiter's (1982) study which extended the Mehrabian & Russel's (1974) S-O-R model to retail environments, the author constituted 8 statements measured by 7-points semantic differential scale ranging from "totally disagree" to "totally agree".

Besides, the sixth question of the questionnaire dealt with the consumers' intent to return to the store by asking them the following straightforward question: "Assuming you were looking for products like those sold at this store and you had the money, how likely would you be to revisit the store?" (Spangenberg et al., 1996). This approach behavior was measured by using a 7-points semantic differential scale consisting of one item (i.e.: the intention to return to the store Alice Délice) ranging from "not at all likely" to "extremely likely".

Additionally, the seventh question of the questionnaire referred to an interesting dependent variable which worth researchers' interest, namely the Word-Of-Mouth (WOM) generated by customers. It should be emphasized that the meaning of WOM in the present study refers to the informal communications between customers and external parties with regard to evaluations of a store environment and its products/offerings. Prior research documented that WOM is often associated to customers' satisfaction or dissatisfaction with previous purchasing experiences (e.g.: Richins, 1983; Singh, 1988; Mangold et al., 1999), the latter being determined by multiple elements such as the store atmosphere, the products, etc. (Yoo & Chang, 2005). Not surprisingly, Anderson (1998) reported that satisfied customers will engage in WOM in favor to the brand (or company). Nonetheless, despite contradiction in researchers' findings (e.g.: Holmes & Lett, 1977; Richins, 1983) as far as the customer satisfaction-WOM relationship is concerned, Anderson's (1998) outcomes tend to confirm Richins' (1983) results that extremely dissatisfied customers are more apt to produce higher levels of negative WOM than highly satisfied customers are disposed to generate positive WOM.

Moreover, according to Nielsen Global Online Consumer Survey[6], 84% of consumers trust recommendations from people they know when choosing brands or products, thus making WOM indeed a very strong asset. In line with this data, the store image – partly determined by factors such as the store environment/design and the store's products – will affect the valance (either negative or positive) of the WOM generated. As a consequence, ambient scent – which has been proven through the literature to have positive effects on the evaluations toward a store and its offerings – may in turn create another type of approach behavior characterized as positive WOM. For this reason, three statements derived from the literature (Zeithaml et al., 1996) were employed and measured via a 7-points semantic differential scale. Indeed, Zeithaml et al. (1996) investigated the effect of service quality on certain behaviors – such as WOM communications – that reflect the customers' willingness to remain with or defect from a company. It appeared from their study that the loyalty scale – comprising the three statements aimed at measuring WOM communications – displayed an excellent internal consistency, making those favorable behavioral-intentions items interesting to include in the present research.

Afterwards, the respondents were requested to indicate the amount of money spent in the store Alice Délice during the day at which the experiment was run. In order to obtain accurate responses, the visitors were demanded to refer to their till receipt. Next, three remaining open-guessing questions were asked to the participants in order for them to report their overall impression about the research to which they had just participated. Such questions could allow the author to record possible customers' awareness of the study's objective and therefore eliminate the data from respondents who did figure out the purpose of the research in order to avoid biased answers.

Finally, with the intention to collect important personal data, the respondents were asked to specify their gender as well as their age at the end of the questionnaire. In addition, customers who wished to participate to the raffle (i.e.: cinema tickets) were requested to report their e-mail address via which the happy winner would be alerted. The researcher was cautious to put at stake an incentive which was not directly related to the store under study as it might have led to prejudiced responses. Furthermore, the incentive was mentioned in the introduction of the questionnaire with the aim to motivate the customers to take part to the survey.

[6] Accessed on the 12th of April 2014 via www.nielsen.com

It should be noted that, as for the pre-test phase, the questionnaire was written by the author with the help of Mrs. Baudoux, an English and Dutch teacher in secondary school.

The following table shows the items that were selected for the experiment's questionnaire.

Table 4: In-store survey - 7-points semantic differentials

Affective responses toward the store environment (Mehrabian & Russel, 1974) Pleasure (6 items) Arousal (6 items)	 Happy/unhappy Pleased/annoyed Satisfied/dissatisfied Contented/melancholic Hopeful/despairing Relaxed/bored Frenzied/sluggish Excited/calm Awake/sleepy Aroused/unaroused Jittery/dull Stimulated/relaxed
Evaluation of the store environment – 20 items (Fisher, 1974; Spangenberg et al., 1996; Briand & Pras, 2010)	 Attractive/unattractive Relaxed/tense Comfortable/uncomfortable Cheerful/depressing Colorful/drab Positive/negative Stimulating/boring Good/bad Lively/unlively Motivating/unmotivating Interesting/uninteresting Pleasant/unpleasant Open/closed Bright/dull Unstressful/stressful Intimate/impersonal Spacious/narrow Modern/outdated Ordered/disordered Upmarket/low end

Overall evaluation of the store – 5 items (Spangenberg et al., 1996)	Good/bad Positive/negative Favorable/unfavorable Modern/outdated Nice/not nice
Evaluation of products – 8 items (Bellizzi et al., 1983; Spangenberg et al., 1996)	Pleasant/unpleasant Attractive/unattractive Favorable/unfavorable Good/bad Up-to-date/outdated High quality/low quality High prices/low prices Good value for money/bad value for money
Approach/avoidance – 8 statements (adapted from Donovan & Rossiter, 1983)	Enjoyment of shopping Stay longer Time spent Urge to leave Feel friendly and have a chat Avoidance to look around and explore Avoidance toward people and to talk Money spent
Intention to revisit the store (1 statement)	/
Word-of-Mouth – 3 statements (Zeithaml et al., 1996)	Say positive things Recommend Encourage friends/relatives
Amount of money spent (in Euro)	/

2.5.2. Encoding of the questionnaire

Concretely, all questions described above were rated on a 7-points semantic differential scale. As far as the first four questions are concerned, the different scales were anchored at their extreme points by bipolar items by placing the negative one on the left-hand side and the positive one on the right-hand side. Concerning the next three questions, the latter were either composed of statements or took the form of a question and were all gauged on a 7-points semantic differential scale likewise the previous ones. The coding is, therefore, for each item ranging from 1 to 7. It should be noted that a balanced scale was preferred meaning that odd numbers were employed so that the participants can have the possibility to "stand in the middle" (i.e.: the mean = 4) and express a neutral opinion. Indeed, sometimes a participant might face difficulties to make a choice and clearly states its point of view. Finally, the answers to the last question dealing with the amount of money spent in the store under study (only for the day at which they were questioned) were encoded in Euro.

In the case the respondents indicated the figure “0” or left the response space blank, the author reported a missing value in the software SPSS so that the mean of this variable would only take into account answers of the participants who did purchase.

3. FACTOR ANALYSIS AND RELIABILITY ANALYSIS OF THE VARIABLES

Before proceeding to the test of the hypotheses mentioned before, a factor analysis and a reliability analysis are required (see appendix 17). Precisely, the scales used in the questionnaire were subjected to factor analysis which refers to “a class of procedures primarily used for data reduction and summarization” (Malhotra et al., 2012). Indeed, in the case of the present study, a large number of variables were used, most of which are correlated and must be reduced to a manageable level, or in other words, to an actual underlying dimensionality. In fact, through such factor analysis, relationships amid sets of numerous interrelated variables can be examined and represented in terms of a few underlying factors (Malhotra et al., 2012). Accordingly, the data can be abridged and the testing of the hypotheses facilitated. It should be highlighted that as Janssens et al. (2008) stressed, the number of respondents should be at least 10 times the number of variables (i.e.: the number of items measuring a variable) with the aim to ensure that the dataset contains enough respondents for the analysis to be performed. In a similar vein, Malhotra et al. (2012) suggest that an appropriate sample size should be used, meaning that there should be at least 4 or 5 times as many respondents as there are variables. As far as this study is concerned, a total number of 120 respondents were questioned meaning that, according to Janssens et al. (2008), this condition has been respected for every variable except for the variable “evaluation of the store environment” which comprises a number of 20 items (120 respondents < 10 x 20 items). Nonetheless, with respect to other authors’ opinion mentioned in Malhotra et al. (2012), this condition was respected for each question of the survey.

A crucial step before actually considering reducing various items of a scale to a convenient number of factors is to check whether the items are sufficiently correlated to one another by using some key statistics associated with factor analysis, that is: the “Kaiser-Meyer-Olkin” measure of sampling adequacy (abbreviated form: “KMO”), the "Bartlett's test of sphericity” and the “anti-image correlation matrix”.

Firstly, the “Bartlett’s test of sphericity”’s purpose is to figure out whether there is a high enough degree of correlation between at least a number of the variables included (Janssens et al., 2008).

Secondly, the anti-image correlation matrix reports the negative value for the partial correlations between all possible pairs of variables included in the analysis (Malhotra et al., 2012).

The factor analysis will only be relevant to perform if the values in the anti-image correlation matrix are close to zero. Last but not least, the KMO measure of sampling adequacy is dedicated to determine the appropriateness of a factor analysis and, hence, compares the magnitudes of the observed correlation coefficients with the magnitudes of the partial correlation coefficients. The measures of sampling adequacy (MSA) reflected by the main diagonal of the correlation matrix lie between 0 and 1 and should be higher than 0.5 to be acceptable.

In order to support the results obtained via the factor analysis, a reliability analysis was run. Indeed, as the indicators all reflect the same underlying construct, they should produce consistent results. As Malhotra et al. (2012) define, reliability refers to "the extent to which a scale produces consistent results if repeated measurements are made". Amidst the approaches to measure reliability, internal consistency reliability is employed to evaluate the reliability of a summated scale where multiple items are summed to constitute a total score. In the case of this paper, the author used 7-points semantic differential scales composed of several items assessing some aspect of the construct measured by the entire scale. Among the measures of internal consistency reliability, the coefficient alpha – also popularized as Cronbach's alpha – is the average of all possible split-half coefficients resulting from different ways of splitting the scale items. The Cronbach's alpha fluctuates between 0 and 1, and a value inferior to 0.6 or 0.7 usually reports unsatisfactory internal consistency reliability (Malhotra et al., 2012). The reliability analysis was performed based on the data obtained from the respondents' answers for all three conditions of the experiment.

3.1. Variable "affective responses toward the store environment"

The "Bartlett's test of sphericity", reporting a p-value of < 0.001, indicates that the null hypothesis which states that the items are uncorrelated is rejected, therefore making the factor analysis meaningful.

Considering only values below the main diagonal in the anti-image correlation matrix, it came out that the all values are close to zero, hence, the factor analysis is considered to be pertinent.

As the “KMO measure of sampling adequacy” statistic used to examine the appropriateness of factor analysis is 0.88, the latter indicates that the correlations between pairs of variable are explained by other variables and that, consequently, a factor analysis is appropriate.

More precisely, since the lowest MSA is 0.71 (> 0.5), not a single variable will be eliminated and the global statistic 0.88 (> 0.5) can be examined in a further step and confirms that a factor analysis may be performed.

As far as the communalities are concerned, although the decision to consider a value as “low” is subjective, given that the lowest communalities are 0.42 for the item “aroused” and 0.43 for the item “jittery”, the researcher decided that all variables are relevant. Taking into account these values, 57.24% of the variance of the present variable is explained.

In addition, the scree plot shows that there are two relevant factors as the “elbow” is located at this point. To support this finding, the author looked at the “rotated component matrix” in which it can clearly be perceived that items above 0.5 in the component 1 can be assigned to the first factor, namely “pleasure”, and that items above 0.5 in the component 2 can be allocated to the second factor, that is “arousal”. Nevertheless, some items (i.e.: frenzied, awake, and aroused) belonging initially to the “arousal” category have been classified in the factor analysis under the “pleasure” factor, which is not relevant. For this purpose, the author performed again the factor analysis by eliminating them. The new “KMO measure of sampling adequacy” statistic is now 0.85 and the lowest MSA is 0.72 (> 0.5), therefore the former value justifies that a factor analysis is meaningful. Also, the percentage of variance explained now reaches 60.78% and the factor analysis displays, likewise the first trial, two relevant factors containing, this time, their appropriate items.

Finally, in order to investigate whether the items indeed measure the obtained factors, a reliability analysis was performed. The Cronbach’s alpha displayed a value of $\alpha = 0.88$ for the items under the factor “pleasure”. In other words, the latter value shows sufficient correlation with the aim to measure the variable “pleasure”. Moreover, the items under the factor “arousal” exhibit a Cronbach's alpha of $\alpha = 0.61$, just above the minimum allowed of 0.6 for summating a scale.

The following table summarizes the classification of the items belonging to the variable “affective responses toward the store environment” dispatched into two factor categories.

Table 5: Item distribution by factor category for the variable "affective responses toward the store environment"

Factor categories	
PLEASURE	**AROUSAL**
Pleased	Stimulated
Happy	Excited
Relaxed	Jittery
Satisfied	
Contented	
Hopeful	

3.2. Variable “evaluation of the store environment”

It should be highlighted that, despite employed in several studies, the last six items of this question – taken from Briand & Pras (2010) – were removed from the factor analysis as they seem not to provide enough consistency. Indeed, including them in such an analysis ends up with multiple factors, yet the majority of the items are aimed at measuring the same variable. As a result, the following factor analysis only included a total of 14 items.

Likewise the previous variable, the p-value of < 0.001 displayed by the “Bartlett’s test of sphericity” confirms that the null hypothesis which states that the items are uncorrelated is rejected, therefore making the factor analysis meaningful.

Considering only values below the main diagonal in the anti-image correlation matrix, it came out that the all values are close to zero, hence, the factor analysis is considered to be pertinent.

Moreover, the “KMO measure of sampling adequacy” statistic obtained is 0.92, indicating that a factor analysis is appropriate. Indeed, it can be perceived that the lowest MSA is 0.88 (> 0.5), and that accordingly, the global statistic 0.92 (> 0.5) can be examined in a further step.

Taking into account that all the communalities are “high” enough, the table “total variance explained” shows that 64.39% of the variance of the present variable is explained. In addition, the scree plot demonstrates that there are two relevant factors. To provide support to this outcome, from the “rotated component matrix”, it is clearly noticeable that items can be allocated to two factor categories. However, since all the items have the objective to measure the present variable, another factor analysis was run by fixing a maximum number of categories of 1.

By doing so, the total variance explained decreases slightly to 57.18% and all the items are now classified under only one category.

To end with, a reliability analysis was conducted and reported a Cronbach's alpha exhibiting a value of $\alpha = 0.94$. Put differently, the latter value shows sufficient correlation with the aim to measure the variable "evaluation of the store environment".

3.3. Variable "overall assessment of the store"

Again, the "Bartlett's test of sphericity" reports a p-value < 0.001 and therefore indicates that a factor analysis is significant.

From the anti-image correlation matrix, one can notice that all values surrounds the value of zero and that, consequently, the factor analysis is relevant.

As far as the "KMO measure of sampling adequacy" statistic is concerned, the latter reaches 0.84, affirming that a factor analysis is appropriate. For confirmation, since the lowest MSA is 0.79 (> 0.5), the global statistic 0.84 (> 0.5) can be examined in a further step.

In addition, the table "total variance explained" certifies that the five statements aimed at measuring the variable "overall assessment of the store" can be assigned to a single component which explains 79.93% of the variance in the present variable.

Finally, in order to investigate whether the items indeed measure the obtained factor, a reliability analysis was conducted. The Cronbach's alpha exhibited a value of $\alpha = 0.94$. Put differently, the latter value shows sufficient correlation with the aim to measure the variable "overall assessment of the store".

3.4. Variable "evaluation of the store's products/offerings"

Similarly to the prior variables, the "Bartlett's test of sphericity" for the present variable presents a p-value of < 0.001, hence, making the factor analysis pertinent.

In this case, the lowest MSA is 0.64 (> 0.5), enabling the global statistic (i.e.: KMO) 0.82 (> 0.5) to be used in a further step and confirming that a factor analysis may be performed.

Concerning the communalities, due to the fact that the lowest communalities are 0.50 for the item “good value” and 0.51 for the item “quality”, the researcher decided that all of the variables are relevant. Taking into account these values, 61.46% of the variance of the present variable is explained.

In addition, the scree plot shows that there are two relevant factors. Concretely, the “rotated component matrix” clearly shows that items above 0.5 in the component 1 can be assigned to the first factor, renamed as “valence”, and that items above 0.5 in the component 2 can be allocated to the second factor, characterized as “value”.

Finally, a reliability analysis was performed and displayed a Cronbach’s alpha reporting a value of α = 0.84 for the items under the factor “valence”. In other words, the latter value shows sufficient correlation with the aim to measure the variable “valence”. Moreover, the items under the factor “value” exhibit a Cronbach's alpha of α = 0.13 which is insufficient for the creation of a summated scale. For this reason, the item reporting the lowest “item-total correlation” value (i.e.: “high prices”) was deleted, giving a new Cronbach’s alpha of α = 0.65 which is an acceptable value for summating the items.

The following table summarizes the classification of the items belonging to the variable “evaluation of the store’s products/offerings” dispatched into two factor categories.

Table 6: Item distribution by factor category for the variable "evaluation of the store's products/offerings"

Factor categories	
VALENCE	**VALUE**
Attractive	Good value for money
Pleasant	Favorable
Good	
Up-to-date	
High quality	

3.5. Variable “approach/avoidance behaviors”

Once again, because the “Bartlett’s test of sphericity” exhibits a p-value of < 0.001 and due to the fact that values below the main diagonal in the anti-image correlation matrix are close to zero, it can be concluded that the factor analysis is meaningful.

Likewise the previous variables examined, the “KMO measure of sampling adequacy” statistic for the present variable reaches 0.82, indicating that a factor analysis is appropriate as the lowest MSA is 0.73 (> 0.5).

Taking into account that all communalities are “high” enough, it appears that 63.98% of the variance of the variable studied is explained. In addition, the scree plot shows that there are two relevant factors, such a result which is confirmed by the “rotated component matrix” in which items above 0.5 in the component 1 can be assigned to the first factor, renamed as “avoidance”, and that items above 0.5 in the component 2 can be allocated to the second factor, characterized as “approach”.

Nonetheless, as it appears obvious from the data set, only a small number of the respondents from the research’s sample have made a purchase during the days at which the study was conducted. As a consequence, it seems wise to remove the approach question (i.e.: “h”) dealing with the amount of money spent from the factor analysis.

Lastly, the final step before creating a summated scale is a reliability analysis from which a Cronbach’s alpha of $\alpha = 0.77$ for the items under the factor “avoidance” was obtained. In other words, the latter value shows sufficient correlation with the aim to measure the variable “avoidance behaviors”. Moreover, the items under the factor “approach” exhibit a Cronbach's alpha of $\alpha = 0.83$ which is sufficient for the creation of a summated scale.

The following table summarizes the classification of the items belonging to the variable “approach/avoidance behaviors” dispatched into two factor categories.

Table 7: Item distribution by factor category for the variable "approach/avoidance behaviors"

Factor categories	
APPROACH	**AVOIDANCE**
Enjoyment of time spent	Leave the store
Stay in the store	Avoid to explore
Perceived time spent	Avoid other people
Good mood, open to chat	

3.6. Variable “intention to revisit/return to the store”

Since this variable is composed of only one item, neither factor analysis nor reliability analysis were carried out for this scale. The following question was therefore renamed as the “intent to revisit/return to the store” variable: “Assuming you were looking for products like those sold at this store and you had the money, how likely would you be to revisit the store?”

3.7. Variable “word-of-mouth”

As for all the prior variables of this research, the “Bartlett’s test of sphericity” for this last variable shows a p-value < 0.001, proving that the factor analysis meaningful.

In the same way that the other variables, the “KMO measure of sampling adequacy” is relatively high (0.75), pointing out that a factor analysis is relevant. Indeed, since the lowest MSA is 0.739 (> 0.5), the global statistic 0.75 (> 0.5) can be examined in a further step and confirms that a factor analysis may be performed.

In addition, the table “total variance explained” affirms that the three statements aimed at measuring the variable “WOM” can be allocated to a single component which explains 82.84% of the variance in the present variable.

Finally, in order to investigate whether the items indeed measure the obtained factor, a reliability analysis was executed. The Cronbach’s alpha displayed a value of $\alpha = 0.89$ indicating that the three items aimed at gauging this dependent variable correlate and therefore prove that they indeed measure this construct appropriately.

4. TESTING THE HYPOTHESES

In this section the following hypotheses (and their sub-hypotheses) have been tested one by one by using the “one-way ANOVA” technique as the aim is to compare whether the sample means differ on three independent samples. Indeed, analysis of variance (ANOVA) is commonly employed as a test of means for at least two samples and, characteristically, the null hypothesis is that all means are equal. It is useful to emphasize that the author opted for the univariate analysis instead of the multivariate analysis (i.e.: MANOVA). This choice is justified by the fact that the present study’s purpose is not to provide what is called a “latent” link between the independent variable (i.e.: the ambient fragrance) and the various dependent variables.

At the opposite, the author is more interested in demonstrating the effect of such an independent variable on each dependent variable, separately. On top of that, the main disadvantage of the multivariate analysis is that, in the case the data set contains missing value(s) for a particular item, the analysis will be run by excluding this item for all the participants, decreasing considerably the sample size.

For this study's purpose, a total of 120 respondents dispatched into three samples (i.e.: 40 respondents per condition) – whose answers have been recorded – will serve for testing the below hypotheses. Therefore, the grouping variable used for testing the hypotheses is the variable "condition" (i.e.: no scent, apple pie, and coffee). Put in a mathematical way, the below hypotheses are statistically interpreted as follow:

$$H_0 : \mu_1 = \mu_2 = \mu_3$$
$$H_1 : \text{at least one } \mu_i \text{ is different from the other } \mu_i$$

Note that, when applicable, the several items aimed at measuring the different variables composing the hypotheses were reduced in a summated scale in order to facilitate the testing of the hypotheses (cf. factor and reliability analyses). The complete statistical results from the one-way ANOVA can be found in appendix 18.

4.1. Hypotheses 1, 2, and 3 (a)

As far as the affective responses are concerned, the latter have been split up into two factor categories, namely "pleasure" and "arousal" (cf. previous section).

Regarding the first factor, the descriptive results illustrate that the cross-modally congruent ambient scent generates an enhanced positive influence on the customers' affective responses, more precisely on their "pleasure" state (M = 6.09; SD = 0.84), in contrast to the condition including the cross-modally incongruent odor (M = 5.97; SD = 0.73) or the non-scented condition (M = 5.45; SD = 0.93). In addition, it can clearly be perceived that the cross-modally incongruent scent still provokes higher positive customers' pleasure state compared to the condition without a scent.

Relying on the ANOVA table, the significance of this effect (sign. < 0.05) is confirmed. Because the test of homogeneity of variances displays a significance of 0.406 (> 0.05), the null hypothesis stating that the variances are equal cannot be rejected and therefore the author will look at the tests of LSD and Bonferroni. It is noteworthy to draw the distinction between both tests, that is, as LSD test is only valid for testing mean comparisons that were predetermined in the hypotheses of the experiment, the latter will be used only when the results indeed meet the expectation(s) made on beforehand, otherwise, the Bonferroni test will be employed to decrease the chances of obtaining type I errors (i.e.: incorrectly rejecting the null hypothesis when it is true). According to those tests of equal variances, hypothesis 2 (a) is confirmed at the 5% significance level as the difference between the cross-modally congruent scent (i.e.: apple pie) and the non-scented condition is significant (0.001 under the LSD test and 0.003 under the Bonferroni test, both < 0.05). Moreover, hypothesis 3 (a) is also confirmed at the 5% significance level as the difference between the cross-modally incongruent fragrance (i.e.: coffee) and the non-scented condition is significant (0.007 under the LSD test and 0.021 under the Bonferroni test, both < 0.05). However, hypothesis 1 (a) is not supported at any significance level.

Concerning the second dimension of the affective responses, that is “arousal”, the descriptive results show that, once again, the cross-modally congruent odor leads to improved positive customers’ arousal state (M = 4.54; SD = 1.28) in comparison to the cross-modally incongruent scent (M = 4.31; SD = 1.40) and to the condition without any fragrance (M = 4.05; SD = 1.13). Likewise the previous dimension, it appears that using any ambient fragrance, even if cross-modally incongruent with the store environment, can result in more positive outcomes compared to leaving the store unscented.

Although the ANOVA table reports a non-significance of this effect (sign. > 0.1), because the author expects some hypotheses to be confirmed, the LSD test of equal variances (0.672 > 0.05) was analyzed and actually revealed that, indeed, the hypothesis 2 (a) is supported at the 10% significance level (0.087 < 0.1) as the cross-modally congruent ambient scent lead to better customers’ arousal states in contrast to the unscented condition. Nevertheless, hypotheses 1 and 3 (a) are not confirmed.

As a conclusion, the author can state that, while there is only one statistically significant effect on the customers' arousal states – that is a store environment comprising a cross-modally congruent scent is more effective than an odorless store in enhancing higher positive customers' arousal states –, a cross-modally congruent ambient scent will produce improved positive customers' pleasure states compared to a situation in which no scent is spread and that a cross-modally incongruent scent still lead to better results – regarding the "pleasure" dimension – than an unscented store environment.

4.2. Hypotheses 1, 2, and 3 (b)

In relation to the evaluation of the store environment, it appears from the descriptive results that, astonishingly, the customers provide a faintly better evaluation when the cross-modally incongruent ambient scent is diffused (M = 6.30; SD = 0.64) than when a cross-modally congruent fragrance (M = 6.27; SD = 0.60) or no odor is dispersed (M = 5.98; SD = 0.94). Despite the ANOVA table illustrating a non-significant effect (sign. > 0.1), the LSD test of equal variances (0.295 > 0.05) reveals that the hypotheses 2 and 3 (b) are confirmed at the 10% significance level (0.089 < 0.1; and 0.058 < 0.1, correspondingly).

As a result, it can be stated that the addition of either a cross-modally congruent or incongruent ambient fragrance will produce, respectively, better evaluations of the store environment compared to a store which is odorless.

4.3. Hypotheses 1, 2, and 3 (c)

Concerning the overall assessment of the store, surprisingly, the descriptive results pinpoint that the cross-modally incongruent ambient scent (M = 6.39; SD = 0.57) has a slightly more positive impact on the present variable compared to the cross-modally congruent ambient fragrance (M = 6.39; SD = 0.67). On top of that, it appears from the outcomes that the addition of a pleasant ambient scent, either cross-modally congruent or not, is more willing to increase customers' overall assessment of the store than when the shop is left unscented (M = 6.05; SD = 1.14). Once again, the ANOVA table documents a non-significance of this effect (sign. > 0.1) and as the variances are assumed to be unequal (0.012 < 0.05), the Tamhane's T2 test should be used and does not reveal any significant effect. However, the LSD test of equal variances assumed illustrates that the hypotheses 2 and 3 (c) are supported at the 10% significance level (0.075 < 0.1; and 0.071 < 0.1, respectively).

To conclude, while hypothesis 1 (c) does not find support; it seems that adding a pleasant ambient odor, cross-modally congruent or not with the store, provokes, respectively, improved customers' overall assessment of the store compared to the condition of an unscented store environment.

4.4. Hypotheses 1, 2, and 3 (d)

It should be reminded that for testing those hypotheses, the present variable has been spread into two factor categories, namely "valence" and "value" (cf. factor and reliability analyses).

In reference to the evaluation of the store's products/offerings – more particularly to the "valence" of the products – once again and to the author's surprise, it appears that customers evaluate the products of the store more positively when they are shopping in a store in which a cross-modally incongruent scent emanates (M = 6.30; SD = 0.65) than when they perform their shopping activity in a store diffusing a cross-modally congruent fragrance (M = 6.27; SD = 0.65) or in a store that is odorless (M = 6.20; SD = 0.65). Despite the descriptive results reporting such differences, the ANOVA table displays a non-significance of this effect (sign. > 0.1).

As far as the "value" of the products is concerned, the descriptive outcomes confirm the assumptions made on beforehand by showing that, indeed, a cross-modally congruent fragrance leads to enhanced customers' evaluation of the value of products (M = 5.61; SD = 1.04) compared to the cross-modally incongruent scent (M = 5.01; SD = 1.29) and the non-scented (M = 4.87; SD = 1.15) conditions. In order to confirm these results, the author searched for the significance of this effect via the ANOVA table which showed a statistically significant impact (sign. < 0.05). Moreover, because the test of homogeneity of the variances documents that the variances are assumed to be equal (0.299 > 0.05), the LSD and Bonferroni tests of equal variances will be further used in order to test the hypotheses.

Through those tests, it can be perceived that the addition of a cross-modally congruent ambient scent stimulates enhanced positive customers' evaluation of the value of the store's products/offerings compared to the two other conditions (0.005 < 0.05 under the LSD test and 0.016 < 0.05 under the Bonferroni test for the no-scent condition and 0.023 < 0.05 under the LSB test and 0.069 < 0.1 under the Bonferroni test for the cross-modally incongruent condition), therefore confirming somewhat hypotheses 1 (d) and 2 (d) at the 5% significance level. However, hypothesis 3 (d) is not supported as no significance has been reported.

To sum up, hypotheses 1 and 2 (d) are partly confirmed as, although no significant effect on the "valence" dimension has been found, customers do indeed score more positively the value of the store's products/offerings when they are confronted to a pleasant and cross-modally congruent fragrance than in the case they face a cross-modally incongruent scent or no odor at all. Yet, hypothesis 3 (d) does not find support, neither for the "valence" dimension nor for the "value" dimension.

4.5. Hypotheses 1, 2, and 3 (e)

Relating to customers' approach and avoidance behaviors, those two types of behaviors have been classified under two factor categories representing them respectively.

Firstly, regarding the approach behaviors, the descriptive results identified that customers are more willing to engage in such favorable behaviors under the condition comprising the cross-modally congruent scent (M = 5.66; SD = 1.14) in contrast to the condition including a cross-modally incongruent scent (M = 5.35; SD = 0.76) or an unscented condition (M = 5.07; SD = 1.02). It should be noted that, diffusing a cross-modally incongruent is still a better solution than leaving the store odorless.

With the aim to claim this impact, it is crucial to take into account the significance reported in the ANOVA table. Actually, the latter provides evidence of a statistically significant effect (sign. < 0.05). Furthermore, as the Levene's test of the homogeneity of the variances documents, the variances are assumed to be unequal (0.013 < 0.05). Hence, the Tamhane's T2 test will be used in order to interpret the results.

According to this test, only hypothesis 2 (d) can be supported at the 10% significance level – regarding the approach behaviors – as the cross-modally congruent ambient scent does indeed influence customers' willingness to engage in approach behaviors compared to the no-scent condition (0.051 < 0.1). However, this effect cannot be expanded neither to the difference between the cross-modally congruent scent and the cross-modally incongruent fragrance nor to the difference between the cross-modally incongruent scent and the non-scented condition, leaving hypotheses 1 and 3 (d) unconfirmed.

About the customers' willingness to engage in avoidance behaviors, the descriptive results tend to go into the direction of the assumption previously made, showing that a cross-modally congruent scent leads to a lesser customers' likelihood to adopt avoidance behaviors (M = 1.99; SD = 1.18) at the opposite of the cross-modally incongruent fragrance (M = 2.51; SD = 1.10) and the no-scent condition (M = 2.32; SD = 1.01). Intriguingly, it seems that using a cross-modally incongruent ambient scent would engender a slightly higher customers' likelihood to behave in an unfavorable way compared to the non-scented environment. Even if the ANOVA table reports a non-statistically significant effect (sign. > 0.1), the author took into consideration the LSD test of equal variances (0.879 > 0.05) to examine whether some hypotheses could be confirmed. As a result, hypothesis 1 (d) is confirmed at the 5% significance level (0.038 < 0.05) by stating that a cross-modally congruent ambient fragrance, compared to a cross-modally incongruent ambient scent, will result in a lesser willingness to adopt unfavorable and avoidance behaviors whereas hypotheses 2 and 3 (d) do not find support.

To summarize, the only statistically significant effects that have been found is the improved positive impact of the cross-modally congruent ambient scent on the customers' willingness to engage in approach behaviors compared to the non-scented condition and the lesser intention to engage in avoidance behaviors when a cross-modally congruent ambient scent is diffused in comparison than when a cross-modally incongruent ambient fragrance is spread in a store environment.

4.6. Hypotheses 1, 2, and 3 (f)

As far as the intent to revisit or return to the store is concerned, the descriptive results document that both the cross-modally congruent and incongruent ambient fragrances have a higher and equal impact on the variable (M = 6.28; SDs = 0.90 and 0.88, respectively) compared to the non-scented condition (M = 6.08; SD = 0.83).

Unfortunately the non-significance (sign. > 0.1) exhibited in the ANOVA table states that this effect is not statistically significant. Consequently, hypotheses 1, 2, and 3 (f) are not confirmed.

4.7. Hypotheses 1, 2, and 3 (g)

The descriptive table shows that, by diffusing a cross-modally congruent ambient scent in a store, the word-of-mouth generated by the customers is more positively affected (M = 6.18; SD = 0.80) than by using a cross-modally incongruent ambient fragrance (M = 6.08; SD = 0.81) or than by keeping the store unscented (M = 5.77; SD = 1.00).

It should be noted that it seems from these descriptive outcomes that spreading a cross-modally incongruent odor is still a better option than a scentless store environment. Nevertheless, the ANOVA table displays a non-significance of this effect (sign. > 0.1). But because the author expects some hypotheses to be supported, although the Levene's test of homogeneity requires to use the test of unequal variances assumed (0.047 < 0.05), the LSD test illustrates that the hypothesis 2 (g) is confirmed at the 5% significance level (0.040 < 0.05) by confirming that a cross-modally congruent scent has the ability to enhance more positively the generation of word-of-mouth by customers compared to a situation in which no odor is spread in the store. On the contrary, both hypotheses 1 and 3 (g) do not find support.

4.8. Hypotheses 1, 2, and 3 (h)

From the descriptive results, it appears that the use of the cross-modally congruent ambient scent (i.e.: apple pie) stimulates sales the best in the sense that the average price of product(s) purchased by a customer is higher in this condition (M = 43.52€; SD = 29.59€). The cross-modally incongruent ambient scent (i.e.: coffee) and the non-scented condition report a lower basket (M = 31.29€; SD = 22.66€ and M = 20.23€; SD = 18.27€; respectively) although the use of a cross-modally incongruent scent appears to lead to a higher average of money spent compared to the non-scented condition.

Moreover, from the ANOVA table, it can be perceived that the use of an ambient fragrance has a significant effect on the average price of product(s) purchased (sign. < 0.05). Given the fact that the null hypothesis cannot be rejected (0.359 > 0.05), the author looked at the LSD and Bonferroni tests of equal variances assumed, both reporting a significant difference between the means of the non-scented condition and the cross-modally congruent ambient scent condition (0.011 < 0.05 under the LSD test; and 0.032 < 0.05 under the Bonferroni test).

From this result, it can be concluded that the hypothesis 2 (h) is supported and that, indeed, the addition of a cross-modally congruent scent in a store has a higher positive impact on the average price of product(s) purchased by a customer compared to the non-scented condition. Nonetheless, the present results should be interpreted with carefulness as the sample size in this study is relatively low. On top of that, hypotheses 1 and 3 (h) do not find support in the present results.

4.9. Summary of the testing of the hypotheses

With the aim to synthetize the effects of either a pleasant ambient scent (both cross-modally congruent and incongruent) or a non-scented condition on the different dependent variables – tested through the above hypotheses – the following table summarizes, for each dependent variable, the means and standard deviations for the three experimental conditions as well as the p-value reported in the ANOVA table. In addition, several graphs (see appendix 19) have been drawn in order to represent the statistically significant effects on the dependent variables at the significant levels of 5% or 10%. It should be noted that although the below table shows significant effects for only four dependent variables – relying on the p-values displayed in the ANOVA tables – the author continued the analysis of the results even in the case of a non-significant effect and looked therefore at the LSD test of equal variances assumed, such a procedure ending with a greater number of significant effects.

Table 8: Effects of the presence of a pleasant ambient fragrance (both cross-modally congruent and incongruent) and a non-scented condition on affective responses, evaluations, approach/avoidance behaviors, intention to return to the store, WOM, and sales

	TOTAL SAMPLE			
	M (SD)			
DEPENDENT MEASURES	NO SCENT (N = 40)	CROSS-MODALLY CONGRUENT SCENT (N = 40)	CROSS-MODALLY INCONGRUENT SCENT (N = 40)	P-VALUE (ANOVA)
Pleasure	5.45 (0,93)	6.09 (0,84)	5.970 (0,73)	0.002 (sign.)
Arousal	4.05 (1,13)	4.54 (1,28)	4.31 (1,40)	0.229
Evaluation of the store environment	5.98 (0,94)	6.27 (0,60)	6.30 (0,64)	0.114
Overall assessment of the store	6.05 (1,14)	6.39 (0,67)	6.39 (0,57)	0.118
Evaluation of the store's offerings (valence)	6.20 (0,65)	6.27 (0,65)	6.30 (0,65)	0.783
Evaluation of the store's offerings (value)	4.87 (1,15)	5.61(1,04)	5.01 (1,29)	0.013 (sign.)
Approach behaviors	5.07 (1,02)	5.66 (1,14)	5.35 (0,76)	0.031 (sign.)
Avoidance behaviors	2.32 (1,01)	1.99 (1,18)	2.51 (1,10)	0.107
Intention to revisit the store	6.08 (0.83)	6.28 (0.90)	6.28 (0.877)	0.497
WOM	5.77 (1.00)	6.18 (0.80)	6.08 (0.81)	0.1
Sales	20.23€ (18.27)	43.52€ (29.59)	31.29€ (22.66)	0.034 (sign.)

DISCUSSION AND CONCLUSION

The overall goal of the present paper was to address the impact on different dependent variables that pleasant ambient fragrances can possibly create while taking into consideration cross-modal correspondences between these olfactory cues and the store under study. Concretely, the author's objective was to demonstrate whether two ambient scents, opposed in their cross-modal congruity with the store in which they are diffused, lead to disparities in their effects on customers' reactions. In other words, from the literature review, it was expected that a pleasant ambient fragrance, cross-modally congruent with the store in which it is dispersed, will produce higher positive effects on affective reactions (i.e.: pleasure and arousal), evaluations (i.e.: of the store and of its products/offerings), approach behaviors, intention to revisit/return to the store, word-of-mouth generation, and the average price of purchases made in comparison to either the use of a pleasant but cross-modally incongruent ambient fragrance or to an odorless condition. On top of that, while the main aim of this research was to prove the efficacy of the concept of cross-modal congruity and its positive impact on diverse dependent variables at the interest of marketers and researchers, another purpose, yet less explicit, was to determine whether the presence of a pleasant ambient scent, while cross-modally incongruent with the store, is still a better solution to opt for compared to a unscented store.

For this purpose, the three hypotheses developed at the beginning of this paper have been tested in order to confirm the author's expectations. From the descriptive results, it appears that for almost every dependent variable, the cross-modally congruent fragrance produces a higher positive impact in contrast to the cross-modally incongruent scent and to the unscented conditions. Nevertheless, as far as the dependent variables "evaluation of the store environment", "overall assessment of the store" and "evaluation of the store's products/offerings (valence)" are concerned, the opposite holds meaning that the cross-modally incongruent fragrance has a slightly higher positive effect on those variables in comparison to the other two conditions. While this effect somehow undermines the usefulness and value of cross-modal congruity between an ambient fragrance and a store environment, it supports the idea that even a cross-modally incongruent ambient scent is still a smarter choice than leaving a store odorless.

While looking at the ANOVA tables, it can be concluded that all the three hypotheses have been supported to some extent, with dispersed effects on the dependent variables. More precisely, in this study, a pleasant and cross-modally congruent ambient fragrance generates higher positive effects, compared to the unscented condition, on the following dependent variables: affective responses (pleasure and arousal), evaluation of the store environment, overall assessment of the store, evaluation of the store's products/offerings (value), approach behaviors, WOM, and sales. Those findings are in line with prior research that pinpoint ambient fragrance as a crucial marketing tool and a powerful weapon for marketers which help them in creating a pleasant store ambiance in order to positively influence customers' reactions (e.g.: Spangenberg et al., 1996; Spangenberg et al., 2006; Bosmans, 2006; Doucé & Janssens, 2013). Furthermore, the present findings contradict the negative effects of a pleasant ambient fragrance on the sales (i.e.: average price of products purchased), which have been documented by Schifferstein & Blok (2002), by showing a positive impact on this dependent variable. Additionally, this study goes beyond previous research by including a paramount dependent variable which has the potential to build a strong brand image and attract new customers, namely "word-of-mouth". From the results, it can be stated that the use of a cross-modally congruent ambient scent indeed affects the personal recommendations that customers make.

In addition, it appears that a cross-modally incongruent ambient odor generates higher positive effects compared to a scentless condition on the affective responses (pleasure), evaluation of the store environment, and overall assessment of the store. Therefore, there are strong reasons to believe that even if an ambient fragrance is cross-modally incongruent with the store, it can still be more effective in enhancing improved customers' reactions compared to an unscented store. Moreover, for none of the various dependent variables, was the odorless condition more efficient than the other two conditions in influencing customers' reactions in a more positive manner.

While, in a similar vein than prior studies, it can be reported that a pleasant – and in this case cross-modally congruent ambient scent – leads to higher positive effects in comparison to an unscented condition, it is quite astonishing to discover that the capacity of a pleasant and cross-modally congruent ambient fragrance to impact more positively on the customers' reactions – in comparison to a, yet pleasant, but cross-modally incongruent ambient scent – is true for only two dependent variables, that is, the evaluation of the store's products/offerings (value) and avoidance behaviors.

Therefore, from this scarce empirical evidence, it can reasonably be assumed that the concept of cross-modal congruity between an ambient fragrance and the store in which it is spread is surely of importance, but to a lesser extent, while the presence of a pleasant ambient scent (congruent with the store theme) remains paramount. Indeed, the paucity of significant differences in customers' reactions between ambient fragrances diverging in their cross-modal congruity with the store might be due to their similarity in their thematic congruency with the store in question. In other words, the customers do not seem to react differently to the olfactory stimuli showing opposite cross-modal correspondences with the store as they are both congruent with the store theme. In the case of this research, both the odors "apple pie" and "coffee" were well suited for a cookware shop although they differed in their cross-modal congruity with the store setting, such a concept which may be overlooked by the customers while doing their shopping activity. Nonetheless, compared to the condition in which the store is left odorless, the cross-modally congruent ambient fragrance leads to a greater number of enhanced positive customers' reactions than the cross-modally incongruent ambient scent does. The managerial implications of these conclusions will be further explained in the next section.

LIMITATIONS, FURTHER RESEARCH AND IMPLICATIONS

It goes without saying that the present study counts several limitations. Among them, perhaps the most important one is that this research took place in a real retail environment, therefore comprising external forces/variables which might influence and bias the customers' responses. Although the researcher paid a particular attention to conduct the three conditions over several weeks so that each condition was studied over levels of shopper traffic and weather circumstances as similar as possible, it might still be probable that the findings obtained were subject to some additional factors which are difficult or even impossible to control and keep constant. Furthermore, as the study took place in a single retail environment employing only two ambient scents, precaution should be taken while generalizing the findings from these fragrances and this particular setting (i.e.: a cookware shop) to other venues or conditions (Soars, 2009; in Doucé & Janssens, 2013). Indeed, the present study could report results completely different than those that might be obtained in other settings.

In addition to the previous limitation, even if the cross-modal (in)congruity between the store and ambient odors has been investigated, the only atmospheric stimulus which was manipulated was the ambient scent, leaving the interaction effects of other possible atmospheric cues neglected in this research. For instance, the store manager was asked to turn off the music generally played in the store in order to ensure that the ambient fragrance was the only atmospheric stimulus which influenced the participants' responses. Nonetheless, as the customers might be used to hear music during their shopping activity, it is plausible that their reactions recorded in this experiment were biased one way or another due to the purposeful silence which might have been perceived as uncomfortable by some visitors.

Moreover, although the pre-tests showed that the scents "apple-pie" and "coffee" were the most appropriate for the store under study – taking into account their oppositeness in terms of cross-modality with the store and their equality in their pleasantness, arousal level and thematic congruency – it might be likely that other scents, which were not included in the pre-tests, could have led to better results. Future work could, hence, determine additional fragrances exhibiting cross-modal (in)congruity with this type of store and, more importantly, with a wider variety of store types. Interestingly, as Michon et al. (2005) and Spangenberg et al. (2006) opined, mildly incongruity might generate more reactions compared to extreme incongruity.

Considerably, under the moderate incongruent condition, the presence of an atmospheric cue increases arousal, resulting into positive evaluations of the store environment, the products, or the sales people. In other words, mildly incongruent scents could surpass incongruent and congruent scents in producing favorable customers' reactions (Michon et al., 2005; Spangenberg et al., 2006). Therefore, future studies aimed at adapting the present research design necessitates the inclusion of a slightly cross-modal incongruent fragrance condition.

Also, it is noteworthy to highlight that, although being of importance, possible moderating variables such as individual differences (e.g.: age, gender, shopping motivation, affect intensity, shopping frequency, etc.) were not considered in this study. Despite enjoying a growing attention from some authors (e.g.: Chebat et al., 2009; Spangenberg et al., 2006; Doucé & Janssens, 2013), individual differences in the cross-modal correspondences literature is rare and requires additional research. Indeed, any of the factors mentioned above might also have a moderating impact on the effects of the ambient scent on customers' reactions and should therefore be considered in future work.

Last but not least, as Baron & Thomley (1994; in Doucé & Janssens, 2013) underlined, the respondents' willingness to participate to the study and to voluntarily spend time to fill in the questionnaire may have increased due to the presence of a pleasant ambient fragrance.

On a final note, further research is needed in order to confirm the present findings by replicating this study in a wider array of retail stores. Interestingly, further research could study the cross-modal correspondences of, not solely ambient scent, but multiple atmospheric cues (e.g.: background music, lighting, etc.) with a particular setting. Indeed, because shopping is a holistic experience in which the customers face numerous environmental elements at the same time, researchers are invited to broaden this field of literature by studying the combined effects of ambient fragrances and other atmospheric stimuli on customers' reactions (e.g.: Mattila & Wirtz, 2001; Michon & Chebat, 2004; Spangenberg et al., 2005).

Needless to say that, the present paper comprises some important managerial implications. In such a turbulent and changing environment, it becomes a necessity to gain your customer's mind and heart and to stand out of the crowd. Therefore, marketers and retailers should bear in mind that creating a pleasant store ambiance represents the key to a successful business. By using pleasant ambient scents in a store environment, retailers are able to establish a favorable atmosphere which will positively impact the customers' reactions. The future winning retailers will be the ones who recognize that this inexpensive and malleable atmospheric cue is an attractive tool for influencing the customer's shopping experience. As prior research indicates, a positive shopping experience will result in a better perception of the brand image, a better satisfaction with the store, the products, or the brand in general, and accordingly, to a higher level of loyalty expressed in greater sales (Lindstrom, 2010).

Another crucial role that pleasant ambient odors play is that they enable retailers to differentiate their store and their offerings from their rivals by creating a unique atmospheric sensation. While selecting the appropriate ambient fragrance, other researchers have pointed out the importance of picking a scent which is thematically congruent with the store environment. In a further step, while making the difficult decision between several odors equally congruent with the store theme, the retailer has the choice to use either a cross-modal congruent or incongruent ambient scent. It seems to make sense to advice shop owners to opt for fragrances which are cross-modally congruent with their store as, at least in the present study, this type of ambient scent possesses a higher capability to positively affect customers' reactions (cf. discussion and conclusion).

In addition, the author would like to praise the importance of employing distinctive and easily recognizable ambient fragrances in order to distinguish from the competition. As more retailers become aware of the benefits of using ambient odors, it goes without saying that a growing number of stores will be scented in the near future, whence the necessity to select a unique ambient scent. Likewise the well-known American retailer "Abercrombie & Fitch", the shop owners should continue their marketing efforts to differentiate themselves from their rivals by complementing their distinctive store layout, lighting, display, etc. with their personal olfactory signature by paying attention to select a scent that will represent their store and/or brand as perfectly as possible, notably by considering the cross-modal correspondences between the fragrance and the store environment and/or brand concept.

Finally, while the present experiment was conducted in a store comprising product categories around the same theme (i.e.: cooking), it might not always be the case. For this reason, for stores offering diverse product ranges, retailers should pay attention to select an ambient scent which is somehow neutral across the various product categories and therefore avoid unfavorable customers' reactions toward certain products. Recognizing this issue, retailers could work together with olfactory companies in order to constitute their own and distinguishable ambient fragrance which holds for the brand in itself while representing the entire retailer's offerings. Actually, it seems reasonable to assume that a rather sophisticated ambient scent could influence even more the customers' reactions. In the same way as a jingle or a sign identify a specific retailer to the customers' ears and eyes, an olfactory logo (i.e.: exclusive fragrance associated with a particular brand or store) could be a strong asset of the store's signature. An alternative to having a definite ambient odor is to alter fragrances, a relatively easy operation, according to seasons or special occasions. Likewise Spangenberg et al.'s (2005) study using atmospheric cues (i.e.: music and ambient scent) congruent with the Christmas period, retailers are suggested to play diversification and adaptation when it makes sense to do so.

As a conclusion, research has proven that fragrance is a decisive factor when a customer buys, collects, or uses a product. Hence, it can be stated that odor plays a very important role in customers' acceptance of a brand and that, therefore, companies should pay an increasing attention to aroma which appears to become a highly effective brand "plus" (Lindstrom, 2010). Although the present research reports partial significant effects on customers' reactions, the author – convinced by prior studies and motivated by her personal opinion – vividly recommends retailers to use a pleasant ambient odor – thematically congruent and cross-modally congruent with their store – with the aim to construct a holistic experience for their customers and enjoy desirable positive reactions from them.

REFERENCES

Aggleton, J. P., & Mishkin, M. (1986). *The amygdala: sensory gateway to the emotions*. Emotion: Theory, research and experience, 3, 281-299.

Anderson, E. W. (1998). *Customer satisfaction and word of mouth. Journal of service research*, 1(1), 5-17.

Areni, C. S., & Kim, D. (1994). *The influence of in-store lighting on consumers' examination of merchandise in a wine store*. International Journal of Research in Marketing, 11(2), 117-125.

Bambauer-Sachse, S. (2012). *Through Which Mechanisms Does Ambient Scent Affect Purchase Intention in Retail Settings?.* Advances in Consumer Research, 40.

Baron, R. A. (1990). *Environmentally Induced Positive Affect: Its Impact on Self-Efficacy, Task Performance, Negotiation, and Conflict*. Journal of Applied Social Psychology, 20(5), 368-384.

Baron-Cohen, S. E., & Harrison, J. E. (1997). *Synaesthesia: Classic and contemporary readings*. Blackwell Publishing.

Belkin, K., Martin, R., Kemp, S. E., & Gilbert, A. N. (1997). *Auditory pitch as a perceptual analogue to odor quality*. Psychological Science, 8(4), 340-342.

Bell, S., & Bell, C. P. (2007). *Future Sense: Defining brands through scent*. The Journal of the Marketing Society, 38.

Bellizzi, J. A., Crowley, A. E., & Hasty, R. W. (1983). *The effects of color in store design*. Journal of retailing.

Bellizzi, J. A., & Hite, R. E. (1992). *Environmental color, consumer feelings, and purchase likelihood*. Psychology & marketing, 9(5), 347-363.

Berman, B., Evans, J. R., & Banerjee, M. (1995). *Retail management: a strategic approach*.

Bettencourt, L. A., & Brown, S. W. (1997). *Contact employees: Relationships among workplace fairness, job satisfaction and prosocial service behaviors*. Journal of retailing, 73(1), 39-61.

Bitner, M. J. (1990). *Evaluating service encounters: the effects of physical surroundings and employee responses*. the Journal of Marketing, 69-82.

Bitner, M. J. (1992). *Servicescapes: the impact of physical surroundings on customers and employees*. The Journal of Marketing, 57-71.

Bone, P. F., & Jantrania, S. (1992). *Olfaction as a cue for product quality*. Marketing Letters, 3(3), 289-296.

Bosmans, A. (2006). *Scents and sensibility: when do (in) congruent ambient scents influence product evaluations?.* Journal of Marketing, 70(3), 32-43.

Bremner, A. J., Caparos, S., Davidoff, J., de Fockert, J., Linnell, K. J., & Spence, C. (2013). *"Bouba" and "Kiki" in Namibia? A remote culture make similar shape–sound matches, but different shape–taste matches to Westerners*. Cognition, 126(2), 165-172.

Bronner, K. (2011). *What is the sound of citrus? Research on the correspondences between the perception of sound and taste/flavour*.

Castiello, U., Zucco, G. M., Parma, V., Ansuini, C., & Tirindelli, R. (2006). *Cross-modal interactions between olfaction and vision when grasping*. Chemical senses, 31(7), 665-671.

Chebat, J. C., & Michon, R. (2003). *Impact of ambient odors on mall shoppers' emotions, cognition, and spending: a test of competitive causal theories*. Journal of Business Research, 56(7), 529-539.

Chebat, J. C., Morrin, M., & Chebat, D. R. (2009). *Does age attenuate the impact of pleasant ambient scent on consumer response?*. Environment and Behavior, 41(2), 258-267.

Cohen, N. E. (1934). *Equivalence of brightnesses across modalities*. The American Journal of Psychology, 117-119.

Crisinel, A. S., & Spence, C. (2010). *Implicit association between basic tastes and pitch*. Neuroscience letters, 464(1), 39-42.

Crisinel, A. S., & Spence, C. (2012a). *A fruity note: Crossmodal associations between odors and musical notes*. Chemical senses, bjr085.

Crisinel, A. S., & Spence, C. (2012b). *The impact of pleasantness ratings on crossmodal associations between food samples and musical notes*. Food Quality and Preference, 24(1), 136-140.

Crisinel, A. S., Jones, S., & Spence, C. (2012). *'The Sweet Taste of Maluma': Crossmodal Associations Between Tastes and Words*. Chemosensory Perception, 5(3-4), 266-273.

Crisinel, A. S., Jacquier, C., Deroy, O., & Spence, C. (2013). *Composing with cross-modal correspondences: music and odors in concert*. Chemosensory Perception, 6(1), 45-52.

Crowley, A. E. (1993). *The two-dimensional impact of color on shopping*. Marketing letters, 4(1), 59-69.

Davies, B.J. & Ward, P. (2002), *Managing retail consumption*, Chichester, John Wiley and Sons

Davies, B. J., Kooijman, D., & Ward, P. (2003). *The sweet smell of success: olfaction in retailing*. Journal of Marketing Management, 19(5-6), 611-627.

Demattè, M. L., Sanabria, D., Sugarman, R., & Spence, C. (2006a). *Cross-modal interactions between olfaction and touch*. Chemical senses, 31(4), 291-300.

Demattè, M. L., Sanabria, D., & Spence, C. (2006b). *Cross-modal associations between odors and colors*. Chemical Senses, 31(6), 531-538.

Demattè, M. L., Sanabria, D., & Spence, C. (2009). *Olfactory discrimination: when vision matters?*. Chemical senses, 34(2), 103-109.

Deroy, O., & Valentin, D. (2011). *Tasting liquid shapes: investigating the sensory basis of cross-modal correspondences*. Chemosensory Perception, 4(3), 80-90.

Deroy, O., Crisinel, A. S., & Spence, C. (2013). *Crossmodal correspondences between odors and contingent features: odors, musical notes, and geometrical shapes.* Psychonomic bulletin & review, 20(5), 878-896.

Donovan, R. J., & Rossiter, J. R. (1982). *Store atmosphere: an environmental psychology approach.* Journal of retailing, 58(1), 34-57.

Donovan, R. J., Rossiter, J. R., Marcoolyn, G., & Nesdale, A. (1994). *Store atmosphere and purchasing behavior*. Journal of retailing, 70(3), 283-294.

Doucé, L., Poels, K., Janssens, W., & De Backer, C. (2013). *Smelling the books: The effect of chocolate scent on purchase-related behavior in a bookstore*. Journal of Environmental Psychology, 36, 65-69.

Doucé, L., & Janssens, W. (2013). *The presence of a pleasant ambient scent in a fashion store: The moderating role of shopping motivation and affect intensity*. Environment and Behavior, 0013916511410421.

Ehrlichman, H., & Halpern, J. N. (1988). *Affect and memory: effects of pleasant and unpleasant odors on retrieval of happy and unhappy memories*. Journal of personality and social psychology, 55(5), 769.

Ellen, P. S., & Bone, P. F. (1999). *Does it matter if it smells? Olfactory stimuli as advertising executional cues*. Journal of Advertising, 27(4), 29-39.

Engen, T. (1982). *The perception of odors*. Elsevier.

Evans, K. K., & Treisman, A. (2010). *Natural cross-modal mappings between visual and auditory features*. Journal of vision, 10(1), 6.

Fiore, A. M., Yah, X., & Yoh, E. (2000). *Effects of a product display and environmental fragrancing on approach responses and pleasurable experiences*. Psychology & Marketing, 17(1), 27-54.

Fisher, J. D. (1974). *Situation-specific variables as determinants of perceived environmental aesthetic quality and perceived crowdedness*. Journal of Research in Personality, 8(2), 177-188.

Fitzgerald Bone, P., & Scholder Ellen, P. (1999). *Scents in the marketplace: explaining a fraction of olfaction*. Journal of Retailing, 75(2), 243-262.

Fónagy, I. (1963). *Die Metaphern in der Phonetik [The metaphors in phonetics]*: The Hague

Gallace, A., & Spence, C. (2006). *Multisensory synesthetic interactions in the speeded classification of visual size*. Perception & Psychophysics, 68(7), 1191-1203.

Gallace, A., Boschin, E., & Spence, C. (2011). *On the taste of "Bouba" and "Kiki": An exploration of word–food associations in neurologically normal participants*. Cognitive Neuroscience, 2(1), 34-46.

Gibson, J. J. (1966). *The senses considered as perceptual systems*.

Gift, A. G. (1989). *Visual analogue scales: measurement of subjective phenomena*. Nursing research, 38(5), 286-287.

Gilbert, A. N., Martin, R., & Kemp, S. E. (1996). *Cross-modal correspondence between vision and olfaction: the color of smells*. The American journal of psychology, 335-351.

Goldstein, E. B. *Sensation and Perception*. 1996. An International Thomson Publishing Company, USA.

Gould, D., Kelly, D., Goldstone, L., & Gammon, J. (2001). *Examining the validity of pressure ulcer risk assessment scales: developing and using illustrated patient simulations to collect the data information point: Visual Analogue Scale*. Journal of clinical nursing, 10(5), 697-706.

Guéguen, N., & Petr, C. (2006). *Odors and consumer behavior in a restaurant*. International Journal of Hospitality Management, 25(2), 335-339.

Gulas, C. S., & Bloch, P. H. (1995). *Right under our noses: ambient scent and consumer responses*. Journal of Business and Psychology, 10(1), 87-98.

Hanson-Vaux, G., Crisinel, A. S., & Spence, C. (2013). *Smelling shapes: Crossmodal correspondences between odors and shapes*. Chemical senses, 38(2), 161-166.

Harrell, G. D., Hutt, M. D., & Anderson, J. C. (1980). *Path analysis of buyer behavior under conditions of crowding*. Journal of Marketing Research, 45-51.

Hauser, K., & Walsh, D. (2008). Visual analogue scales and assessment of quality of life in cancer. J Support Oncol, 6(6), 277-282.

Herz, R. S., & Engen, T. (1996). *Odor memory: review and analysis*. Psychonomic Bulletin & Review, 3(3), 300-313.

Hirsch, A. R. (1995). *Effects of ambient odors on slot-machine usage in a Las Vegas casino*. Psychology & Marketing, 12(7), 585-594.

Holmes, J. H., & Lett, J. D. (1977). *Product sampling and word of mouth*. Journal of Advertising Research.

Hui, M. K., & Bateson, J. E. (1991). *Perceived control and the effects of crowding and consumer choice on the service experience*. Journal of Consumer Research, 174-184.

Janssens, W., Wijnen, K., De Pelsmacker, P., & Van Kenhove, P. (2008). *Marketing research with SPSS*. Pearson.

Kelly, A. M. (1998). *Does the clinically significant difference in visual analog scale pain scores vary with gender, age, or cause of pain?.* Academic Emergency Medicine, 5(11), 1086-1090.

Kemp, S. E., & Gilbert, A. N. (1994). *The cross-modal relationship between vision and olfaction is dimensional: Color value varies inversely with odor intensity*. Chemical Senses, 19, 495.

Kemp, S. E., & Gilbert, A. N. (1997). *Odor intensity and color lightness are correlated sensory dimensions*. The American journal of psychology.

Koelega, H. S., & Köster, E. P. (1974). *Some experiments on sex differences in odor perception*. Annals of the New York Academy of Sciences, 237(1), 234-246.

Koelega, H. S. (1994). *Sex differences in olfactory sensitivity and the problem of the generality of smell acuity*. Perceptual and motor skills, 78(1), 203-213.

Köhler, W. (1929). *Gestalt psychology*. New York: Liveright

Köhler, W. (1947). *Gestalt psychology: An introduction to new concepts in modern psychology*. New York, NY: Liveright

Kotler, P. (1973). *Atmospherics as a marketing tool*. Journal of retailing, 49(4), 48-64.

Kotler, P., & Keller, K.L. (2005). *Marketing Management.* 12th edition. Prentice Hall International.

Krishna, A., Lwin, M. O., & Morrin, M. (2010). *Product scent and memory*. Journal of Consumer Research, 37(1), 57-67.

Krishna, A. (Ed.). (2011). *Sensory marketing: research on the sensuality of products*. Routledge.

Krishna, A. (2012). *An integrative review of sensory marketing: Engaging the senses to affect perception, judgment and behavior*. Journal of Consumer Psychology, 22(3), 332-351.

Knasko, S. C. (1989). *Ambient odor and shopping behavior*. Chemical Senses, 14(5), 719.

Knasko, S. C. (1995). *Pleasant odors and congruency: effects on approach behavior*. Chemical Senses, 20(5), 479-487.

Laird, D., 1932. *How the consumer estimates quality by subconscious sensory impressions: with special reference to the role of smell*. Journal of Applied Psychology 16, 241–246

Lindstrom, M. (2005). *Brand Sense: How to build powerful brands through touch, taste, smell, sight & sound*. Kogan Page Publishers.

Lindstrom, M. (2008). *Brand sense: sensory secrets behind the stuff we buy*. Simon and Schuster.

Lorig, T. S., & Roberts, M. (1990). *Odor and cognitive alteration of the contingent negative variation*. Chemical Senses, 15(5), 537-545.

Lorig, T. S. (Ed.). (2001). *Compendium of Olfactory Research Supplement: Explorations in Aroma-chology: Investigating the Sense of Smell and Human Response to Odors*, 1995-2000. Kendall/Hunt Publishing Company.

Malhotra, N., Birks, D., & Wills, P. (2012). *Marketing Research: an applied approach*: 4th European Edition. Pearson Education.

Mangold, W. G., Miller, F., & Brockway, G. R. (1999). *Word-of-mouth communication in the service marketplace*. Journal of Services Marketing, 13(1), 73-89.

Maric, Y., & Jacquot, M. (2013). *Contribution to understanding odour–colour associations*. Food Quality and Preference, 27(2), 191-195.

Marks, L. E. (1978). *The unity of the senses: Interrelations among the modalities*.

Marks, L. E. (1987). *On cross-modal similarity: Auditory–visual interactions in speeded discrimination*. Journal of Experimental Psychology: Human Perception and Performance, 13(3), 384.

Martino, G., & Marks, L. E. (2000). *Cross-modal interaction between vision and touch: the role of synesthetic correspondence*. PERCEPTION-LONDON-, 29(6), 745-754.

Martino, G., & Marks, L. E. (2001). *Synesthesia: Strong and weak*. Current Directions in Psychological Science, 10(2), 61-65.

Mattila, A. S., & Wirtz, J. (2001). *Congruency of scent and music as a driver of in-store evaluations and behavior*. Journal of Retailing, 77(2), 273-289.

Mehrabian, A., & Russell, J. A. (1974). *An approach to environmental psychology*. the MIT Press.

Michon, R., & Chebat, J. C. (2004). *The interaction effect of background music and ambient scent on the perception of service quality*. Journal of Business Research, 34(3), 191-196.

Michon, R., Chebat, J. C., & Turley, L. W. (2005). *Mall atmospherics: the interaction effects of the mall environment on shopping behavior*. Journal of Business Research, 58(5), 576-583.

Milliman, R. E. (1982). *Using background music to affect the behavior of supermarket shoppers*. The Journal of Marketing, 86-91.

Milliman, R. E. (1986). *The influence of background music on the behavior of restaurant patrons*. Journal of consumer research, 286-289.

Mitchell, D. J., Kahn, B. E., & Knasko, S. C. (1995). *There's something in the air: effects of congruent or incongruent ambient odor on consumer decision making*. Journal of Consumer Research, 229-238.

Morrin, M., & Ratneshwar, S. (2000). *The impact of ambient scent on evaluation, attention, and memory for familiar and unfamiliar brands*. Journal of Business Research, 49(2), 157-165.

Morrin, M., & Ratneshwar, S. (2003). *Does it make sense to use scents to enhance brand memory?*. Journal of Marketing Research, 40(1), 10-25.

Morrin, M., & Chebat, J. C. (2005). *Person-place congruency the interactive effects of shopper style and atmospherics on consumer expenditures*. Journal of Service Research, 8(2), 181-191.

Morrot, G., Brochet, F., & Dubourdieu, D. (2001). *The color of odors*. Brain and language, 79(2), 309-320.

Ngo, M. K., Misra, R., & Spence, C. (2011). *Assessing the shapes and speech sounds that people associate with chocolate samples varying in cocoa content*. Food Quality and Preference, 22(6), 567-572.

Obermiller, C., & Bitner, M. J. (1984). *Store atmosphere: a peripheral cue for product evaluation*. In American Psychological Association Annual Conference Proceedings, Consumer Psychology Division (pp. 52-53). American Psychological Association.

Osgood, C. E. (1957). *The measurement of meaning* (No. 47). University of Illinois press.

Parsons, A. G. (2009). *Use of scent in a naturally odourless store*. International Journal of Retail & Distribution Management, 37(5), 440-452.

Pras, B., & Briand-Decre, G. (2010). *Lighting and Perceived Temperature: Energy-Saving Levers to Improve Store Evaluations?.*

Ramachandran, V. S., & Hubbard, E. M. (2001). *Synaesthesia--a window into perception, thought and language*. Journal of consciousness studies, 8(12), 3-34.

Reips, U. D., & Funke, F. (2008). Interval-level measurement with visual analogue scales in Internet-based research: VAS Generator. Behavior Research Methods, 40(3), 699-704.

Richins, M. L. (1983). *Negative word-of-mouth by dissatisfied consumers: a pilot study*. The Journal of Marketing, 68-78.

Sagiv, N., & Ward, J. (2006). *Crossmodal interactions: lessons from synesthesia*. Progress in brain research, 155, 259-271.

Schifferstein, H. N., & Blok, S. T. (2002). *The signal function of thematically (in) congruent ambient scents in a retail environment*. Chemical Senses, 27(6), 539-549.

Schifferstein, H. N., & Tanudjaja, I. (2004). *Visualising fragrances through colours: the mediating role of emotions*. Perception-London, 33(10), 1249-1266.

Schifferstein, H. N. (2006). *The perceived importance of sensory modalities in product usage: A study of self-reports*. Acta psychologica, 121(1), 41-64.

Schiller, P. (1935). *Interrelation of different senses in perception*. British Journal of Psychology. General Section, 25(4), 465-469.

Schmitt, B. (1999). *Experiential marketing*. Journal of marketing management, 15(1-3), 53-67.

Seigneuric, A., Durand, K., Jiang, T., Baudouin, J. Y., & Schaal, B. (2010). *The nose tells it to the eyes: crossmodal associations between olfaction and vision*. Perception, 39(11), 1541.

Seo, H. S., Arshamian, A., Schemmer, K., Scheer, I., Sander, T., Ritter, G., & Hummel, T. (2010). *Cross-modal integration between odors and abstract symbols*. Neuroscience letters, 478(3), 175-178.

Seo, H. S., & Hummel, T. (2011). *Auditory–olfactory integration: congruent or pleasant sounds amplify odor pleasantness*. Chemical senses, 36(3), 301-309.

Simner, J., & Ludwig, V. (2009). *What colour does that feel? Crossmodal correspondences from touch to colour*. Paper presented at the Third International Conference of Synaesthesia and Art, Granada, Spain, April.

Simner, J., Cuskley, C., & Kirby, S. (2010). *What sound does that taste? Cross-modal mapping across gustation and audition*. Perception, 39, 553–569.

Singh, J. (1988). *Consumer complaint intentions and behavior: definitional and taxonomical issues*. The journal of Marketing, 93-107.

Spangenberg, E. R., Crowley, A. E., & Henderson, P. W. (1996). *Improving the store environment: do olfactory cues affect evaluations and behaviors?*. The Journal of Marketing, 67-80.

Spangenberg, E. R., Grohmann, B., & Sprott, D. E. (2005). *It's beginning to smell (and sound) a lot like Christmas: the interactive effects of ambient scent and music in a retail setting*. Journal of Business Research, 58(11), 1583-1589.

Spangenberg, E. R., Sprott, D. E., Grohmann, B., & Tracy, D. L. (2006). *Gender-congruent ambient scent influences on approach and avoidance behaviors in a retail store*. Journal of Business Research, 59(12), 1281-1287.

Spence, C. (2011). *Crossmodal correspondences: A tutorial review*. Attention, Perception, & Psychophysics, 73(4), 971-995.

Spence, C. (2012). *Managing sensory expectations concerning products and brands: Capitalizing on the potential of sound and shape symbolism*. Journal of Consumer Psychology, 22(1), 37-54.

Spence, C., & Gallace, A. (2011). *Tasting shapes and words*. Food Quality and Preference, 22(3), 290-295.

Spence, C., & Deroy, O. (2012). *Hearing mouth shapes: Sound symbolism and the reverse McGurk effect*. i-Perception, 3(8), 550.

Spence, C., Ngo, M. K., Percival, B., & Smith, B. (2013). *Crossmodal correspondences: Assessing shape symbolism for cheese*. Food Quality and Preference, 28(1), 206-212.

Stevenson, R. J., & Boakes, R. A. (2004). *Sweet and sour smells: learned synesthesia between the senses of taste and smell*. The handbook of multisensory processes, 69-83.

Stevenson, R. J., & Mahmut, M. K. (2011). *Experience dependent changes in odour–viscosity perception*. Acta psychologica, 136(1), 60-66.

Suskind, P. (1986). *Perfume: The story of a murderer*. New York: Alfred A. Knopf.

Sweeney, J. C., & Wyber, F. (2002). *The role of cognitions and emotions in the music-approach-avoidance behavior relationship*. Journal of Services Marketing, 16(1), 51-69.

Teller, C., & Dennis, C. (2012). *The effect of ambient scent on consumers' perception, emotions and behaviour: A critical review*. Journal of Marketing Management, 28(1-2), 14-36.

Turley, L. W., & Milliman, R. E. (2000). *Atmospheric effects on shopping behavior: a review of the experimental evidence*. Journal of Business Research, 49(2), 193-211.

Urdapilleta, I., Giboreau, A., Manetta, C., Houix, O., & Richard, J. F. (2006). *The mental context for the description of odors: A semantic space*. Revue Européenne de Psychologie Appliquée/European Review of Applied Psychology, 56(4), 261-271.

Vlahos, J. (2007). *Scent and sensibility*. New York Times.

von Hornbostel, E. M. (1931). *Über Geruchshelligkeit [On odor/smell brightness]*. Pflügers Archiv für die Gesamte Physiologie des Menschen, 227, 517–538.

Walker, P., Francis, B. J., & Walker, L. (2010). *The brightness-weight illusion: Darker objects look heavier but feel lighter*. Experimental psychology, 57(6), 462.

Ward, P. J., Davies, B., & Kooijmanb, D. (2003). Ambient Smell and the Retail Environment: Relating Olfaction Research to Consumer Behavior. Journal of Business and Management, 9(3), 289-302.

Ward, J., Huckstep, B., & Tsakanikos, E. (2006). *Sound-colour synaesthesia: To what extent does it use cross-modal mechanisms common to us all?*. Cortex, 42(2), 264-280.

Ward, P., Davies, B. J., & Kooijman, D. (2007). *Olfaction and the retail environment: examining the influence of ambient scent*. Service Business, 1(4), 295-316.

Wilkie, M. (1995). *Scent of a Market*. American Demographics, 17(8), 40-47.

Yalch, R. F., & Spangenberg, E. (1988). An environmental psychological study of foreground and background music as retail atmospheric factors. In AMA educators' conference proceedings (Vol. 54, pp. 106-110). Chicago: American Marketing Association.

Yalch, R., & Spangenberg, E. (1990). *Effects of store music on shopping behavior*. Journal of Consumer Marketing, 7(2), 55-63.

Yalch, R. F., & Spangenberg, E. (1993). *Using store music for retail zoning: a field experiment*. Advances in consumer research, 20(1), 632-636.

Yau, J. M., Olenczak, J. B., Dammann, J. F., & Bensmaia, S. J. (2009). *Temporal frequency channels are linked across audition and touch*. Current Biology, 19(7), 561-566.

Yoo, S.J., Chang, Y.J. (2005). An Exploratory Research on the Store Image Attributes Affecting Its Store Loyalty. Seoul Journal of Business, 11(1), 19-41.

Yorkston, E., & Menon, G. (2004). *A sound idea: Phonetic effects of brand names on consumer judgments*. Journal of Consumer Research, 31(1), 43-51.

Zaltman, G. (2003). How customers think: Essential insights into the mind of the market. Harvard Business Press.

Zeithaml, V. A., Berry, L. L., & Parasuraman, A. (1996). *The behavioral consequences of service quality*. the Journal of Marketing, 31-46.

Zeithaml, V. A., Bitner, M. J., & Gremler, D. D. (2006). Services marketing: Integrating customer focus across the firm.

Zellner, D. A., & Kautz, M. A. (1990). *Color affects perceived odor intensity*. Journal of Experimental Psychology. Human Perception and Performance, 16, 391–397. doi:10.1037/0096-1523.16.2.391

Zellner, D. A., Bartoli, A. M., & Eckard, R. (1991). *Influence of color on odor identification and liking ratings*. The American Journal of Psychology, 104, 547–561.

Zellner, D. A., & Whitten, L. A. (1999). *The effect of color intensity and appropriateness on color-induced odor enhancement*. The American Journal of Psychology, 112, 585–604.

Zoladz, P. R., & Raudenbush, B. (2005). *Cognitive enhancement through stimulation of the chemical senses*. North American Journal of Psychology, 7(1), 125-140.

APPENDICES

➢ APPENDIX 1: CLASSIFICATION OF ATMOSPHERIC VARIABLES

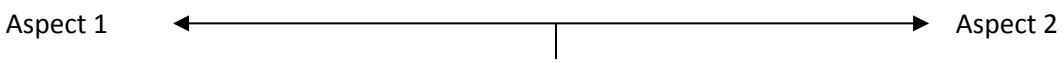
EXTERNAL VARIABLES	GENERAL INTERIOR VARIABLES	LAYOUT AND DESIGN VARIABLES	POP AND DECORATION VARIABLES	HUMAN VARIABLES
Exterior signs	Flooring and carpeting	Space design and allocation	POP displays	Employee characteristics
Entrances	Color schemes	Placement of merchandise	Signs and cards	Employee uniforms
Exterior displays windows	Lighting	Grouping of merchandise	Wall decorations	Crowding
Height of building	Music	Work station placement	Degrees and certificates	Customer characteristics
Size of building	P.A. usage	Placement of equipment	Pictures	Privacy
Color of building	**Scents**	Placement of cash registers	Artwork	
Surrounding stores	Tobacco smoke	Waiting areas	Product displays	
Lawns and gardens	Width of aisles	Waiting rooms	Usage instructions	
Address and location	Wall composition	Department locations	Price displays	
Architectural style	Paint and wall paper	Traffic flow	Teletexts	
Surrounding area	Ceiling composition	Racks and cases		
Parking availability	Merchandise	Waiting queues		
Congestion and traffic	Temperature	Furniture		
Exterior walls	Cleanliness	Dead areas		

➢ APPENDIX 2: PICTURES AND PLAN (I.E.: THE FIVE UNIVERSES) OF THE COOKWARE STORE "ALICE DÉLICE"

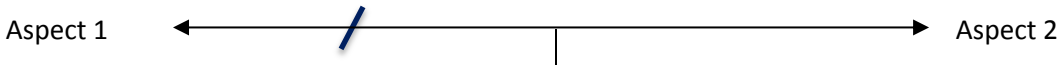
- Appendix 3: Booklet including introduction and response sheets for the pre-test with the scents (in French)

Mademoiselle, Madame, Monsieur,

Durant cette étude, il vous sera demandé de juger différentes senteurs qui vous seront présentées dans divers flacons. Pour chacune de ces senteurs, un jugement devra être apporté et sera reflété sur une ligne comprenant deux points extrêmes. Chaque ligne comprend donc une combinaison de deux aspects qui sont placés aux extrémités de la ligne. A noter que le milieu de la ligne est indiqué par une petite barre verticale (voir exemple ci-dessous).



Votre contribution revient à placer une petite barre à l'endroit qui concorde avec votre jugement. Plus vous placez votre petite barre près d'un des aspects, plus vous êtes d'avis que l'aspect est en accordance avec la senteur que vous êtes en train de juger. Attention, il est important que chaque dimension soit évaluée, autrement dit, aucune d'entre elles ne doit être ignorée.



Sachez que les aspects présentés sont abstraits et certains mots sont inexistants. Par conséquent, il peut arriver que vous ne puissiez pas donner de soutien rationnel à votre réponse. Cependant, ceci ne représente pas un problème. De plus, rappelez-vous que c'est votre propre sentiment qui compte, il n'y a donc pas de bonnes ou mauvaises réponses possibles.

PS : n'hésitez pas à sentir les grains de café mis à votre disposition dès que vous en ressentez le besoin (généralement après deux ou trois senteurs consécutives) afin de restaurer votre odorat.

Merci d'avance pour votre collaboration.

Cordialement,

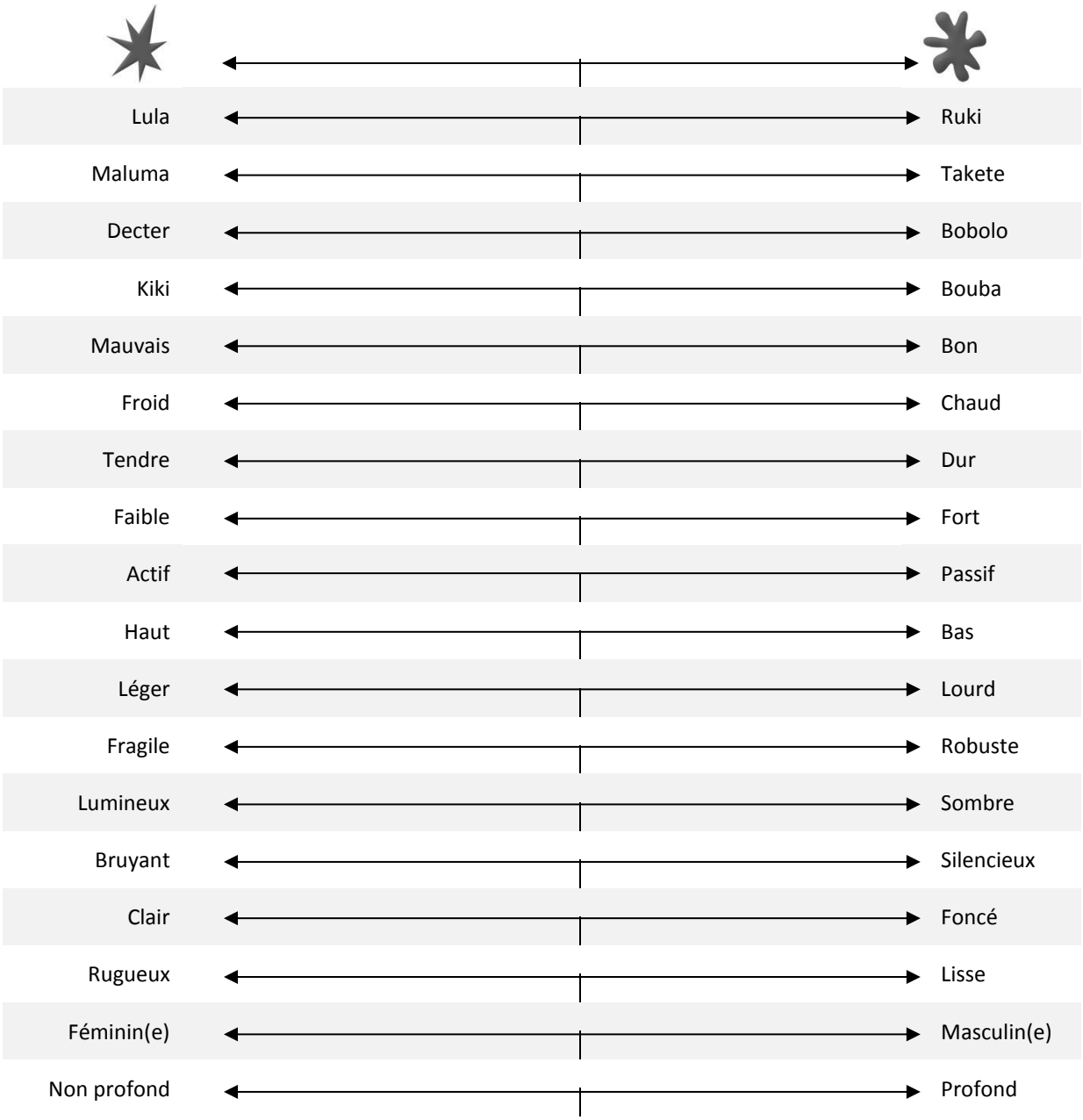
Fiona Baleau

Veuillez préciser les caractéristiques suivantes:

Votre âge =

Votre sexe =

Comment évalueriez-vous cette senteur (A/B/C/D/E/F/G/H/I/J/K/L/M/N/O/P) sur base des caractéristiques suivantes ?



Comment évaluez-vous cette senteur sur base des caractéristiques suivantes? Veuillez noircir le rond de votre choix qui montre où vous êtes positionné entre les deux caractéristiques.

Cette senteur, je pense qu'elle est :

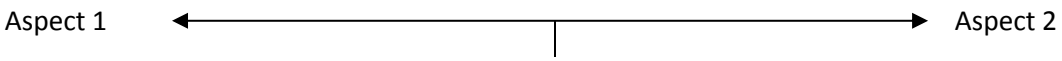
désagréable	O	O	O	O	O	O	O	agréable
non stimulante	O	O	O	O	O	O	O	stimulante

- Appendix 3 (cont.): Booklet including introduction and response sheets for the pre-test with the scents (in English)

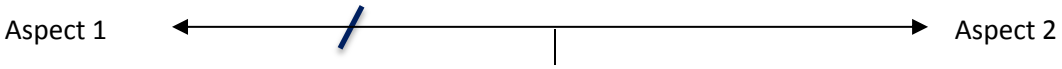
Dear Sir or Madam,

Thank you for your collaboration and the time you accord to this study.

In this survey, you will be asked to evaluate several scents that will be presented to you in their respective vial. For each scent, a judgment will have to be reported and will be reflected on a horizontal line determined by two extreme points. Each line, hence, includes a combination of two aspects which are anchored at the opposite ends of that line. It should be noted that the midpoint of this line is indicated by a small vertical mark (please refer to the example below).



Your contribution consists of placing a vertical mark at the spot which matches your judgment. In other words, the more you position the mark close to one of the two aspects, the more you agree that this aspect accords well with the store environment (please refer to the example below). Carefulness should be taken to evaluate each line. Put differently, none of them should be neglected.



It should be highlighted that some of the aspects presented in this survey are abstract or consist of nonsense words. Accordingly, it might be that you won't be able to give a rational support to your answer. However, it doesn't raise a problem. Moreover, remember that it is your own feeling that should be reported, hence, there are neither right nor wrong answers.

PS: feel free to smell the coffee grounds at your disposal at any time you need (generally after every two or three consecutive scents) in order to restore your scent palettes.

I thank you in advance for your collaboration.

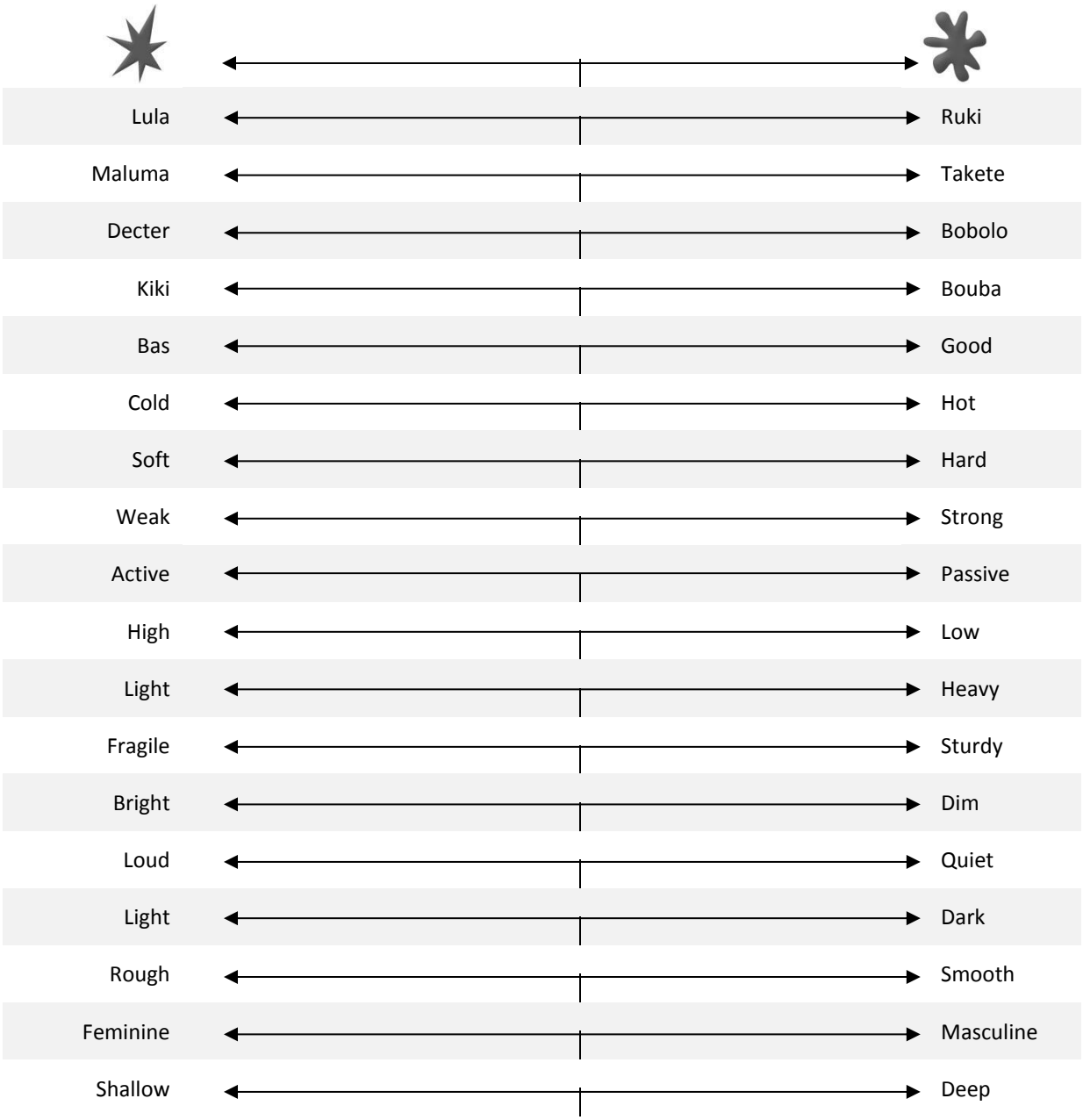
Fiona Baleau

Could you please precise the following personal characteristics:

Your age =

Your gender =

How would you evaluate this scent (A/B/C/D/E/F/G/H/I/J/K/L/M/N/O/P) based on the following dimensions?



How would you evaluate this scent based on the following dimensions? Please blacken the circle of your choice which shows where you position your opinion between the two characteristics.

This scent, in my opinion, is:

unpleasant	O	O	O	O	O	O	O	pleasant
not arousing	O	O	O	O	O	O	O	arousing

➢ APPENDIX 4: FREQUENCIES TABLE AND DESCRIPTIVE STATISTICS OF THE PRE-TEST 1 – STEP 1

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	24	80,0	80,0	80,0
	M	6	20,0	20,0	100,0
	Total	30	100,0	100,0	

Statistics

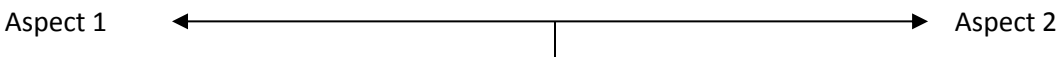
Age

N	Valid	30
	Missing	0
Mean		41,40

- Appendix 5: Booklet including introduction and response sheets for the pre-test in the store (in French)

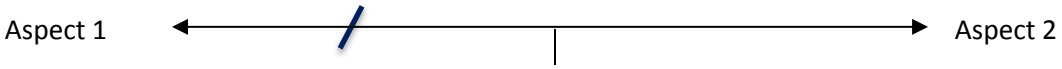
Mademoiselle, Madame, Monsieur,

Durant cette étude, il vous sera demandé de juger l'environnement de ce magasin « Alice Délice ». Par environnement, nous entendons l'ambiance/atmosphère globale du magasin. Dès lors, un jugement devra être apporté et sera reflété sur une ligne comprenant deux points extrêmes. Chaque ligne comprend donc une combinaison de deux aspects qui sont placés aux extrémités de la ligne. A noter que le milieu de la ligne est indiqué par une petite barre verticale (voir exemple ci-dessous).



Votre contribution revient à placer une petite barre à l'endroit qui concorde avec votre jugement. Plus vous placez votre petite barre près d'un des aspects, plus vous êtes d'avis que l'aspect est en accordance avec l'environnement du magasin que vous êtes en train de juger.

Attention, il est important que chaque dimension soit évaluée, autrement dit, aucune d'entre elles ne doit être ignorée.



Sachez que les aspects présentés sont abstraits et certains mots sont inexistants. Par conséquent, il peut arriver que vous ne puissiez pas donner de soutien rationnel à votre réponse. Cependant, ceci ne représente pas un problème.

De plus, rappelez-vous que c'est votre propre sentiment qui compte, il n'y a donc pas de bonnes ou mauvaises réponses possibles.

Merci d'avance pour votre collaboration.

Cordialement,

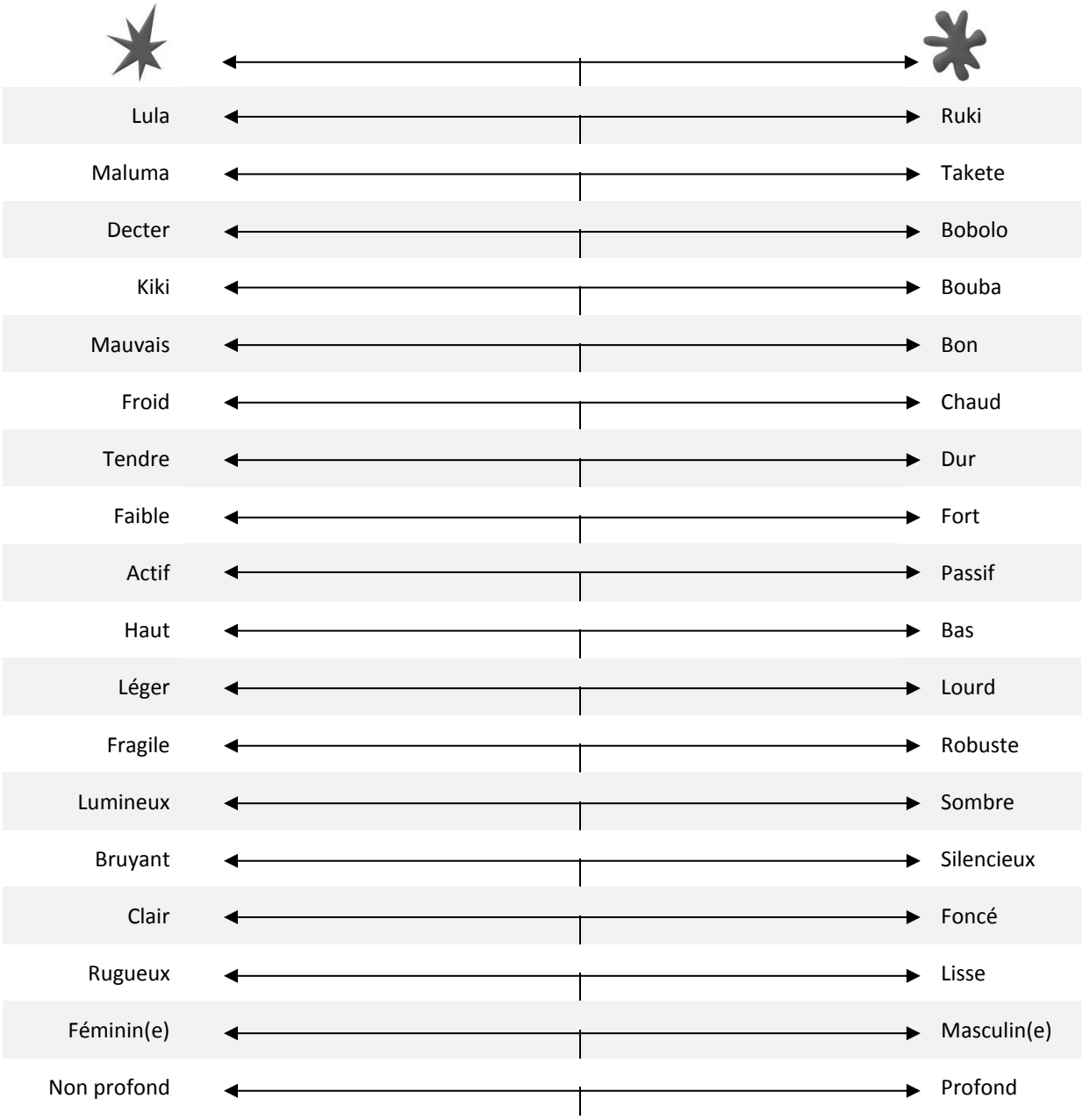
Fiona Baleau

Veuillez préciser les caractéristiques suivantes:

Votre âge =

Votre sexe =

Comment évaluez-vous l'environnement (atmosphère) de ce magasin sur base de ces dimensions?



Comment évaluez-vous ce magasin sur base des caractéristiques suivantes? Veuillez noircir le rond de votre choix qui montre où vous êtes positionné entre les deux caractéristiques.

Ce magasin, je pense qu'il est :

désagréable	O	O	O	O	O	O	O	agréable
non stimulant	O	O	O	O	O	O	O	stimulant

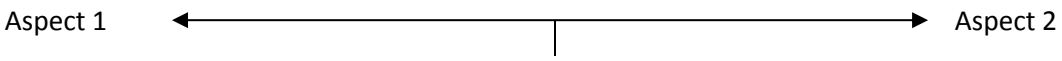
- Appendix 5 (Cont.): Booklet including introduction and response sheets for the pre-test in the store (in English)

Dear Sir or Madam,

Thank you for your collaboration and the time you accord to this study.

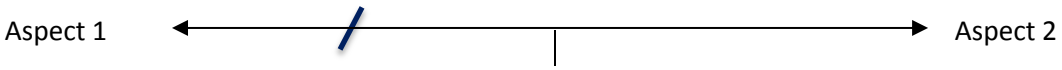
In this survey, you will be asked to evaluate the store environment of the shop "Alice Délice". By environment, we mean the general atmosphere of the store. Therefore, a judgment will have to be reported and will be reflected on a horizontal line determined by two extreme points.

Each line, hence, includes a combination of two aspects which are anchored at the opposite ends of that line. It should be noted that the midpoint of this line is indicated by a small vertical mark (please refer to the example below).



Your contribution consists of placing a vertical mark at the spot which matches your judgment. In other words, the more you position the mark close to one of the two aspects, the more you agree that this aspect accords well with the store environment (please refer to the example below).

Carefulness should be taken to evaluate each line. Put differently, none of them should be neglected.



It should be highlighted that some of the aspects presented in this survey are abstract or consist of nonsense words. Accordingly, it might be that you won't be able to give a rational support to your answer. However, it doesn't raise a problem.

Moreover, remember that it is your own feeling that should be reported, hence, there are neither right nor wrong answers.

I thank you in advance for your collaboration.

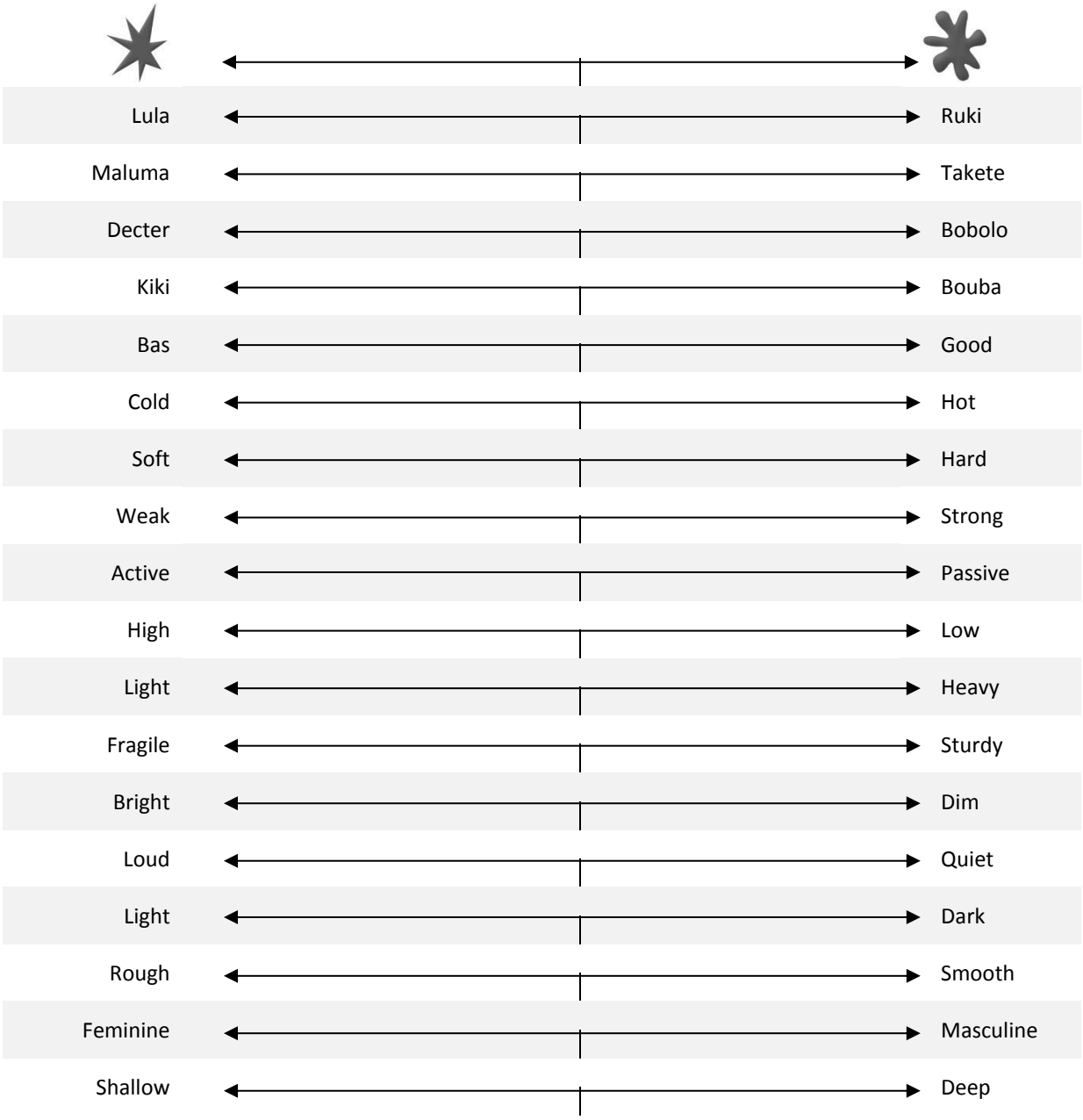
Fiona Baleau

Could you please precise the following personal characteristics:

Your age =

Your gender =

How would you evaluate the general atmosphere of this store based on the following dimensions?



How would you evaluate this store based on the following dimensions ? Please blacken the circle of your choice which shows where you position your opinion between the two characteristics.

This store, in my opinion, is:

unpleasant	O	O	O	O	O	O	O	pleasant
not arousing	O	O	O	O	O	O	O	arousing

➢ APPENDIX 6: FREQUENCIES TABLE AND DESCRIPTIVE STATISTICS OF THE PRE-TEST 1 – STEP 2

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	24	80,0	80,0	80,0
	M	6	20,0	20,0	100,0
	Total	30	100,0	100,0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	30	15	69	39,67	14,887
Valid N (listwise)	30				

➢ APPENDIX 7: CRONBACH'S ALPHA (PRE-TEST 1 – STEP 2)

Reliability Statistics

Cronbach's Alpha	N of Items
,371	5

Reliability Statistics

Cronbach's Alpha	N of Items
,421	4

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
AngulaireRonde	30	77,07	13,496	2,464

Statistics

AngulaireRonde

N	Valid	30
	Missing	0
Mean		77,07
Minimum		42
Maximum		100

AngulaireRonde

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	42	1	3,3	3,3	3,3
	50	1	3,3	3,3	6,7
	57	2	6,7	6,7	13,3
	63	1	3,3	3,3	16,7
	66	1	3,3	3,3	20,0
	73	3	10,0	10,0	30,0
	74	1	3,3	3,3	33,3
	75	2	6,7	6,7	40,0
	76	2	6,7	6,7	46,7
	77	4	13,3	13,3	60,0
	83	1	3,3	3,3	63,3
	84	1	3,3	3,3	66,7
	86	1	3,3	3,3	70,0
	87	2	6,7	6,7	76,7
	88	2	6,7	6,7	83,3
	91	1	3,3	3,3	86,7
	92	2	6,7	6,7	93,3
	96	1	3,3	3,3	96,7
	100	1	3,3	3,3	100,0
	Total	30	100,0	100,0	

➢ APPENDIX 8: ONE SAMPLE T-TEST OF THE PRE-TEST 1 – STEP 1

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BakeryAngulaireRonde	30	48,97	34,087	6,223
BakeryMauvaisBon	30	33,07	24,711	4,512
BakeryFroidChaud	30	53,30	28,361	5,178
BakeryTendreDur	30	69,53	22,797	4,162
BakeryFaibleFort	30	71,03	26,648	4,865
BakeryActifPassif	30	43,97	25,367	4,631
BakeryHautBas	30	39,00	30,707	5,606
BakeryLégerLourd	30	79,20	16,558	3,023
BakeryFragileRobuste	30	80,17	14,247	2,601
BakeryLumineuxSombre	30	75,60	19,569	3,573
BakeryBruyantSilencieux	30	33,50	24,200	4,418
BakeryClairFoncé	30	78,53	15,290	2,792
BakeryRugueuxLisse	30	28,60	22,692	4,143
BakeryFémininMasculin	30	73,03	21,209	3,872
BakeryNonprofondProfond	30	76,07	17,186	3,138

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
BakeryAngulaireRonde	-,166	29	,869	-1,033	-13,76	11,69
BakeryMauvaisBon	-3,753	29	,001	-16,933	-26,16	-7,71
BakeryFroidChaud	,637	29	,529	3,300	-7,29	13,89
BakeryTendreDur	4,693	29	,000	19,533	11,02	28,05
BakeryFaibleFort	4,323	29	,000	21,033	11,08	30,98
BakeryActifPassif	-1,303	29	,203	-6,033	-15,51	3,44
BakeryHautBas	-1,962	29	,059	-11,000	-22,47	,47
BakeryLégerLourd	9,659	29	,000	29,200	23,02	35,38
BakeryFragileRobuste	11,598	29	,000	30,167	24,85	35,49
BakeryLumineuxSombre	7,165	29	,000	25,600	18,29	32,91
BakeryBruyantSilencieux	-3,734	29	,001	-16,500	-25,54	-7,46
BakeryClairFoncé	10,221	29	,000	28,533	22,82	34,24
BakeryRugueuxLisse	-5,165	29	,000	-21,400	-29,87	-12,93
BakeryFémininMasculin	5,948	29	,000	23,033	15,11	30,95
BakeryNonprofondProfond	8,307	29	,000	26,067	19,65	32,48

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BakeryAgréable	30	2,53	1,479	,270
BakeryStimulant	30	3,17	1,821	,332

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
BakeryAgréable	-5,430	29	,000	-1,467	-2,02	-,91
BakeryStimulant	-2,506	29	,018	-,833	-1,51	-,15

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CinnamonAngulaireRonde	30	41,10	32,419	5,919
CinnamonMauvaisBon	30	56,67	32,641	5,959
CinnamonFroidChaud	30	64,53	29,881	5,456
CinnamonTendreDur	30	57,47	30,805	5,624
CinnamonFaibleFort	30	74,87	16,429	3,000
CinnamonActifPassif	30	36,93	27,454	5,012
CinnamonHautBas	30	30,80	24,197	4,418
CinnamonLégerLourd	30	68,70	25,252	4,610
CinnamonFragileRobuste	30	73,40	20,350	3,715
CinnamonLumieuxSombre	30	56,40	28,120	5,134
CinnamonBruyantSilencieux	30	40,57	25,153	4,592
CinnamonClairFoncé	30	62,40	28,095	5,129
CinnamonRugueuxLisse	30	43,20	28,465	5,197
CinnamonFémininMasculin	30	57,80	27,414	5,005
CinnamonNonprofondProfond	30	76,07	18,941	3,458

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CinnamonAngulaireRonde	-1,504	29	,143	-8,900	-21,01	3,21
CinnamonMauvaisBon	1,119	29	,272	6,667	-5,52	18,85
CinnamonFroidChaud	2,664	29	,012	14,533	3,38	25,69
CinnamonTendreDur	1,328	29	,195	7,467	-4,04	18,97
CinnamonFaibleFort	8,290	29	,000	24,867	18,73	31,00
CinnamonActifPassif	-2,607	29	,014	-13,067	-23,32	-2,82
CinnamonHautBas	-4,346	29	,000	-19,200	-28,24	-10,16
CinnamonLégerLourd	4,056	29	,000	18,700	9,27	28,13
CinnamonFragileRobuste	6,298	29	,000	23,400	15,80	31,00
CinnamonLumieuxSombre	1,247	29	,223	6,400	-4,10	16,90
CinnamonBruyantSilencieux	-2,054	29	,049	-9,433	-18,83	-,04
CinnamonClairFoncé	2,417	29	,022	12,400	1,91	22,89
CinnamonRugueuxLisse	-1,308	29	,201	-6,800	-17,43	3,83
CinnamonFémininMasculin	1,558	29	,130	7,800	-2,44	18,04
CinnamonNonprofondProfond	7,538	29	,000	26,067	18,99	33,14

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CinnamonAgréable	30	4,30	2,200	,402
CinnamonStimulant	30	4,50	2,030	,371

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CinnamonAgréable	,747	29	,461	,300	-,52	1,12
CinnamonStimulant	1,349	29	,188	,500	-,26	1,26

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
ChocolateAngulaireRonde	30	57,77	31,586	5,767
ChocolateMauvaisBon	30	61,53	28,085	5,128
ChocolateFroidChaud	30	63,20	28,803	5,259
ChocolateTendreDur	30	53,53	28,597	5,221
ChocolateFaibleFort	30	69,60	19,973	3,647
ChocolateActifPassif	30	42,83	28,874	5,272
ChocolateHautBas	30	40,37	23,862	4,357
ChocolateLégerLourd	30	64,97	28,948	5,285
ChocolateFragileRobuste	30	69,60	24,745	4,518
ChocolateLumineuxSombre	30	63,63	24,584	4,488
ChocolateBruyantSilencieux	30	48,13	27,726	5,062
ChocolateClairFoncé	30	69,20	24,411	4,457
ChocolateRugueuxLisse	30	47,77	29,219	5,335
ChocolateFémininMasculin	30	60,00	27,029	4,935
ChocolateNonprofondProfond	30	69,33	22,222	4,057

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
ChocolateAngulaireRonde	1,347	29	,188	7,767	-4,03	19,56
ChocolateMauvaisBon	2,249	29	,032	11,533	1,05	22,02
ChocolateFroidChaud	2,510	29	,018	13,200	2,44	23,96
ChocolateTendreDur	,677	29	,504	3,533	-7,14	14,21
ChocolateFaibleFort	5,375	29	,000	19,600	12,14	27,06
ChocolateActifPassif	-1,359	29	,184	-7,167	-17,95	3,62
ChocolateHautBas	-2,211	29	,035	-9,633	-18,54	-,72
ChocolateLégerLourd	2,832	29	,008	14,967	4,16	25,78
ChocolateFragileRobuste	4,338	29	,000	19,600	10,36	28,84
ChocolateLumineuxSombre	3,037	29	,005	13,633	4,45	22,81
ChocolateBruyantSilencieux	-,369	29	,715	-1,867	-12,22	8,49
ChocolateClairFoncé	4,308	29	,000	19,200	10,08	28,32
ChocolateRugueuxLisse	-,419	29	,679	-2,233	-13,14	8,68
ChocolateFémininMasculin	2,026	29	,052	10,000	-,09	20,09
ChocolateNonprofondProfond	4,765	29	,000	19,333	11,04	27,63

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
ChocolateAgréable	30	4,27	1,964	,359
ChocolateStimulant	30	4,03	1,884	,344

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
ChocolateAgréable	,744	29	,463	,267	-,47	1,00
ChocolateStimulant	,097	29	,923	,033	-,67	,74

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CinnaCookAngulaireRonde	30	47,83	30,328	5,537
CinnaCookMauvaisBon	30	45,43	30,918	5,645
CinnaCookFroidChaud	30	51,87	26,775	4,888
CinnaCookTendreDur	30	55,97	29,245	5,339
CinnaCookFaibleFort	30	72,30	19,914	3,636
CinnaCookActifPassif	30	38,33	25,470	4,650
CinnaCookHautBas	30	43,93	26,587	4,854
CinnaCookLégerLourd	30	69,50	23,540	4,298
CinnaCookFragileRobuste	30	69,47	23,078	4,213
CinnaCookLumineuxSombre	30	69,10	19,552	3,570
CinnaCookBruyantSilencieux	30	47,50	26,250	4,793
CinnaCookClairFoncé	30	71,17	18,892	3,449
CinnaCookRugueuxLisse	30	36,47	24,906	4,547
CinnaCookFémininMasculin	30	62,43	26,074	4,760
CinnaCookNonprofondProfond	30	68,43	21,263	3,882

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CinnaCookAngulaireRonde	-,391	29	,698	-2,167	-13,49	9,16
CinnaCookMauvaisBon	-,809	29	,425	-4,567	-16,11	6,98
CinnaCookFroidChaud	,382	29	,705	1,867	-8,13	11,86
CinnaCookTendreDur	1,117	29	,273	5,967	-4,95	16,89
CinnaCookFaibleFort	6,134	29	,000	22,300	14,86	29,74
CinnaCookActifPassif	-2,509	29	,018	-11,667	-21,18	-2,16
CinnaCookHautBas	-1,250	29	,221	-6,067	-15,99	3,86
CinnaCookLégerLourd	4,537	29	,000	19,500	10,71	28,29
CinnaCookFragileRobuste	4,620	29	,000	19,467	10,85	28,08
CinnaCookLumineuxSombre	5,350	29	,000	19,100	11,80	26,40
CinnaCookBruyantSilencieux	-,522	29	,606	-2,500	-12,30	7,30
CinnaCookClairFoncé	6,137	29	,000	21,167	14,11	28,22
CinnaCookRugueuxLisse	-2,976	29	,006	-13,533	-22,83	-4,23
CinnaCookFémininMasculin	2,612	29	,014	12,433	2,70	22,17
CinnaCookNonprofondProfond	4,748	29	,000	18,433	10,49	26,37

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CinnaCookAgréable	30	3,37	1,629	,297
CinnaCookStimulant	30	3,57	1,654	,302

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CinnaCookAgréable	-2,129	29	,042	-,633	-1,24	-,03
CinnaCookStimulant	-1,435	29	,162	-,433	-1,05	,18

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
VanillaAngulaireRonde	30	80,97	18,470	3,372
VanillaMauvaisBon	30	75,27	23,001	4,199
VanillaFroidChaud	30	79,30	19,001	3,469
VanillaTendreDur	30	26,93	22,378	4,086
VanillaFaibleFort	30	61,53	25,570	4,668
VanillaActifPassif	30	48,50	23,774	4,341
VanillaHautBas	30	42,47	16,911	3,088
VanillaLégerLourd	30	53,73	23,817	4,348
VanillaFragileRobuste	30	54,30	25,020	4,568
VanillaLumineuxSombre	30	34,30	18,219	3,326
VanillaBruyantSilencieux	30	60,37	19,614	3,581
VanillaClairFoncé	30	41,03	17,835	3,256
VanillaRugueuxLisse	30	66,87	24,040	4,389
VanillaFémininMasculin	30	29,27	25,168	4,595
VanillaNonprofondProfond	30	59,83	23,650	4,318

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
VanillaAngulaireRonde	9,183	29	,000	30,967	24,07	37,86
VanillaMauvaisBon	6,017	29	,000	25,267	16,68	33,86
VanillaFroidChaud	8,446	29	,000	29,300	22,20	36,40
VanillaTendreDur	-5,646	29	,000	-23,067	-31,42	-14,71
VanillaFaibleFort	2,470	29	,020	11,533	1,99	21,08
VanillaActifPassif	-,346	29	,732	-1,500	-10,38	7,38
VanillaHautBas	-2,440	29	,021	-7,533	-13,85	-1,22
VanillaLégerLourd	,859	29	,398	3,733	-5,16	12,63
VanillaFragileRobuste	,941	29	,354	4,300	-5,04	13,64
VanillaLumineuxSombre	-4,720	29	,000	-15,700	-22,50	-8,90
VanillaBruyantSilencieux	2,895	29	,007	10,367	3,04	17,69
VanillaClairFoncé	-2,754	29	,010	-8,967	-15,63	-2,31
VanillaRugueuxLisse	3,843	29	,001	16,867	7,89	25,84
VanillaFémininMasculin	-4,512	29	,000	-20,733	-30,13	-11,34
VanillaNonprofondProfond	2,277	29	,030	9,833	1,00	18,66

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
VanillaAgréable	30	5,27	1,660	,303
VanillaStimulant	30	4,63	2,025	,370

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
VanillaAgréable	4,181	29	,000	1,267	,65	1,89
VanillaStimulant	1,713	29	,097	,633	-,12	1,39

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CoffeeAngulaireRonde	30	44,90	27,602	5,039
CoffeeMauvaisBon	30	58,43	24,220	4,422
CoffeeFroidChaud	30	65,37	23,531	4,296
CoffeeTendreDur	30	66,03	20,584	3,758
CoffeeFaibleFort	30	75,23	21,803	3,981
CoffeeActifPassif	30	38,40	23,115	4,220
CoffeeHautBas	30	40,30	22,233	4,059
CoffeeLégerLourd	30	64,93	23,698	4,327
CoffeeFragileRobuste	30	73,47	17,009	3,105
CoffeeLumieuxSombre	30	71,67	23,241	4,243
CoffeeBruyantSilencieux	30	49,60	21,245	3,879
CoffeeClairFoncé	30	69,40	21,426	3,912
CoffeeRugueuxLisse	30	42,50	25,359	4,630
CoffeeFémininMasculin	30	64,67	23,980	4,378
CoffeeNonprofondProfond	30	72,50	21,924	4,003

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CoffeeAngulaireRonde	-1,012	29	,320	-5,100	-15,41	5,21
CoffeeMauvaisBon	1,907	29	,066	8,433	-,61	17,48
CoffeeFroidChaud	3,577	29	,001	15,367	6,58	24,15
CoffeeTendreDur	4,266	29	,000	16,033	8,35	23,72
CoffeeFaibleFort	6,339	29	,000	25,233	17,09	33,37
CoffeeActifPassif	-2,749	29	,010	-11,600	-20,23	-2,97
CoffeeHautBas	-2,390	29	,024	-9,700	-18,00	-1,40
CoffeeLégerLourd	3,452	29	,002	14,933	6,08	23,78
CoffeeFragileRobuste	7,557	29	,000	23,467	17,12	29,82
CoffeeLumieuxSombre	5,106	29	,000	21,667	12,99	30,35
CoffeeBruyantSilencieux	-,103	29	,919	-,400	-8,33	7,53
CoffeeClairFoncé	4,959	29	,000	19,400	11,40	27,40
CoffeeRugueuxLisse	-1,620	29	,116	-7,500	-16,97	1,97
CoffeeFémininMasculin	3,350	29	,002	14,667	5,71	23,62
CoffeeNonprofondProfond	5,621	29	,000	22,500	14,31	30,69

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CoffeeAgréable	30	4,47	1,737	,317
CoffeeStimulant	30	4,37	1,884	,344

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CoffeeAgréable	1,472	29	,152	,467	-,18	1,12
CoffeeStimulant	1,066	29	,295	,367	-,34	1,07

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
ApplepieAngulaireRonde	30	58,27	31,560	5,762
ApplepieMauvaisBon	30	66,47	25,753	4,702
ApplepieFroidChaud	30	68,87	22,952	4,191
ApplepieTendreDur	30	42,50	23,754	4,337
ApplepieFaibleFort	30	62,57	21,105	3,853
ApplepieActifPassif	30	36,73	20,698	3,779
ApplepieHautBas	30	38,80	19,672	3,592
ApplepieLégerLourd	30	52,80	24,238	4,425
ApplepieFragileRobuste	30	57,97	19,306	3,525
ApplepieLumineuxSombre	30	40,57	22,750	4,154
ApplepieBruyantSilencieux	30	44,53	18,414	3,362
ApplepieClairFoncé	30	48,53	24,483	4,470
ApplepieRugueuxLisse	30	55,07	24,716	4,513
ApplepieFémininMasculin	30	40,80	26,775	4,889
ApplepieNonprofondProfond	30	71,10	19,938	3,640

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
ApplepieAngulaireRonde	1,435	29	,162	8,267	-3,52	20,05
ApplepieMauvaisBon	3,502	29	,002	16,467	6,85	26,08
ApplepieFroidChaud	4,502	29	,000	18,867	10,30	27,44
ApplepieTendreDur	-1,729	29	,094	-7,500	-16,37	1,37
ApplepieFaibleFort	3,261	29	,003	12,567	4,69	20,45
ApplepieActifPassif	-3,511	29	,001	-13,267	-21,00	-5,54
ApplepieHautBas	-3,118	29	,004	-11,200	-18,55	-3,85
ApplepieLégerLourd	,633	29	,532	2,800	-6,25	11,85
ApplepieFragileRobuste	2,260	29	,031	7,967	,76	15,18
ApplepieLumineuxSombre	-2,271	29	,031	-9,433	-17,93	-,94
ApplepieBruyantSilencieux	-1,626	29	,115	-5,467	-12,34	1,41
ApplepieClairFoncé	-,328	29	,745	-1,467	-10,61	7,68
ApplepieRugueuxLisse	1,123	29	,271	5,067	-4,16	14,30
ApplepieFémininMasculin	-1,882	29	,070	-9,200	-19,20	,80
ApplepieNonprofondProfond	5,796	29	,000	21,100	13,65	28,55

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
ApplepieAgréable	30	4,60	1,905	,348
ApplepieStimulant	30	4,73	1,799	,328

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
ApplepieAgréable	1,725	29	,095	,600	-,11	1,31
ApplepieStimulant	2,233	29	,033	,733	,06	1,41

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CottoncandyAngulaireRonde	30	74,10	18,553	3,387
CottoncandyMauvaisBon	30	68,23	24,479	4,469
CottoncandyFroidChaud	30	66,97	22,457	4,100
CottoncandyTendreDur	30	33,70	19,048	3,478
CottoncandyFaibleFort	30	44,33	24,906	4,547
CottoncandyActifPassif	30	54,63	23,828	4,350
CottoncandyHautBas	30	58,90	21,783	3,977
CottoncandyLégerLourd	30	45,53	26,189	4,781
CottoncandyFragileRobuste	30	38,27	21,582	3,940
CottoncandyLumineuxSombre	30	38,77	21,299	3,889
CottoncandyBruyantSilencieux	30	62,80	19,607	3,580
CottoncandyClairFoncé	30	41,87	22,363	4,083
CottoncandyRugueuxLisse	30	65,60	19,701	3,597
CottoncandyFémininMasculin	30	34,40	23,271	4,249
CottoncandyNonprofondProfond	30	58,13	22,624	4,131

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CottoncandyAngulaireRonde	7,115	29	,000	24,100	17,17	31,03
CottoncandyMauvaisBon	4,080	29	,000	18,233	9,09	27,37
CottoncandyFroidChaud	4,138	29	,000	16,967	8,58	25,35
CottoncandyTendreDur	-4,687	29	,000	-16,300	-23,41	-9,19
CottoncandyFaibleFort	-1,246	29	,223	-5,667	-14,97	3,63
CottoncandyActifPassif	1,065	29	,296	4,633	-4,26	13,53
CottoncandyHautBas	2,238	29	,033	8,900	,77	17,03
CottoncandyLégerLourd	-,934	29	,358	-4,467	-14,25	5,31
CottoncandyFragileRobuste	-2,978	29	,006	-11,733	-19,79	-3,67
CottoncandyLumineuxSombre	-2,889	29	,007	-11,233	-19,19	-3,28
CottoncandyBruyantSilencieux	3,576	29	,001	12,800	5,48	20,12
CottoncandyClairFoncé	-1,992	29	,056	-8,133	-16,48	,22
CottoncandyRugueuxLisse	4,337	29	,000	15,600	8,24	22,96
CottoncandyFémininMasculin	-3,672	29	,001	-15,600	-24,29	-6,91
CottoncandyNonprofondProfond	1,969	29	,059	8,133	-,31	16,58

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
CottoncandyAgréable	30	4,70	1,664	,304
CottoncandyStimulant	30	4,47	1,737	,317

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
CottoncandyAgréable	2,304	29	,029	,700	,08	1,32
CottoncandyStimulant	1,472	29	,152	,467	-,18	1,12

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DropAngulaireRonde	30	58,07	30,868	5,636
DropMauvaisBon	30	63,23	29,012	5,297
DropFroidChaud	30	57,30	27,147	4,956
DropTendreDur	30	44,03	27,657	5,050
DropFaibleFort	30	62,00	24,366	4,449
DropActifPassif	30	36,47	21,409	3,909
DropHautBas	30	35,50	18,754	3,424
DropLégerLourd	30	51,97	25,180	4,597
DropFragileRobuste	30	54,17	26,567	4,850
DropLumineuxSombre	30	45,70	27,900	5,094
DropBruyantSilencieux	30	54,97	24,515	4,476
DropClairFoncé	30	52,43	26,626	4,861
DropRugueuxLisse	30	51,27	27,625	5,044
DropFémininMasculin	30	53,30	27,331	4,990
DropNonprofondProfond	30	66,00	20,248	3,697

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
DropAngulaireRonde	1,431	29	,163	8,067	-3,46	19,59
DropMauvaisBon	2,498	29	,018	13,233	2,40	24,07
DropFroidChaud	1,473	29	,152	7,300	-2,84	17,44
DropTendreDur	-1,182	29	,247	-5,967	-16,29	4,36
DropFaibleFort	2,697	29	,012	12,000	2,90	21,10
DropActifPassif	-3,462	29	,002	-13,533	-21,53	-5,54
DropHautBas	-4,235	29	,000	-14,500	-21,50	-7,50
DropLégerLourd	,428	29	,672	1,967	-7,44	11,37
DropFragileRobuste	,859	29	,397	4,167	-5,75	14,09
DropLumineuxSombre	-,844	29	,405	-4,300	-14,72	6,12
DropBruyantSilencieux	1,110	29	,276	4,967	-4,19	14,12
DropClairFoncé	,501	29	,620	2,433	-7,51	12,38
DropRugueuxLisse	,251	29	,803	1,267	-9,05	11,58
DropFémininMasculin	,661	29	,514	3,300	-6,91	13,51
DropNonprofondProfond	4,328	29	,000	16,000	8,44	23,56

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
DropAgréable	30	4,70	1,685	,308
DropStimulant	30	4,53	1,871	,342

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
DropAgréable	2,276	29	,030	,700	,07	1,33
DropStimulant	1,562	29	,129	,533	-,17	1,23

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
WaffleAngulaireRonde	30	45,80	32,911	6,009
WaffleMauvaisBon	30	35,37	30,429	5,555
WaffleFroidChaud	30	55,47	30,241	5,521
WaffleTendreDur	30	66,40	26,792	4,892
WaffleFaibleFort	30	78,03	18,609	3,398
WaffleActifPassif	30	42,33	28,854	5,268
WaffleHautBas	30	42,53	32,610	5,954
WaffleLégerLourd	30	80,20	14,023	2,560
WaffleFragileRobuste	30	76,60	20,048	3,660
WaffleLumineuxSombre	30	71,60	19,767	3,609
WaffleBruyantSilencieux	30	42,27	28,896	5,276
WaffleClairFoncé	30	74,97	19,452	3,551
WaffleRugueuxLisse	30	35,17	27,744	5,065
WaffleFémininMasculin	30	66,83	22,742	4,152
WaffleNonprofondProfond	30	77,43	15,817	2,888

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
WaffleAngulaireRonde	-,699	29	,490	-4,200	-16,49	8,09
WaffleMauvaisBon	-2,634	29	,013	-14,633	-26,00	-3,27
WaffleFroidChaud	,990	29	,330	5,467	-5,83	16,76
WaffleTendreDur	3,353	29	,002	16,400	6,40	26,40
WaffleFaibleFort	8,251	29	,000	28,033	21,08	34,98
WaffleActifPassif	-1,455	29	,156	-7,667	-18,44	3,11
WaffleHautBas	-1,254	29	,220	-7,467	-19,64	4,71
WaffleLégerLourd	11,796	29	,000	30,200	24,96	35,44
WaffleFragileRobuste	7,267	29	,000	26,600	19,11	34,09
WaffleLumineuxSombre	5,985	29	,000	21,600	14,22	28,98
WaffleBruyantSilencieux	-1,466	29	,153	-7,733	-18,52	3,06
WaffleClairFoncé	7,030	29	,000	24,967	17,70	32,23
WaffleRugueuxLisse	-2,928	29	,007	-14,833	-25,19	-4,47
WaffleFémininMasculin	4,054	29	,000	16,833	8,34	25,33
WaffleNonprofondProfond	9,500	29	,000	27,433	21,53	33,34

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
WaffleAgréable	30	2,50	1,717	,313
WaffleStimulant	30	2,77	1,794	,328

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
WaffleAgréable	-4,785	29	,000	-1,500	-2,14	-,86
WaffleStimulant	-3,765	29	,001	-1,233	-1,90	-,56

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
PopcornAngulaireRonde	30	49,23	33,023	6,029
PopcornMauvaisBon	30	44,30	31,770	5,800
PopcornFroidChaud	30	65,40	30,093	5,494
PopcornTendreDur	30	56,43	32,571	5,947
PopcornFaibleFort	30	75,37	21,650	3,953
PopcornActifPassif	30	39,40	29,183	5,328
PopcornHautBas	30	35,70	26,878	4,907
PopcornLégerLourd	30	72,13	24,270	4,431
PopcornFragileRobuste	30	69,47	23,381	4,269
PopcornLumineuxSombre	30	68,80	21,968	4,011
PopcornBruyantSilencieux	30	36,13	23,737	4,334
PopcornClairFoncé	30	69,47	22,835	4,169
PopcornRugueuxLisse	30	36,73	24,762	4,521
PopcornFémininMasculin	30	65,43	21,951	4,008
PopcornNonprofondProfond	30	66,50	23,828	4,350

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
PopcornAngulaireRonde	-,127	29	,900	-,767	-13,10	11,56
PopcornMauvaisBon	-,983	29	,334	-5,700	-17,56	6,16
PopcornFroidChaud	2,803	29	,009	15,400	4,16	26,64
PopcornTendreDur	1,082	29	,288	6,433	-5,73	18,60
PopcornFaibleFort	6,418	29	,000	25,367	17,28	33,45
PopcornActifPassif	-1,989	29	,056	-10,600	-21,50	,30
PopcornHautBas	-2,914	29	,007	-14,300	-24,34	-4,26
PopcornLégerLourd	4,995	29	,000	22,133	13,07	31,20
PopcornFragileRobuste	4,560	29	,000	19,467	10,74	28,20
PopcornLumineuxSombre	4,687	29	,000	18,800	10,60	27,00
PopcornBruyantSilencieux	-3,200	29	,003	-13,867	-22,73	-5,00
PopcornClairFoncé	4,669	29	,000	19,467	10,94	27,99
PopcornRugueuxLisse	-2,934	29	,006	-13,267	-22,51	-4,02
PopcornFémininMasculin	3,851	29	,001	15,433	7,24	23,63
PopcornNonprofondProfond	3,793	29	,001	16,500	7,60	25,40

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
PopcornAgréable	30	3,30	2,120	,387
PopcornStimulant	30	3,13	1,907	,348

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
PopcornAgréable	-1,809	29	,081	-,700	-1,49	,09
PopcornStimulant	-2,489	29	,019	-,867	-1,58	-,15

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
RedberriesAngulaireRonde	30	74,33	25,479	4,652
RedberriesMauvaisBon	30	77,03	24,527	4,478
RedberriesFroidChaud	30	75,23	22,821	4,167
RedberriesTendreDur	30	29,00	22,353	4,081
RedberriesFaibleFort	30	60,80	24,799	4,528
RedberriesActifPassif	30	42,90	26,179	4,780
RedberriesHautBas	30	48,60	24,731	4,515
RedberriesLégerLourd	30	47,07	24,585	4,489
RedberriesFragileRobuste	30	43,63	22,932	4,187
RedberriesLumineuxSombre	30	29,37	19,448	3,551
RedberriesBruyantSilencieux	30	60,90	25,388	4,635
RedberriesClairFoncé	30	36,37	23,091	4,216
RedberriesRugueuxLisse	30	69,87	22,697	4,144
RedberriesFémininMasculin	30	21,33	16,270	2,970
RedberriesNonprofondProfond	30	66,07	22,670	4,139

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
RedberriesAngulaireRonde	5,231	29	,000	24,333	14,82	33,85
RedberriesMauvaisBon	6,037	29	,000	27,033	17,87	36,19
RedberriesFroidChaud	6,056	29	,000	25,233	16,71	33,75
RedberriesTendreDur	-5,146	29	,000	-21,000	-29,35	-12,65
RedberriesFaibleFort	2,385	29	,024	10,800	1,54	20,06
RedberriesActifPassif	-1,485	29	,148	-7,100	-16,88	2,68
RedberriesHautBas	-,310	29	,759	-1,400	-10,63	7,83
RedberriesLégerLourd	-,654	29	,519	-2,933	-12,11	6,25
RedberriesFragileRobuste	-1,521	29	,139	-6,367	-14,93	2,20
RedberriesLumineuxSombre	-5,811	29	,000	-20,633	-27,90	-13,37
RedberriesBruyantSilencieux	2,352	29	,026	10,900	1,42	20,38
RedberriesClairFoncé	-3,234	29	,003	-13,633	-22,26	-5,01
RedberriesRugueuxLisse	4,794	29	,000	19,867	11,39	28,34
RedberriesFémininMasculin	-9,651	29	,000	-28,667	-34,74	-22,59
RedberriesNonprofondProfond	3,882	29	,001	16,067	7,60	24,53

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
RedberriesAgréable	30	5,57	1,455	,266
RedberriesStimulant	30	5,30	1,418	,259

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
RedberriesAgréable	5,899	29	,000	1,567	1,02	2,11
RedberriesStimulant	5,022	29	,000	1,300	,77	1,83

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BananaAngulaireRonde	30	73,27	24,407	4,456
BananaMauvaisBon	30	77,17	17,358	3,169
BananaFroidChaud	30	67,83	22,962	4,192
BananaTendreDur	30	32,57	24,941	4,554
BananaFaibleFort	30	63,03	20,058	3,662
BananaActifPassif	30	43,97	25,448	4,646
BananaHautBas	30	44,90	23,323	4,258
BananaLégerLourd	30	52,40	25,586	4,671
BananaFragileRobuste	30	55,57	21,872	3,993
BananaLumineuxSombre	30	33,67	23,210	4,238
BananaBruyantSilencieux	30	56,70	24,388	4,453
BananaClairFoncé	30	42,03	24,272	4,431
BananaRugueuxLisse	30	67,60	18,203	3,323
BananaFémininMasculin	30	28,97	14,077	2,570
BananaNonprofondProfond	30	64,23	18,269	3,336

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
BananaAngulaireRonde	5,221	29	,000	23,267	14,15	32,38
BananaMauvaisBon	8,572	29	,000	27,167	20,68	33,65
BananaFroidChaud	4,254	29	,000	17,833	9,26	26,41
BananaTendreDur	-3,829	29	,001	-17,433	-26,75	-8,12
BananaFaibleFort	3,559	29	,001	13,033	5,54	20,52
BananaActifPassif	-1,299	29	,204	-6,033	-15,54	3,47
BananaHautBas	-1,198	29	,241	-5,100	-13,81	3,61
BananaLégerLourd	,514	29	,611	2,400	-7,15	11,95
BananaFragileRobuste	1,394	29	,174	5,567	-2,60	13,73
BananaLumineuxSombre	-3,854	29	,001	-16,333	-25,00	-7,67
BananaBruyantSilencieux	1,505	29	,143	6,700	-2,41	15,81
BananaClairFoncé	-1,798	29	,083	-7,967	-17,03	1,10
BananaRugueuxLisse	5,296	29	,000	17,600	10,80	24,40
BananaFémininMasculin	-8,184	29	,000	-21,033	-26,29	-15,78
BananaNonprofondProfond	4,267	29	,000	14,233	7,41	21,06

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
BananaAgréable	30	5,50	1,280	,234
BananaStimulant	30	4,97	1,650	,301

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
BananaAgréable	6,420	29	,000	1,500	1,02	1,98
BananaStimulant	3,209	29	,003	,967	,35	1,58

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
GreenappAngulaireRonde	30	61,83	29,740	5,430
GreenappMauvaisBon	30	78,00	20,447	3,733
GreenappFroidChaud	30	60,17	25,083	4,580
GreenappTendreDur	30	29,63	23,196	4,235
GreenappFaibleFort	30	51,53	21,964	4,010
GreenappActifPassif	30	41,03	26,244	4,791
GreenappHautBas	30	47,17	26,275	4,797
GreenappLégerLourd	30	41,67	23,533	4,297
GreenappFragileRobuste	30	45,30	21,667	3,956
GreenappLumineuxSombre	30	31,90	21,403	3,908
GreenappBruyantSilencieux	30	59,43	22,201	4,053
GreenappClairFoncé	30	34,33	21,744	3,970
GreenappRugueuxLisse	30	67,80	22,792	4,161
GreenappFémininMasculin	30	30,70	17,519	3,198
GreenappNonprofondProfond	30	62,90	24,946	4,554

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
GreenappAngulaireRonde	2,179	29	,038	11,833	,73	22,94
GreenappMauvaisBon	7,501	29	,000	28,000	20,37	35,63
GreenappFroidChaud	2,220	29	,034	10,167	,80	19,53
GreenappTendreDur	-4,809	29	,000	-20,367	-29,03	-11,71
GreenappFaibleFort	,382	29	,705	1,533	-6,67	9,73
GreenappActifPassif	-1,871	29	,071	-8,967	-18,77	,83
GreenappHautBas	-,591	29	,559	-2,833	-12,64	6,98
GreenappLégerLourd	-1,940	29	,062	-8,333	-17,12	,45
GreenappFragileRobuste	-1,188	29	,244	-4,700	-12,79	3,39
GreenappLumineuxSombre	-4,632	29	,000	-18,100	-26,09	-10,11
GreenappBruyantSilencieux	2,327	29	,027	9,433	1,14	17,72
GreenappClairFoncé	-3,946	29	,000	-15,667	-23,79	-7,55
GreenappRugueuxLisse	4,278	29	,000	17,800	9,29	26,31
GreenappFémininMasculin	-6,034	29	,000	-19,300	-25,84	-12,76
GreenappNonprofondProfond	2,832	29	,008	12,900	3,59	22,21

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
GreenappAgréable	30	5,63	1,564	,286
GreenappStimulant	30	5,33	1,668	,305

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
GreenappAgréable	5,719	29	,000	1,633	1,05	2,22
GreenappStimulant	4,379	29	,000	1,333	,71	1,96

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
LemonAngulaireRonde	30	15,47	14,680	2,680
LemonMauvaisBon	30	68,80	23,577	4,305
LemonFroidChaud	30	34,33	23,992	4,380
LemonTendreDur	30	66,37	25,162	4,594
LemonFaibleFort	30	78,70	19,003	3,469
LemonActifPassif	30	17,47	14,357	2,621
LemonHautBas	30	24,03	19,800	3,615
LemonLégerLourd	30	50,17	26,403	4,820
LemonFragileRobuste	30	67,50	24,747	4,518
LemonLumineuxSombre	30	30,23	23,992	4,380
LemonBruyantSilencieux	30	37,20	19,455	3,552
LemonClairFoncé	30	32,10	27,241	4,974
LemonRugueuxLisse	30	45,60	25,413	4,640
LemonFémininMasculin	30	57,30	24,013	4,384
LemonNonprofondProfond	30	76,60	20,227	3,693

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
LemonAngulaireRonde	-12,885	29	,000	-34,533	-40,01	-29,05
LemonMauvaisBon	4,367	29	,000	18,800	10,00	27,60
LemonFroidChaud	-3,577	29	,001	-15,667	-24,63	-6,71
LemonTendreDur	3,563	29	,001	16,367	6,97	25,76
LemonFaibleFort	8,272	29	,000	28,700	21,60	35,80
LemonActifPassif	-12,412	29	,000	-32,533	-37,89	-27,17
LemonHautBas	-7,183	29	,000	-25,967	-33,36	-18,57
LemonLégerLourd	,035	29	,973	,167	-9,69	10,03
LemonFragileRobuste	3,873	29	,001	17,500	8,26	26,74
LemonLumineuxSombre	-4,513	29	,000	-19,767	-28,73	-10,81
LemonBruyantSilencieux	-3,604	29	,001	-12,800	-20,06	-5,54
LemonClairFoncé	-3,599	29	,001	-17,900	-28,07	-7,73
LemonRugueuxLisse	-,948	29	,351	-4,400	-13,89	5,09
LemonFémininMasculin	1,665	29	,107	7,300	-1,67	16,27
LemonNonprofondProfond	7,203	29	,000	26,600	19,05	34,15

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
LemonAgréable	30	5,50	1,075	,196
LemonStimulant	30	5,93	,907	,166

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
LemonAgréable	7,644	29	,000	1,500	1,10	1,90
LemonStimulant	11,673	29	,000	1,933	1,59	2,27

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
PeachAngulaireRonde	30	79,17	21,138	3,859
PeachMauvaisBon	30	83,07	16,182	2,954
PeachFroidChaud	30	64,70	24,125	4,405
PeachTendreDur	30	20,53	19,868	3,627
PeachFaibleFort	30	46,93	23,802	4,346
PeachActifPassif	30	45,50	30,774	5,618
PeachHautBas	30	50,90	30,755	5,615
PeachLégerLourd	30	31,63	22,798	4,162
PeachFragileRobuste	30	32,63	19,595	3,578
PeachLumineuxSombre	30	27,97	18,713	3,416
PeachBruyantSilencieux	30	70,17	23,183	4,233
PeachClairFoncé	30	26,23	21,777	3,976
PeachRugueuxLisse	30	78,97	18,131	3,310
PeachFémininMasculin	30	20,57	19,835	3,621
PeachNonProfondProfond	30	46,63	28,396	5,184

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
PeachAngulaireRonde	7,557	29	,000	29,167	21,27	37,06
PeachMauvaisBon	11,192	29	,000	33,067	27,02	39,11
PeachFroidChaud	3,337	29	,002	14,700	5,69	23,71
PeachTendreDur	-8,123	29	,000	-29,467	-36,89	-22,05
PeachFaibleFort	-,706	29	,486	-3,067	-11,95	5,82
PeachActifPassif	-,801	29	,430	-4,500	-15,99	6,99
PeachHautBas	,160	29	,874	,900	-10,58	12,38
PeachLégerLourd	-4,413	29	,000	-18,367	-26,88	-9,85
PeachFragileRobuste	-4,854	29	,000	-17,367	-24,68	-10,05
PeachLumineuxSombre	-6,449	29	,000	-22,033	-29,02	-15,05
PeachBruyantSilencieux	4,765	29	,000	20,167	11,51	28,82
PeachClairFoncé	-5,978	29	,000	-23,767	-31,90	-15,63
PeachRugueuxLisse	8,751	29	,000	28,967	22,20	35,74
PeachFémininMasculin	-8,128	29	,000	-29,433	-36,84	-22,03
PeachNonProfondProfond	-,649	29	,521	-3,367	-13,97	7,24

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
PeachAgréable	30	6,30	,877	,160
PeachStimulant	30	5,30	1,685	,308

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
PeachAgréable	14,366	29	,000	2,300	1,97	2,63
PeachStimulant	4,227	29	,000	1,300	,67	1,93

➢ APPENDIX 9: ONE SAMPLE T-TEST OF THE PRE-TEST 1 – STEP 2

One-Sample Test

	Test Value = 50					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
AngulaireRonde	10,985	29	,000	27,067	22,03	32,11
MauvaisBon	14,631	29	,000	33,800	29,08	38,52
FroidChaud	13,864	29	,000	31,700	27,02	36,38
TendreDur	-8,761	29	,000	-25,267	-31,16	-19,37
FaibleFort	4,582	29	,000	13,833	7,66	20,01
ActifPassif	-6,688	29	,000	-21,767	-28,42	-15,11
HautBas	-3,123	29	,004	-12,567	-20,80	-4,34
LégerLourd	-4,094	29	,000	-15,033	-22,54	-7,52
FragileRobuste	2,112	29	,043	7,867	,25	15,48
LumineuxSombre	-11,768	29	,000	-32,400	-38,03	-26,77
BruyantSilencieux	-,775	29	,444	-3,033	-11,03	4,97
ClairFoncé	-10,041	29	,000	-28,700	-34,55	-22,85
RugueuxLisse	7,440	29	,000	20,633	14,96	26,31
FémininMasculin	-6,339	29	,000	-22,767	-30,11	-15,42
NonprofondProfond	3,949	29	,000	13,400	6,46	20,34

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
AngulaireRonde	30	77,07	13,496	2,464
MauvaisBon	30	83,80	12,653	2,310
FroidChaud	30	81,70	12,523	2,286
TendreDur	30	24,73	15,796	2,884
FaibleFort	30	63,83	16,534	3,019
ActifPassif	30	28,23	17,826	3,255
HautBas	30	37,43	22,043	4,025
LégerLourd	30	34,97	20,111	3,672
FragileRobuste	30	57,87	20,399	3,724
LumineuxSombre	30	17,60	15,080	2,753
BruyantSilencieux	30	46,97	21,427	3,912
ClairFoncé	30	21,30	15,656	2,858
RugueuxLisse	30	70,63	15,190	2,773
FémininMasculin	30	27,23	19,673	3,592
NonprofondProfond	30	63,40	18,585	3,393

One-Sample Test

	Test Value = 4					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Agréable	19,386	29	,000	2,367	2,12	2,62
Stimulant	17,517	29	,000	1,967	1,74	2,20

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Agréable	30	6,37	,669	,122
Stimulant	30	5,97	,615	,112

➢ APPENDIX 10: RESULTS FROM THE PRE-TEST 1 (STEPS 1 AND 2) – CONGRUENCY INDEX

Table 9: incongruency index based on the sum of the absolute values

Scents	Incongruency index	Pleasantness	Arousal
Red berries	126	5.6	5.3
Vanilla	126	5.3	4.6
Banana	128	5.5	5
Green apple	148	5.6	5.3
Peach	171	6.3	5.3
Apple pie	185	4.6	4.7
Cotton candy	215	4.7	4.5
English drop	231	4.7	4.5
Chocolate	311	4.3	4
Lemon	331	5.5	5.9
Cinnamon	346	4.3	4.5
Coffee	365	4.5	4.4
Popcorn	374	3.3	3.1
Cinnamon/cookies	376	3.4	3.6
Belgian waffle	446	2.5	2.8
Bakery	472	2.5	3.2

Table 10: incongruency index based on absolute values compared to the mid-point

Scents	Incongruency index	Pleasantness	Arousal
Apple pie	18	4.6	4.7
Green apple	25	5.6	5.3
Banana	27	5.5	5
Red berries	28	5.6	5.3
Vanilla	32	5.3	4.6
English drop	82	4.7	4.5
Peach	96	6.3	5.3
Cotton candy	103	4.7	4.5
Chocolate	208	4.3	4
Lemon	221	5.5	5.9
Cinnamon	240	4.3	4.5
Coffee	271	4.5	4.4
Cinnamon/cookies	304	3.4	3.6
Popcorn	308	3.3	3.1
Belgian waffle	349	2.5	2.8
Bakery	371	2.5	3.2

Table 11: incongruency index based on values (1 or 0)

Scents	Incongruency index	Pleasantness	Arousal
Apple pie	1	4.6	4.7
Red berries	2	5.6	5.3
Vanilla	2	5.3	4.6
Banana	2	5.5	5
Green apple	2	5.6	5.3
English drop	4	4.7	4.5
Cotton candy	5	4.7	4.5
Peach	5	6.3	5.3
Chocolate	6	4.3	4
Lemon	6	5.5	5.9
Cinnamon	7	4.3	4.5
Coffee	7	4.5	4.4
Popcorn	8	3.3	3.1
Cinnamon/cookies	8	3.4	3.6
Belgian waffle	8	2.5	2.8
Bakery	8	2.5	3.2

➢ APPENDIX 11: TESTING FOR SCENTS' EQUIVALENCE ON THE PLEASANTNESS AND AROUSAL DIMENSIONS

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	CoffeePleasant - ApplepiePleasant	-,133	2,569	,469	-1,093	,826	-,284	29	,778
Pair 2	CoffeeArousing - ApplepieArousing	-,367	2,526	,461	-1,310	,576	-,795	29	,433
Pair 3	RedberriesPleasant - LemonPleasant	,067	1,461	,267	-,479	,612	,250	29	,804
Pair 4	RedberriesArousing - LemonArousing	-,633	1,586	,290	-1,226	-,041	-2,187	29	,037

- APPENDIX 12: QUESTIONNAIRE FOR THE THIRD STEP OF THE FIRST PRE-TEST TESTING THE THEMATICALLY CONGRUENCY OF THE SCENT WITH REGARD TO THE STORE (IN FRENCH)

Selon vous, est-ce que les senteurs suivantes sont appropriées pour le magasin “Alice Délice”?

Senteur Q

Pas du tout	O	O	O	O	O	O	O	Tout à fait

Senteur B

Pas du tout	O	O	O	O	O	O	O	Tout à fait

Senteur I

Pas du tout	O	O	O	O	O	O	O	Tout à fait

Senteur P

Pas du tout	O	O	O	O	O	O	O	Tout à fait

Senteur O

Pas du tout	O	O	O	O	O	O	O	Tout à fait

Senteur L

Pas du tout	O	O	O	O	O	O	O	Tout à fait

Veuillez préciser les caractéristiques suivantes :

Age =

Sexe = F/M (entourez)

- APPENDIX 12 (CONT.): QUESTIONNAIRE FOR THE THIRD PRE-TEST TESTING THE THEMATICALLY CONGRUENCY OF THE SCENT WITH REGARD TO THE STORE (IN ENGLISH)

According to you, are these scents appropriate to the theme of the store "Alice Délice"?

Scent Q

Not at all	O	O	O	O	O	O	O	Very much

Scent B

Not at all	O	O	O	O	O	O	O	Very much

Scent I

Not at all	O	O	O	O	O	O	O	Very much

Scent P

Not at all	O	O	O	O	O	O	O	Very much

Scent O

Not at all	O	O	O	O	O	O	O	Very much

Scent L

Not at all	O	O	O	O	O	O	O	Very much

Could you please precise the following characteristics:

Age =

Gender = F/M (encircle)

➢ APPENDIX 13: RESULTS FROM THE THIRD STEP OF THE FIRST PRE-TEST TESTING THE THEMATICALLY CONGRUENCY OF THE SCENT WITH REGARD TO THE STORE

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	30	16	61	34,80	14,131
Valid N (listwise)	30				

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	26	86,7	86,7	86,7
	M	4	13,3	13,3	100,0
	Total	30	100,0	100,0	

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Coffee	4,80	30	1,215	,222
	Apple_pie	5,30	30	1,535	,280
Pair 2	Red_berries	5,73	30	1,530	,279
	Lemon	4,37	30	1,691	,309

Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Coffee - Apple_pie	-,500	2,047	,374	-1,264	,264	-1,338	29	,191
Pair 2	Red_berries - Lemon	1,367	1,810	,330	,691	2,042	4,137	29	,000

➢ APPENDIX 14: WEATHER CONDITIONS PER EXPERIMENTAL CONDITION

	Sunny	Cloudy	Rainy
No scent	2 days	1 day	/
Apple pie	1 day	2 days	/
Coffee	/	2 days	1 day

➢ APPENDIX 15: DESCRIPTIVE STATISTICS – EXPERIMENT

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	120	17	65	37,12	12,466
Valid N (listwise)	120				

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	101	84,2	84,2	84,2
	M	19	15,8	15,8	100,0
	Total	120	100,0	100,0	

➢ APPENDIX 16: QUESTIONNAIRE FOR THE FIELD EXPERIMENTS (IN FRENCH)

Chers participants,

Dans le cadre de mes études en Management avec spécialisation en marketing international à l'université d'Hasselt, j'effectue actuellement une enquête pour mon mémoire. Dans ce but, je serais très reconnaissante si vous auriez l'amabilité de compléter le bref questionnaire suivant qui ne vous demandera que quelques minutes de votre temps.

Sachez que je suis particulièrement intéressée par votre propre opinion et, étant donné qu'il n'y a ni mauvaises ni bonnes réponses, j'apprécierais que vous preniez votre temps vu que seulement les réponses complètes et honnêtes seront prises en compte et pourront être utilisées par après.

A la fin du questionnaire, quelques questions relatives à vos données personnelles vous seront demandées. Notez que j'assurerai que vos informations personnelles restent confidentielles et ne seront pas divulguées à des tierces personnes.

De plus, compléter ce questionnaire peut faire de vous un heureux gagnant ! En effet, plusieurs tickets de cinéma seront offerts parmi les participants. Si vous souhaitez participer à cette mise en jeu, veuillez indiquer votre adresse e-mail à la fin de cette enquête. Le gagnant sera averti par e-mail et pourra récupérer son cadeau directement au magasin « Alice Délice ».

Je vous remercie d'avance pour votre collaboration et pour le temps que vous accordez à cette étude.

Fiona Baleau

Le questionnaire ci-dessous concerne votre expérience au sein du magasin “Alice Délice”. Veuillez lire attentivement chaque question et compléter chacune d’entre elles. Sachez qu’il n’y a pas de bonnes ou mauvaises réponses, seule votre propre opinion importe. De plus, notez que les informations que vous fournirez seront traitées de manière confidentielle et seront uniquement utilisées à des fins statistiques.

1. Quels sentiments le magasin “Alice Délice” vous évoque-t-il? Veuillez noircir le rond de votre choix qui montre où vous êtes positionné(e) entre les deux caractéristiques.

Je me suis senti(e) … dans ce magasin

mécontent(e)	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**content(e)**
énervé(e)	O	O	O	O	O	O	O	**heureux(se)**
insatisfait(e)	O	O	O	O	O	O	O	**satisfait(e)**
mélancolique	O	O	O	O	O	O	O	**joyeux(se)**
désespéré(e)	O	O	O	O	O	O	O	**plein(e) d’espoir**
ennuyé(e)	O	O	O	O	O	O	O	**relaxé(e)**
mou (molle)	O	O	O	O	O	O	O	**enthousiaste**
calme	O	O	O	O	O	O	O	**excité(e)**
endormi(e)	O	O	O	O	O	O	O	**éveillé(e)**
non stimulé(e)	O	O	O	O	O	O	O	**stimulé(e)**
engourdi(e)	O	O	O	O	O	O	O	**nerveux(se)**
détendu(e)	**O**	**O**	**O**	**O**	**O**	**O**	**O**	**stimulé(e)**

2. Comment évalueriez-vous l'environnement (c.-à-d. l'atmosphère) du magasin "Alice Délice"? Veuillez noircir le rond de votre choix qui montre où vous êtes positionné(e) entre les deux caractéristiques.

Selon moi, l'environnement de ce magasin est…

peu attrayant	O	O	O	O	O	O	O	attrayant
tendu	O	O	O	O	O	O	O	détendu
inconfortable	O	O	O	O	O	O	O	confortable
déprimant	O	O	O	O	O	O	O	joyeux
terne	O	O	O	O	O	O	O	coloré
négatif	O	O	O	O	O	O	O	positif
ennuyant	O	O	O	O	O	O	O	stimulant
mauvais	O	O	O	O	O	O	O	bon
inanimé	O	O	O	O	O	O	O	animé
démotivant	O	O	O	O	O	O	O	motivant
inintéressant	O	O	O	O	O	O	O	intéressant
déplaisant	O	O	O	O	O	O	O	plaisant
fermé	O	O	O	O	O	O	O	ouvert
sombre	O	O	O	O	O	O	O	lumineux
non stressant	O	O	O	O	O	O	O	stressant
impersonnel	O	O	O	O	O	O	O	personnel
étroit	O	O	O	O	O	O	O	large
démodé	O	O	O	O	O	O	O	moderne
désordonné	O	O	O	O	O	O	O	ordonné
bon marché	O	O	O	O	O	O	O	luxueux

3. Comment évalueriez-vous l'environnement du magasin "Alice Délice" sur base des caractéristiques suivantes? Veuillez noircir le rond de votre choix qui montre où vous êtes positionné(e) entre les deux caractéristiques.

Mon évaluation générale de ce magasin est…

mauvaise	O	O	O	O	O	O	O	bonne
négative	O	O	O	O	O	O	O	positive
défavorable	O	O	O	O	O	O	O	favorable

Selon moi, ce magasin est…

démodé	O	O	O	O	O	O	O	moderne
désagréable	O	O	O	O	O	O	O	agréable

4. Comment évalueriez-vous les produits du magasin “Alice Délice” sur base des caractéristiques suivantes? Veuillez noircir le rond de votre choix qui montre où vous êtes positionné(e) entre les deux caractéristiques.

Selon moi, les produits de ce magasin sont…

déplaisants	O	O	O	O	O	O	O	plaisants
peu attrayants	O	O	O	O	O	O	O	attrayants
désavantageux	O	O	O	O	O	O	O	avantageux
mauvais	O	O	O	O	O	O	O	bons
démodés	O	O	O	O	O	O	O	modernes
de basse qualité	O	O	O	O	O	O	O	de haute qualité
à prix bas	O	O	O	O	O	O	O	à prix élevés
de mauvais rapport qualité/prix	O	O	O	O	O	O	O	de bon rapport qualité prix

5. Quel est votre avis concernant les affirmations suivantes ?

a) J’ai apprécié passer du temps dans ce magasin

Pas du tout d’accord	Pas d’accord	Plutôt pas d’accord	Ni d’accord, ni pas d’accord	Plutôt d’accord	D’accord	Tout à fait d’accord
O	O	O	O	O	O	O

b) J’ai souhaité rester dans ce magasin aussi longtemps que possible

Pas du tout d’accord	Pas d’accord	Plutôt pas d’accord	Ni d’accord, ni pas d’accord	Plutôt d’accord	D’accord	Tout à fait d’accord
O	O	O	O	O	O	O

c) J'ai passé plus de temps dans ce magasin que je n'avais initialement prévu

Pas du tout d'accord	Pas d'accord	Plutôt pas d'accord	Ni d'accord, ni pas d'accord	Plutôt d'accord	D'accord	Tout à fait d'accord
O	O	O	O	O	O	O

d) J'ai ressenti l'envie pressante de quitter ce magasin le plus rapidement possible

Pas du tout d'accord	Pas d'accord	Plutôt pas d'accord	Ni d'accord, ni pas d'accord	Plutôt d'accord	D'accord	Tout à fait d'accord
O	O	O	O	O	O	O

e) Dans ce magasin, je me suis senti(e) de bonne humeur et j'étais ouvert(e) à toute conversation

Pas du tout d'accord	Pas d'accord	Plutôt pas d'accord	Ni d'accord, ni pas d'accord	Plutôt d'accord	D'accord	Tout à fait d'accord
O	O	O	O	O	O	O

f) J'ai essayé d'éviter le plus possible de chercher et d'explorer ce magasin

Pas du tout d'accord	Pas d'accord	Plutôt pas d'accord	Ni d'accord, ni pas d'accord	Plutôt d'accord	D'accord	Tout à fait d'accord
O	O	O	O	O	O	O

g) Dans ce magasin, j'aimerais éviter les autres personnes et éviter d'avoir à leur parler

Pas du tout d'accord	Pas d'accord	Plutôt pas d'accord	Ni d'accord, ni pas d'accord	Plutôt d'accord	D'accord	Tout à fait d'accord
O	O	O	O	O	O	O

h) Dans ce magasin, j'ai finalement dépensé plus d'argent que je ne l'avais prévu

Pas du tout d'accord	Pas d'accord	Plutôt pas d'accord	Ni d'accord, ni pas d'accord	Plutôt d'accord	D'accord	Tout à fait d'accord
O	O	O	O	O	O	O

6. En supposant que vous étiez à la recherche de produits comme ceux vendus dans ce magasin et que vous aviez de l'argent, seriez-vous susceptible de revenir dans ce magasin?

Pas du tout probable	Peu probable	Plutôt peu probable	Ni peu probable, ni probable	Plutôt probable	Probable	Fortement probable
O	O	O	O	O	O	O

7. Quelle est la probabilité que vous :

a) Disiez des choses positives à propos de ce magasin à d'autres personnes?

Pas du tout probable	Peu probable	Plutôt peu probable	Ni peu probable, ni probable	Plutôt probable	Probable	Fortement probable
O	O	O	O	O	O	O

b) Recommandiez ce magasin à quelqu'un qui demanderait votre avis ?

Pas du tout probable	Peu probable	Plutôt peu probable	Ni peu probable, ni probable	Plutôt probable	Probable	Fortement probable
O	O	O	O	O	O	O

c) Encouragiez des amis ou des membres de votre famille à faire affaire avec ce magasin ?

Pas du tout probable	Peu probable	Plutôt peu probable	Ni peu probable, ni probable	Plutôt probable	Probable	Fortement probable
O	O	O	O	O	O	O

Combien d'argent avez-vous dépensé dans ce magasin? …… €

Est-ce que le magasin vous a fait penser à quelque chose? Si oui, quoi ?

……
……

Avez-vous remarqué quelque chose dans ce magasin?

……
……

Selon vous, quel est l'objectif de cette étude?

……
……

Veuillez préciser les données personnelles suivantes. Je vous rappelle que celles-ci resteront confidentielles et seront uniquement utilisées à des fins statistiques.

Je suis un(e)	O homme	O femme
Âge	…… ans	
Adresse e-mail (seulement si vous souhaitez avoir la chance de gagner des tickets de cinéma)	……	

Merci pour votre collaboration à cette étude!

➢ APPENDIX 16 (CONT.): QUESTIONNAIRE FOR THE FIELD EXPERIMENTS (IN ENGLISH)

Dear participant,

Within the framework of my studies in Management with specialization in International Marketing Strategy at the University of Hasselt, I am currently running a research for my Master thesis. For this purpose, I would be grateful if you could fill in the following brief questionnaire which will take only few minutes of your time.

Note that I am mostly interested in your personal opinion and, as there is no right or wrong answers, I would be pleased if you can take your time as only complete and honest responses can be used further for this research.

At the end of the questionnaire, few questions related to personal data will be asked. I will ensure that all of your personal information will be treated confidentially and will not be divulgated to external parties.

In addition, completing this survey might make you a happy winner. Indeed, several cinema tickets will be offered among the respondents. If you wish to participate to this raffle, please indicate your e-mail address at the end of the survey. The winner will be notified via e-mail and can pick up the cinema tickets in the store.

I thank you in advance for your collaboration and the time your accord to this survey.

Fiona Baleau

Below is a brief questionnaire about your experience in the store “Alice Délice”. Please read each question accurately. Note that there is no right or wrong answers as what matters is your personal opinion. Furthermore, the information you provide is confidential and will only be used for statistical purposes.

1. Which feelings the store “Alice Délice” evokes to you? Please blacken the circle of your choice that shows where you are positioned between the two characteristics.

I felt … in this store

unhappy	O	O	O	O	O	O	O	happy
annoyed	O	O	O	O	O	O	O	pleased
dissatisfied	O	O	O	O	O	O	O	satisfied
melancholic	O	O	O	O	O	O	O	contented
despairing	O	O	O	O	O	O	O	hopeful
bored	O	O	O	O	O	O	O	relaxed
sluggish	O	O	O	O	O	O	O	frenzied
calm	O	O	O	O	O	O	O	excited
sleepy	O	O	O	O	O	O	O	awake
unaroused	O	O	O	O	O	O	O	aroused
dull	O	O	O	O	O	O	O	jittery
relaxed	O	O	O	O	O	O	O	stimulated

2. How would you evaluate the store environment of “Alice Délice” based on the following characteristics? Please blacken the circle of your choice that shows where you are positioned between the two characteristics.

In my opinion, this store environment is…

unattractive	O	O	O	O	O	O	O	attractive
tense	O	O	O	O	O	O	O	relaxed
uncomfortable	O	O	O	O	O	O	O	comfortable
depressing	O	O	O	O	O	O	O	cheerful
drab	O	O	O	O	O	O	O	colourful
negative	O	O	O	O	O	O	O	positive
boring	O	O	O	O	O	O	O	stimulating
bad	O	O	O	O	O	O	O	good
unlively	O	O	O	O	O	O	O	lively
unmotivating	O	O	O	O	O	O	O	motivating
uninteresting	O	O	O	O	O	O	O	interesting
unpleasant	O	O	O	O	O	O	O	pleasant
closed	O	O	O	O	O	O	O	open
dull	O	O	O	O	O	O	O	bright
unstressful	O	O	O	O	O	O	O	stressful
impersonal	O	O	O	O	O	O	O	intimate
narrow	O	O	O	O	O	O	O	spacious
outdated	O	O	O	O	O	O	O	modern
disordered	O	O	O	O	O	O	O	ordered
low end	O	O	O	O	O	O	O	upmarket

3. How would you evaluate the store “Alice Délice” on the basis of the following characteristics? Please blacken the circle of your choice that shows where you are positioned between the two characteristics.

My overall assessment of this store is…

bad	O	O	O	O	O	O	O	good
negative	O	O	O	O	O	O	O	positive
unfavorable	O	O	O	O	O	O	O	favorable

In my opinion, this store is…

outdated	O	O	O	O	O	O	O	modern
not nice	O	O	O	O	O	O	O	nice

4. How would you evaluate the products of the store “Alice Délice” based on the following characteristics? Please blacken the circle of your choice that shows where you are positioned between the two characteristics.

In my opinion, the products are…

unpleasant	O	O	O	O	O	O	O	pleasant
unattractive	O	O	O	O	O	O	O	attractive
unfavorable	O	O	O	O	O	O	O	favorable
bad	O	O	O	O	O	O	O	good
outdated	O	O	O	O	O	O	O	up-to-date
low quality	O	O	O	O	O	O	O	high quality
low prices	O	O	O	O	O	O	O	high prices
Bad value for money	O	O	O	O	O	O	O	Good value for money

5. What is your opinion about the following statements?

a) I found it pleasant to spend time in this store

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

b) I wanted to stay in this store as long as possible

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

c) I have spent more time in this store than I had first planned

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

d) I felt the urge to leave this store as soon as possible

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

e) In this store, I felt in a good mood and I was open for a chat

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

f) I have tried to avoid to look around in this store and explore it as much as possible

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

g) In this store, I would try to avoid people or avoid having to talk

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

h) I have eventually spent more money in this store than I had planned initially

Totally disagree	Disagree	Rather disagree	Neither disagree, nor agree	Rather agree	Agree	Totally agree
O	O	O	O	O	O	O

6. Assuming you were looking for products like those sold at this store and you had the money, how likely would you be to revisit the store?

Not at all likely	Unlikely	Rather unlikely	Neither unlikely, nor likely	Rather likely	Likely	Extremely likely
O	O	O	O	O	O	O

7. How likely is it that you:

d) Say positive things about the store “Alice Délice” to other people

Not at all likely	Unlikely	Rather unlikely	Neither unlikely, nor likely	Rather likely	Likely	Extremely likely
O	O	O	O	O	O	O

e) Recommend “Alice Délice” to someone who seeks your advice

Not at all likely	Unlikely	Rather unlikely	Neither unlikely, nor likely	Rather likely	Likely	Extremely likely
O	O	O	O	O	O	O

f) Encourage friends and relatives to do business with “Alice Délice”

Not at all likely	Unlikely	Rather unlikely	Neither unlikely, nor likely	Rather likely	Likely	Extremely likely
O	O	O	O	O	O	O

How much money did you spent in the store? …… €

Did the store make you think about something? If yes, what?

……
……
……

Is there anything you noticed in the store?

……
……
……

What do you think the purpose of this study is?

……
……
……

In addition, I would appreciate if you could fill in some demographic data. Note that this information will be kept strictly confidential and only used for statistical purposes.

I am a	O man	O woman
Age	…… years old	
E-mail address (only if you want to have a chance to win cinema tickets)	……	

Thank you for your collaboration and the time you accorded to this survey!

➢ APPENDIX 17: FACTOR AND RELIABILITY ANALYSES OF THE SCALES USED – EXPERIMENT

❖ QUESTION 1: AFFECTIVE RESPONSES (I.E. : PLEASURE AND AROUSAL)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,882
Bartlett's Test of Sphericity	Approx. Chi-Square	632,800
	df	66
	Sig.	,000

Anti-image Matrices

		Q1_happy	Q1_pleased	Q1_satisfied	Q1_contented	Q1_hopeful	Q1_relaxed	Q1_frenzied	Q1_excited	Q1_awake	Q1_aroused	Q1_jittery	Q1_stimulated
Anti-image Correlation	Q1_happy	,897[a]	-,158	-,390	-,194	,130	-,153	-,001	-,056	-,076	-,066	,050	,002
	Q1_pleased	-,158	,885[a]	-,263	-,229	-,338	,028	-,309	,008	-,042	,110	,034	-,118
	Q1_satisfied	-,390	-,263	,897[a]	-,026	-,080	,026	,070	-,001	-,121	-,086	-,044	,065
	Q1_contented	-,194	-,229	-,026	,937[a]	-,129	-,015	-,160	-,003	,020	-,085	-,118	,061
	Q1_hopeful	,130	-,338	-,080	-,129	,892[a]	-,297	,052	,017	-,014	-,069	,029	-,094
	Q1_relaxed	-,153	,028	,026	-,015	-,297	,870[a]	-,222	,139	-,148	-,315	,116	,057
	Q1_frenzied	-,001	-,309	,070	-,160	,052	-,222	,882[a]	-,214	-,309	,087	-,024	,012
	Q1_excited	-,056	,008	-,001	-,003	,017	,139	-,214	,709[a]	,138	-,166	-,017	-,369
	Q1_awake	-,076	-,042	-,121	,020	-,014	-,148	-,309	,138	,916[a]	-,107	-,145	-,140
	Q1_aroused	-,066	,110	-,086	-,085	-,069	-,315	,087	-,166	-,107	,875[a]	-,188	-,082
	Q1_jittery	,050	,034	-,044	-,118	,029	,116	-,024	-,017	-,145	-,188	,835[a]	-,212
	Q1_stimulated	,002	-,118	,065	,061	-,094	,057	,012	-,369	-,140	-,082	-,212	,813[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

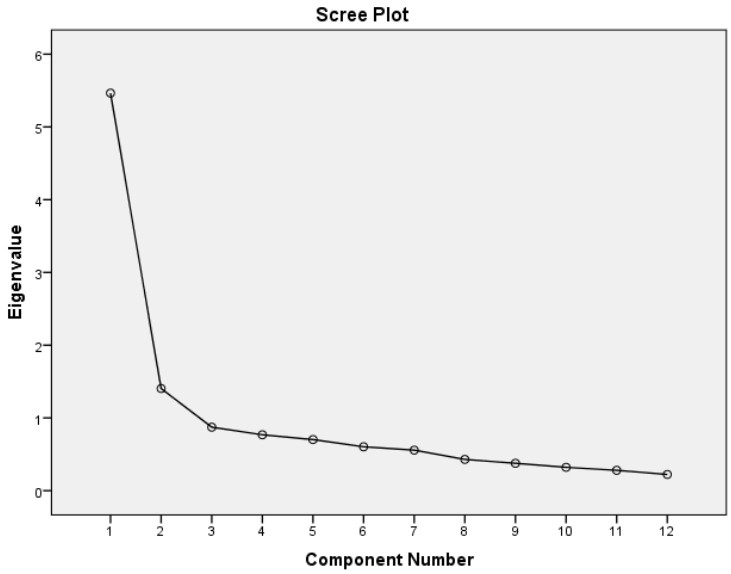
	Initial	Extraction
Q1_happy	1,000	,601
Q1_pleased	1,000	,718
Q1_satisfied	1,000	,590
Q1_contented	1,000	,593
Q1_hopeful	1,000	,548
Q1_relaxed	1,000	,584
Q1_frenzied	1,000	,591
Q1_excited	1,000	,579
Q1_awake	1,000	,560
Q1_aroused	1,000	,419
Q1_jittery	1,000	,428
Q1_stimulated	1,000	,657

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	5,465	45,540	45,540	5,465	45,540	45,540	4,827	40,227	40,227
2	1,404	11,697	57,237	1,404	11,697	57,237	2,041	17,010	57,237
3	,872	7,270	64,507						
4	,768	6,400	70,907						
5	,702	5,852	76,760						
6	,603	5,023	81,783						
7	,557	4,643	86,426						
8	,429	3,576	90,002						
9	,376	3,133	93,136						
10	,321	2,674	95,810						
11	,280	2,334	98,145						
12	,223	1,855	100,000						

Extraction Method: Principal Component Analysis.



Rotated Component Matrix[a]

	Component	
	1	2
Q1_pleased	,825	,195
Q1_happy	,766	,120
Q1_relaxed	,764	,032
Q1_satisfied	,760	,109
Q1_contented	,749	,179
Q1_hopeful	,728	,134
Q1_frenzied	,715	,283
Q1_awake	,697	,272
Q1_aroused	,499	,413
Q1_stimulated	,183	,790
Q1_excited	,055	,759
Q1_jittery	,160	,634

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

New factor analysis (items « aroused », « awake », and « frenzied » eliminated)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,848
Bartlett's Test of Sphericity	Approx. Chi-Square	409,765
	df	36
	Sig.	,000

Anti-image Matrices

		Q1_happy	Q1_pleased	Q1_satisfied	Q1_contented	Q1_hopeful	Q1_relaxed	Q1_excited	Q1_jittery	Q1_stimulated
Anti-image Correlation	Q1_happy	,844[a]	-,174	-,414	-,207	,126	-,219	-,063	,023	-,017
	Q1_pleased	-,174	,866[a]	-,265	-,298	-,336	-,040	-,033	,032	-,134
	Q1_satisfied	-,414	-,265	,866[a]	-,026	-,093	-,016	,008	-,084	,041
	Q1_contented	-,207	-,298	-,026	,901[a]	-,129	-,093	-,048	-,149	,053
	Q1_hopeful	,126	-,336	-,093	-,129	,845[a]	-,347	,018	,016	-,104
	Q1_relaxed	-,219	-,040	-,016	-,093	-,347	,877[a]	,073	,012	-,005
	Q1_excited	-,063	-,033	,008	-,048	,018	,073	,723[a]	-,041	-,389
	Q1_jittery	,023	,032	-,084	-,149	,016	,012	-,041	,802[a]	-,268
	Q1_stimulated	-,017	-,134	,041	,053	-,104	-,005	-,389	-,268	,741[a]

a. Measures of Sampling Adequacy(MSA)

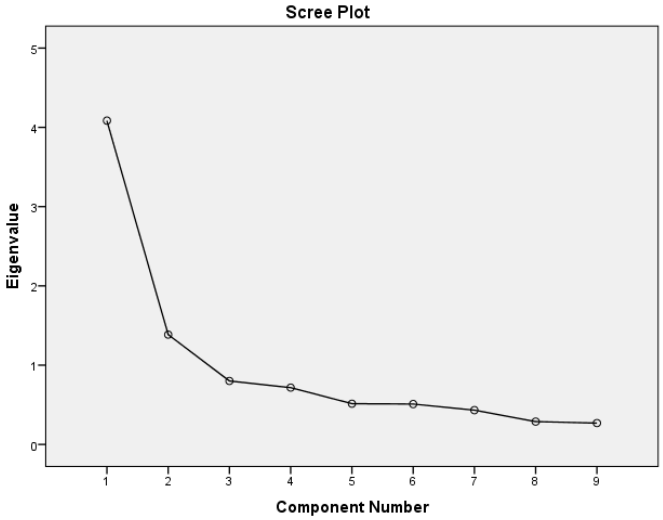
Communalities

	Initial	Extraction
Q1_happy	1,000	,635
Q1_pleased	1,000	,746
Q1_satisfied	1,000	,632
Q1_contented	1,000	,621
Q1_hopeful	1,000	,584
Q1_relaxed	1,000	,559
Q1_excited	1,000	,600
Q1_jittery	1,000	,412
Q1_stimulated	1,000	,682

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4,085	45,385	45,385	4,085	45,385	45,385	3,677	40,851	40,851
2	1,385	15,391	60,776	1,385	15,391	60,776	1,793	19,924	60,776
3	,801	8,896	69,671						
4	,716	7,960	77,632						
5	,514	5,710	83,341						
6	,509	5,661	89,002						
7	,433	4,807	93,809						
8	,288	3,197	97,006						
9	,269	2,994	100,000						

Extraction Method: Principal Component Analysis.



Rotated Component Matrix[a]

	Component	
	1	2
Q1_pleased	,831	,235
Q1_happy	,784	,142
Q1_satisfied	,783	,136
Q1_contented	,761	,203
Q1_hopeful	,749	,152
Q1_relaxed	,748	,003
Q1_stimulated	,181	,806
Q1_excited	,056	,772
Q1_jittery	,151	,623

Reliability Statistics (arousal)

Cronbach's Alpha	N of Items
,606	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1_excited	8,63	6,572	,437	,483
Q1_jittery	8,62	10,793	,333	,628
Q1_stimulated	8,56	6,114	,529	,317

Reliability Statistics (pleasure)

Cronbach's Alpha	N of Items
,876	6

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1_happy	28,88	20,843	,686	,855
Q1_pleased	29,13	18,906	,781	,837
Q1_satisfied	28,95	20,401	,681	,855
Q1_contented	29,21	19,813	,682	,854
Q1_hopeful	29,82	18,885	,663	,859
Q1_relaxed	29,21	19,528	,618	,866

❖ QUESTION 2 (EVALUATION OF THE STORE ENVIRONMENT)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,922
Bartlett's Test of Sphericity	Approx. Chi-Square	1138,873
	df	91
	Sig.	,000

Anti-image Matrices

		Q2_attractive	Q2_relaxed	Q2_comfortable	Q2_cheerful	Q2_colorful	Q2_positive	Q2_stimulating	Q2_good	Q2_lively	Q2_motivating	Q2_interesting	Q2_pleasant	Q2_open	Q2_bright
Anti-image Correlation	Q2_attractive	,892[a]	-,246	-,182	,232	-,392	,014	-,126	-,010	-,064	-,077	-,075	-,074	-,006	,185
	Q2_relaxed	-,246	,892[a]	-,284	-,172	,211	,121	,030	-,270	-,024	,039	,033	-,118	,097	-,117
	Q2_comfortable	-,182	-,284	,928[a]	-,386	-,013	-,066	-,076	-,092	-,062	-,086	,118	,090	-,061	-,069
	Q2_cheerful	,232	-,172	-,386	,884[a]	-,173	,006	-,072	-,078	,061	-,101	-,167	,003	-,207	,285
	Q2_colorful	-,392	,211	-,013	-,173	,894[a]	-,271	,083	-,053	-,096	,134	-,010	,010	,013	-,224
	Q2_positive	,014	,121	-,066	,006	-,271	,918[a]	-,388	-,345	,032	-,050	-,032	-,194	,090	-,118
	Q2_stimulating	-,126	,030	-,076	-,072	,083	-,388	,944[a]	,072	,059	-,062	-,092	,004	-,085	-,089
	Q2_good	-,010	-,270	-,092	-,078	-,053	-,345	,072	,950[a]	-,085	,016	-,107	-,043	-,084	-,145
	Q2_lively	-,064	-,024	-,062	,061	-,096	,032	,059	-,085	,912[a]	-,504	-,094	-,039	,040	,047
	Q2_motivating	-,077	,039	-,086	-,101	,134	-,050	-,062	,016	-,504	,917[a]	-,182	-,041	-,164	,000
	Q2_interesting	-,075	,033	,118	-,167	-,010	-,032	-,092	-,107	-,094	-,182	,953[a]	-,314	-,076	-,035
	Q2_pleasant	-,074	-,118	,090	,003	,010	-,194	,004	-,043	-,039	-,041	-,314	,956[a]	-,120	-,127
	Q2_open	-,006	,097	-,061	-,207	,013	,090	-,085	-,084	,040	-,164	-,076	-,120	,936[a]	-,385
	Q2_bright	,185	-,117	-,069	,285	-,224	-,118	-,089	-,145	,047	,000	-,035	-,127	-,385	,901[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

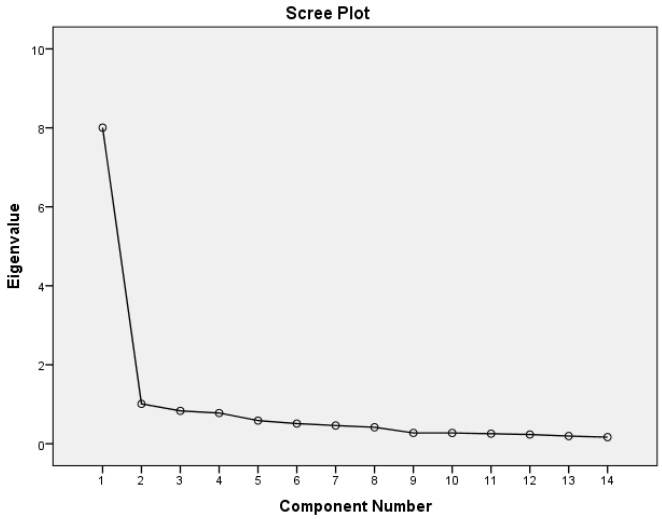
	Initial	Extraction
Q2_attractive	1,000	,476
Q2_relaxed	1,000	,661
Q2_comfortable	1,000	,742
Q2_cheerful	1,000	,641
Q2_colorful	1,000	,579
Q2_positive	1,000	,779
Q2_stimulating	1,000	,600
Q2_good	1,000	,738
Q2_lively	1,000	,517
Q2_motivating	1,000	,631
Q2_interesting	1,000	,661
Q2_pleasant	1,000	,674
Q2_open	1,000	,622
Q2_bright	1,000	,695

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8,005	57,179	57,179	8,005	57,179	57,179	4,952	35,370	35,370
2	1,010	7,213	64,392	1,010	7,213	64,392	4,063	29,022	64,392
3	,833	5,948	70,340						
4	,779	5,562	75,902						
5	,587	4,194	80,096						
6	,511	3,650	83,746						
7	,461	3,292	87,038						
8	,417	2,981	90,019						
9	,274	1,957	91,977						
10	,273	1,951	93,927						
11	,254	1,814	95,741						
12	,234	1,672	97,413						
13	,195	1,390	98,803						
14	,168	1,197	100,000						

Extraction Method: Principal Component Analysis.



Rotated Component Matrix[a]

	Component	
	1	2
Q2_bright	,813	,182
Q2_positive	,812	,347
Q2_colorful	,721	,244
Q2_pleasant	,721	,393
Q2_stimulating	,695	,342
Q2_open	,675	,408
Q2_interesting	,660	,474
Q2_good	,650	,562
Q2_relaxed	,169	,795
Q2_comfortable	,353	,786
Q2_cheerful	,285	,748
Q2_motivating	,469	,641
Q2_lively	,372	,616
Q2_attractive	,451	,522

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Total Variance Explained (with only one factor category permitted)

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8,005	57,179	57,179	8,005	57,179	57,179
2	1,010	7,213	64,392			
3	,833	5,948	70,340			
4	,779	5,562	75,902			
5	,587	4,194	80,096			
6	,511	3,650	83,746			
7	,461	3,292	87,038			
8	,417	2,981	90,019			
9	,274	1,957	91,977			
10	,273	1,951	93,927			
11	,254	1,814	95,741			
12	,234	1,672	97,413			
13	,195	1,390	98,803			
14	,168	1,197	100,000			

Extraction Method: Principal Component Analysis.

Reliability Statistics

Cronbach's Alpha	N of Items
,939	14

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q2_attractive	80,26	99,907	,637	,936
Q2_relaxed	80,52	96,705	,602	,938
Q2_comfortable	80,54	95,477	,751	,933
Q2_cheerful	80,59	95,672	,665	,936
Q2_colorful	80,18	98,806	,641	,936
Q2_positive	80,26	96,983	,792	,933
Q2_stimulating	80,50	96,555	,692	,935
Q2_good	80,32	95,448	,823	,931
Q2_lively	80,90	94,444	,642	,937
Q2_motivating	80,83	92,493	,741	,934
Q2_interesting	80,35	95,221	,769	,933
Q2_pleasant	80,41	95,992	,754	,933
Q2_open	80,37	96,438	,728	,934
Q2_bright	80,07	99,650	,672	,936

❖ QUESTION 3 (OVERALL ASSESSMENT OF THE STORE)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,840
Bartlett's Test of Sphericity	Approx. Chi-Square	622,094
	df	10
	Sig.	,000

Anti-image Matrices

		Q3_good	Q3_positive	Q3_favorable	Q3_modern	Q3_nice
Anti-image Correlation	Q3_good	,787[a]	-,765	-,315	-,096	,004
	Q3_positive	-,765	,802[a]	-,181	-,095	-,054
	Q3_favorable	-,315	-,181	,917[a]	,077	-,271
	Q3_modern	-,096	-,095	,077	,865[a]	-,514
	Q3_nice	,004	-,054	-,271	-,514	,857[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
Q3_good	1,000	,883
Q3_positive	1,000	,880
Q3_favorable	1,000	,825
Q3_modern	1,000	,676
Q3_nice	1,000	,734

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,997	79,935	79,935	3,997	79,935	79,935
2	,527	10,539	90,475			
3	,264	5,276	95,750			
4	,158	3,155	98,905			
5	,055	1,095	100,000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q3_good	,940
Q3_positive	,938
Q3_favorable	,908
Q3_nice	,856
Q3_modern	,822

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	N of Items
,937	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q3_good	25,18	11,109	,896	,910
Q3_positive	25,18	11,227	,895	,910
Q3_favorable	25,21	11,292	,849	,919
Q3_modern	24,99	12,311	,736	,939
Q3_nice	25,03	11,881	,782	,931

❖ QUESTION 4 (EVALUATION OF THE STORE'S PRODUCTS/OFFERINGS)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,822
Bartlett's Test of Sphericity	Approx. Chi-Square	368,195
	df	28
	Sig.	,000

Anti-image Matrices

		Q4_pleasant	Q4_attractive	Q4_favorable	Q4_good	Q4_uptodate	Q4_highquality	Q4_highprices	Q4_goodvalue
Anti-image Correlation	Q4_pleasant	,751[a]	-,692	-,112	-,203	,010	-,004	,059	,017
	Q4_attractive	-,692	,742[a]	,071	-,050	-,210	-,058	-,038	-,014
	Q4_favorable	-,112	,071	,842[a]	-,269	-,070	-,134	,190	-,291
	Q4_good	-,203	-,050	-,269	,886[a]	-,218	-,206	,031	-,111
	Q4_uptodate	,010	-,210	-,070	-,218	,893[a]	-,249	,017	-,025
	Q4_highquality	-,004	-,058	-,134	-,206	-,249	,873[a]	-,172	-,088
	Q4_highprices	,059	-,038	,190	,031	,017	-,172	,642[a]	,079
	Q4_goodvalue	,017	-,014	-,291	-,111	-,025	-,088	,079	,869[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

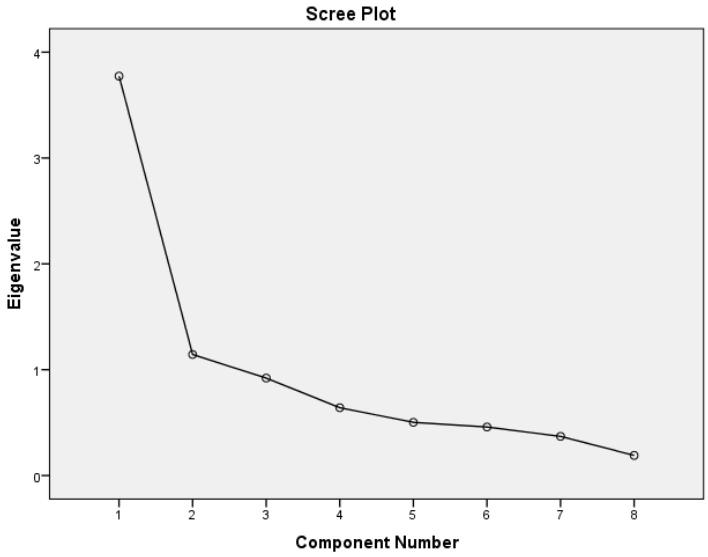
	Initial	Extraction
Q4_pleasant	1,000	,675
Q4_attractive	1,000	,693
Q4_favorable	1,000	,643
Q4_good	1,000	,681
Q4_uptodate	1,000	,578
Q4_highquality	1,000	,505
Q4_highprices	1,000	,639
Q4_goodvalue	1,000	,503

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,774	47,170	47,170	3,774	47,170	47,170	3,314	41,420	41,420
2	1,144	14,296	61,465	1,144	14,296	61,465	1,604	20,045	61,465
3	,921	11,510	72,975						
4	,641	8,010	80,985						
5	,502	6,281	87,265						
6	,459	5,733	92,998						
7	,370	4,627	97,625						
8	,190	2,375	100,000						

Extraction Method: Principal Component Analysis.



Rotated Component Matrix[a]

	Component	
	1	2
Q4_attractive	,832	,031
Q4_pleasant	,812	,125
Q4_good	,745	,354
Q4_uptodate	,743	,161
Q4_highquality	,702	,110
Q4_highprices	,132	-,788
Q4_favorable	,489	,636
Q4_goodvalue	,325	,631

Reliability Statistics (valence)

Cronbach's Alpha	N of Items
,837	5

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q4_pleasant	24,88	7,381	,690	,796
Q4_attractive	24,90	7,200	,685	,795
Q4_good	25,24	6,370	,686	,791
Q4_uptodate	24,91	7,193	,645	,803
Q4_highquality	25,27	6,483	,561	,837

Reliability Statistics (value)

Cronbach's Alpha	N of Items
,129	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q4_favorable	11,02	2,672	,223	-,406[a]
Q4_highprices	10,33	5,754	-,245	,647
Q4_goodvalue	11,03	2,554	,302	-,645[a]

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

❖ QUESTION 5 (APPROACH/AVOIDANCE BEHAVIORS)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,819
Bartlett's Test of Sphericity	Approx. Chi-Square	367,110
	df	28
	Sig.	,000

Anti-image Matrices

		Q5_a	Q5_b	Q5_c	Q5_d	Q5_e	Q5_f	Q5_g	Q5_h
Anti-image Correlation	Q5_a	,868[a]	-,295	-,107	,274	-,209	,115	-,077	-,049
	Q5_b	-,295	,831[a]	-,456	,207	-,105	,066	,025	,002
	Q5_c	-,107	-,456	,796[a]	-,134	-,246	,040	-,040	-,148
	Q5_d	,274	,207	-,134	,815[a]	,006	-,032	-,396	,021
	Q5_e	-,209	-,105	-,246	,006	,881[a]	-,043	,213	-,128
	Q5_f	,115	,066	,040	-,032	-,043	,820[a]	-,444	,031
	Q5_g	-,077	,025	-,040	-,396	,213	-,444	,728[a]	-,167
	Q5_h	-,049	,002	-,148	,021	-,128	,031	-,167	,762[a]

a. Measures of Sampling Adequacy(MSA)

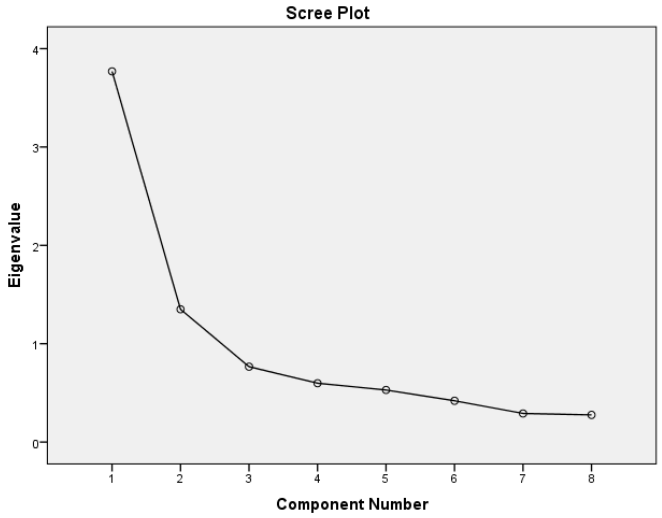
Communalities

	Initial	Extraction
Q5_a	1,000	,650
Q5_b	1,000	,717
Q5_c	1,000	,683
Q5_d	1,000	,635
Q5_e	1,000	,588
Q5_f	1,000	,586
Q5_g	1,000	,754
Q5_h	1,000	,505

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3,769	47,113	47,113	3,769	47,113	47,113	2,578	32,229	32,229
2	1,350	16,872	63,985	1,350	16,872	63,985	2,540	31,756	63,985
3	,767	9,582	73,567						
4	,598	7,481	81,048						
5	,529	6,617	87,665						
6	,420	5,248	92,913						
7	,291	3,636	96,550						
8	,276	3,450	100,000						



Rotated Component Matrix[a]

	Component	
	1	2
Q5_g	,867	-,057
Q5_f	,753	-,138
Q5_d	,753	-,261
Q5_c	-,187	,805
Q5_b	-,457	,713
Q5_e	-,379	,667
Q5_h	,276	,655
Q5_a	-,480	,648

Reliability Statistics

(avoidance)

Cronbach's Alpha	N of Items
,774	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q5_d	4,81	6,139	,570	,738
Q5_f	4,36	5,106	,578	,739
Q5_g	4,48	5,210	,693	,600

Reliability Statistics

(approach)

Cronbach's Alpha	N of Items
,828	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q5_a	15,48	11,193	,660	,795
Q5_b	16,33	9,031	,747	,740
Q5_c	16,51	7,630	,680	,795
Q5_e	16,03	10,604	,624	,799

❖ QUESTION 7 (WORD-OF-MOUTH)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,751
Bartlett's Test of Sphericity	Approx. Chi-Square	211,777
	df	3
	Sig.	,000

Anti-image Matrices

		Q7_WOMa	Q7_WOMb	Q7_WOMc
Anti-image Correlation	Q7_WOMa	,739[a]	-,418	-,471
	Q7_WOMb	-,418	,768[a]	-,389
	Q7_WOMc	-,471	-,389	,748[a]

a. Measures of Sampling Adequacy(MSA)

Communalities

	Initial	Extraction
Q7_WOMa	1,000	,837
Q7_WOMb	1,000	,818
Q7_WOMc	1,000	,831

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2,485	82,841	82,841	2,485	82,841	82,841
2	,273	9,088	91,928			
3	,242	8,072	100,000			

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q7_WOMa	,915
Q7_WOMc	,911
Q7_WOMb	,904

Extraction Method: Principal Component Analysis.

a. 1 components extracted.

Reliability Statistics

Cronbach's Alpha	N of Items
,895	3

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q7_WOMa	11,99	3,504	,805	,844
Q7_WOMb	11,92	3,321	,784	,858
Q7_WOMc	12,18	3,137	,797	,849

➢ APPENDIX 18: ONE WAY ANOVA

❖ VARIABLE "AFFECTIVE RESPONSES TOWARD THE STORE ENVIRONMENT"

Descriptives

Q1_PLEASURE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	5,4542	,93216	,14739	5,1560	5,7523	2,67	7,00
Apple_pie	40	6,0958	,84047	,13289	5,8270	6,3646	4,17	7,00
Coffee	40	5,9708	,73272	,11585	5,7365	6,2052	4,33	7,00
Total	120	5,8403	,87751	,08011	5,6817	5,9989	2,67	7,00

ANOVA

Q1_PLEASURE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	9,257	2	4,629	6,574	,002
Within Groups	82,376	117	,704		
Total	91,633	119			

Test of Homogeneity of Variances

Q1_PLEASURE

Levene Statistic	df1	df2	Sig.
,909	2	117	,406

Multiple Comparisons

Dependent Variable: Q1_PLEASURE

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	-,64167*	,18763	,001	-1,0132	-,2701
		Coffee	-,51667*	,18763	,007	-,8882	-,1451
	Apple_pie	No_Scent	,64167*	,18763	,001	,2701	1,0132
		Coffee	,12500	,18763	,507	-,2466	,4966
	Coffee	No_Scent	,51667*	,18763	,007	,1451	,8882
		Apple_pie	-,12500	,18763	,507	-,4966	,2466
Bonferroni	No_Scent	Apple_pie	-,64167*	,18763	,003	-1,0974	-,1859
		Coffee	-,51667*	,18763	,021	-,9724	-,0609
	Apple_pie	No_Scent	,64167*	,18763	,003	,1859	1,0974
		Coffee	,12500	,18763	1,000	-,3307	,5807
	Coffee	No_Scent	,51667*	,18763	,021	,0609	,9724
		Apple_pie	-,12500	,18763	1,000	-,5807	,3307
Tamhane	No_Scent	Apple_pie	-,64167*	,19845	,005	-1,1260	-,1573
		Coffee	-,51667*	,18747	,022	-,9747	-,0587
	Apple_pie	No_Scent	,64167*	,19845	,005	,1573	1,1260
		Coffee	,12500	,17630	,860	-,3054	,5554
	Coffee	No_Scent	,51667*	,18747	,022	,0587	,9747
		Apple_pie	-,12500	,17630	,860	-,5554	,3054

*. The mean difference is significant at the 0.05 level.

Descriptives

Q1_AROUSAL

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	4,0500	1,12610	,17805	3,6899	4,4101	2,00	6,33
Apple_pie	40	4,5417	1,28033	,20244	4,1322	4,9511	1,67	7,00
Coffee	40	4,3083	1,39879	,22117	3,8610	4,7557	1,00	7,00
Total	120	4,3000	1,27857	,11672	4,0689	4,5311	1,00	7,00

ANOVA

Q1_AROUSAL

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,839	2	2,419	1,492	,229
Within Groups	189,694	117	1,621		
Total	194,533	119			

Test of Homogeneity of Variances

Q1_AROUSAL

Levene Statistic	df1	df2	Sig.
,399	2	117	,672

Multiple Comparisons

Dependent Variable: Q1_AROUSAL

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
LSD	No_Scent	Apple_pie	-,49167	,28472	,087	-1,0555	,0722
		Coffee	-,25833	,28472	,366	-,8222	,3055
	Apple_pie	No_Scent	,49167	,28472	,087	-,0722	1,0555
		Coffee	,23333	,28472	,414	-,3305	,7972
	Coffee	No_Scent	,25833	,28472	,366	-,3055	,8222
		Apple_pie	-,23333	,28472	,414	-,7972	,3305
Bonferroni	No_Scent	Apple_pie	-,49167	,28472	,261	-1,1832	,1999
		Coffee	-,25833	,28472	1,000	-,9499	,4332
	Apple_pie	No_Scent	,49167	,28472	,261	-,1999	1,1832
		Coffee	,23333	,28472	1,000	-,4582	,9249
	Coffee	No_Scent	,25833	,28472	1,000	-,4332	,9499
		Apple_pie	-,23333	,28472	1,000	-,9249	,4582
Tamhane	No_Scent	Apple_pie	-,49167	,26960	,201	-1,1497	,1664
		Coffee	-,25833	,28393	,745	-,9518	,4352
	Apple_pie	No_Scent	,49167	,26960	,201	-,1664	1,1497
		Coffee	,23333	,29983	,823	-,4984	,9651
	Coffee	No_Scent	,25833	,28393	,745	-,4352	,9518
		Apple_pie	-,23333	,29983	,823	-,9651	,4984

❖ VARIABLE "EVALUATION OF THE STORE ENVIRONMENT"

Descriptives

Q2_EVALUATION_STORE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	5,9857	,94251	,14902	5,6843	6,2871	2,14	7,00
Apple_pie	40	6,2714	,60376	,09546	6,0783	6,4645	5,07	7,00
Coffee	40	6,3054	,64539	,10205	6,0990	6,5118	4,00	7,00
Total	120	6,1875	,75355	,06879	6,0513	6,3237	2,14	7,00

ANOVA

Q2_EVALUATION_STORE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	2,466	2	1,233	2,216	,114
Within Groups	65,106	117	,556		
Total	67,572	119			

Test of Homogeneity of Variances

Q2_EVALUATION_STORE

Levene Statistic	df1	df2	Sig.
1,235	2	117	,295

Multiple Comparisons

Dependent Variable: Q2_EVALUATION_STORE

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	-,28571	,16680	,089	-,6161	,0446
		Coffee	-,31964	,16680	,058	-,6500	,0107
	Apple_pie	No_Scent	,28571	,16680	,089	-,0446	,6161
		Coffee	-,03393	,16680	,839	-,3643	,2964
	Coffee	No_Scent	,31964	,16680	,058	-,0107	,6500
		Apple_pie	,03393	,16680	,839	-,2964	,3643
Bonferroni	No_Scent	Apple_pie	-,28571	,16680	,268	-,6909	,1194
		Coffee	-,31964	,16680	,173	-,7248	,0855
	Apple_pie	No_Scent	,28571	,16680	,268	-,1194	,6909
		Coffee	-,03393	,16680	1,000	-,4391	,3712
	Coffee	No_Scent	,31964	,16680	,173	-,0855	,7248
		Apple_pie	,03393	,16680	1,000	-,3712	,4391
Tamhane	No_Scent	Apple_pie	-,28571	,17698	,298	-,7192	,1478
		Coffee	-,31964	,18061	,224	-,7616	,1223
	Apple_pie	No_Scent	,28571	,17698	,298	-,1478	,7192
		Coffee	-,03393	,13974	,993	-,3749	,3071
	Coffee	No_Scent	,31964	,18061	,224	-,1223	,7616
		Apple_pie	,03393	,13974	,993	-,3071	,3749

- VARIABLE "OVERALL ASSESSMENT OF THE STORE"

Descriptives

OVERALL_ASS

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	6,0550	1,14577	,18116	5,6886	6,4214	1,00	7,00
Apple_pie	40	6,3900	,67322	,10645	6,1747	6,6053	5,00	7,00
Coffee	40	6,3950	,57197	,09044	6,2121	6,5779	5,00	7,00
Total	120	6,2800	,84352	,07700	6,1275	6,4325	1,00	7,00

ANOVA

OVERALL_ASS

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,038	2	1,519	2,177	,118
Within Groups	81,634	117	,698		
Total	84,672	119			

Test of Homogeneity of Variances

OVERALL_ASS

Levene Statistic	df1	df2	Sig.
4,615	2	117	,012

Multiple Comparisons

Dependent Variable: OVERALL_ASS

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
LSD	No_Scent	Apple_pie	-,33500	,18678	,075	-,7049	,0349
		Coffee	-,34000	,18678	,071	-,7099	,0299
	Apple_pie	No_Scent	,33500	,18678	,075	-,0349	,7049
		Coffee	-,00500	,18678	,979	-,3749	,3649
	Coffee	No_Scent	,34000	,18678	,071	-,0299	,7099
		Apple_pie	,00500	,18678	,979	-,3649	,3749
Bonferroni	No_Scent	Apple_pie	-,33500	,18678	,226	-,7887	,1187
		Coffee	-,34000	,18678	,214	-,7937	,1137
	Apple_pie	No_Scent	,33500	,18678	,226	-,1187	,7887
		Coffee	-,00500	,18678	1,000	-,4587	,4487
	Coffee	No_Scent	,34000	,18678	,214	-,1137	,7937
		Apple_pie	,00500	,18678	1,000	-,4487	,4587
Tamhane	No_Scent	Apple_pie	-,33500	,21012	,309	-,8504	,1804
		Coffee	-,34000	,20248	,268	-,8380	,1580
	Apple_pie	No_Scent	,33500	,21012	,309	-,1804	,8504
		Coffee	-,00500	,13968	1,000	-,3460	,3360
	Coffee	No_Scent	,34000	,20248	,268	-,1580	,8380
		Apple_pie	,00500	,13968	1,000	-,3360	,3460

❖ VARIABLE "EVALUATION OF THE STORE'S OFFERINGS/PRODUCTS"

Descriptives

Q4_VALENCE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	6,2050	,65239	,10315	5,9964	6,4136	5,00	7,00
Apple_pie	40	6,2700	,64776	,10242	6,0628	6,4772	4,80	7,00
Coffee	40	6,3050	,64687	,10228	6,0981	6,5119	4,60	7,00
Total	120	6,2600	,64488	,05887	6,1434	6,3766	4,60	7,00

ANOVA

Q4_VALENCE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	,206	2	,103	,245	,783
Within Groups	49,282	117	,421		
Total	49,488	119			

Test of Homogeneity of Variances

Q4_VALENCE

Levene Statistic	df1	df2	Sig.
,446	2	117	,642

Multiple Comparisons

Dependent Variable: Q4_VALENCE

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	-,06500	,14512	,655	-,3524	,2224
		Coffee	-,10000	,14512	,492	-,3874	,1874
	Apple_pie	No_Scent	,06500	,14512	,655	-,2224	,3524
		Coffee	-,03500	,14512	,810	-,3224	,2524
	Coffee	No_Scent	,10000	,14512	,492	-,1874	,3874
		Apple_pie	,03500	,14512	,810	-,2524	,3224
Bonferroni	No_Scent	Apple_pie	-,06500	,14512	1,000	-,4175	,2875
		Coffee	-,10000	,14512	1,000	-,4525	,2525
	Apple_pie	No_Scent	,06500	,14512	1,000	-,2875	,4175
		Coffee	-,03500	,14512	1,000	-,3875	,3175
	Coffee	No_Scent	,10000	,14512	1,000	-,2525	,4525
		Apple_pie	,03500	,14512	1,000	-,3175	,3875
Tamhane	No_Scent	Apple_pie	-,06500	,14536	,959	-,4197	,2897
		Coffee	-,10000	,14526	,870	-,4545	,2545
	Apple_pie	No_Scent	,06500	,14536	,959	-,2897	,4197
		Coffee	-,03500	,14474	,993	-,3882	,3182
	Coffee	No_Scent	,10000	,14526	,870	-,2545	,4545
		Apple_pie	,03500	,14474	,993	-,3182	,3882

Descriptives

Q4_VALUE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	4,8750	1,14774	,18147	4,5079	5,2421	2,50	7,00
Apple_pie	40	5,6125	1,04076	,16456	5,2797	5,9453	3,50	7,00
Coffee	40	5,0125	1,29341	,20451	4,5988	5,4262	1,50	7,00
Total	120	5,1667	1,19932	,10948	4,9499	5,3835	1,50	7,00

ANOVA

Q4_VALUE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	12,304	2	6,152	4,531	,013
Within Groups	158,862	117	1,358		
Total	171,167	119			

Test of Homogeneity of Variances

Q4_VALUE

Levene Statistic	df1	df2	Sig.
1,219	2	117	,299

Multiple Comparisons

Dependent Variable: Q4_VALUE

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
LSD	No_Scent	Apple_pie	-,73750*	,26056	,005	-1,2535	-,2215
		Coffee	-,13750	,26056	,599	-,6535	,3785
	Apple_pie	No_Scent	,73750*	,26056	,005	,2215	1,2535
		Coffee	,60000*	,26056	,023	,0840	1,1160
	Coffee	No_Scent	,13750	,26056	,599	-,3785	,6535
		Apple_pie	-,60000*	,26056	,023	-1,1160	-,0840
Bonferroni	No_Scent	Apple_pie	-,73750*	,26056	,016	-1,3704	-,1046
		Coffee	-,13750	,26056	1,000	-,7704	,4954
	Apple_pie	No_Scent	,73750*	,26056	,016	,1046	1,3704
		Coffee	,60000	,26056	,069	-,0329	1,2329
	Coffee	No_Scent	,13750	,26056	1,000	-,4954	,7704
		Apple_pie	-,60000	,26056	,069	-1,2329	,0329
Tamhane	No_Scent	Apple_pie	-,73750*	,24497	,011	-1,3354	-,1396
		Coffee	-,13750	,27341	,944	-,8049	,5299
	Apple_pie	No_Scent	,73750*	,24497	,011	,1396	1,3354
		Coffee	,60000	,26249	,073	-,0411	1,2411
	Coffee	No_Scent	,13750	,27341	,944	-,5299	,8049
		Apple_pie	-,60000	,26249	,073	-1,2411	,0411

*. The mean difference is significant at the 0.05 level.

❖ VARIABLE "APPROACH/AVOIDANCE BEHAVIORS"

Descriptives

Q5_APPROACH

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	5,0750	1,01779	,16093	4,7495	5,4005	2,50	7,00
Apple_pie	40	5,6625	1,13729	,17982	5,2988	6,0262	2,75	7,00
Coffee	40	5,3500	,75913	,12003	5,1072	5,5928	4,00	6,75
Total	120	5,3625	1,00516	,09176	5,1808	5,5442	2,50	7,00

ANOVA

Q5_APPROACH

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6,912	2	3,456	3,569	,031
Within Groups	113,319	117	,969		
Total	120,231	119			

Test of Homogeneity of Variances

Q5_APPROACH

Levene Statistic	df1	df2	Sig.
4,477	2	117	,013

Multiple Comparisons

Dependent Variable: Q5_APPROACH

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	-,58750*	,22006	,009	-1,0233	-,1517
		Coffee	-,27500	,22006	,214	-,7108	,1608
	Apple_pie	No_Scent	,58750*	,22006	,009	,1517	1,0233
		Coffee	,31250	,22006	,158	-,1233	,7483
	Coffee	No_Scent	,27500	,22006	,214	-,1608	,7108
		Apple_pie	-,31250	,22006	,158	-,7483	,1233
Bonferroni	No_Scent	Apple_pie	-,58750*	,22006	,026	-1,1220	-,0530
		Coffee	-,27500	,22006	,642	-,8095	,2595
	Apple_pie	No_Scent	,58750*	,22006	,026	,0530	1,1220
		Coffee	,31250	,22006	,475	-,2220	,8470
	Coffee	No_Scent	,27500	,22006	,642	-,2595	,8095
		Apple_pie	-,31250	,22006	,475	-,8470	,2220
Tamhane	No_Scent	Apple_pie	-,58750	,24132	,051	-1,1765	,0015
		Coffee	-,27500	,20076	,438	-,7657	,2157
	Apple_pie	No_Scent	,58750	,24132	,051	-,0015	1,1765
		Coffee	,31250	,21620	,392	-,2168	,8418
	Coffee	No_Scent	,27500	,20076	,438	-,2157	,7657
		Apple_pie	-,31250	,21620	,392	-,8418	,2168

*. The mean difference is significant at the 0.05 level.

Descriptives

Q5_AVOIDANCE

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	2,3250	1,00848	,15945	2,0025	2,6475	1,00	4,67
Apple_pie	40	1,9917	1,18029	,18662	1,6142	2,3691	1,00	7,00
Coffee	40	2,5083	1,09905	,17377	2,1568	2,8598	1,00	5,00
Total	120	2,2750	1,10989	,10132	2,0744	2,4756	1,00	7,00

ANOVA

Q5_AVOIDANCE

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5,489	2	2,744	2,276	,107
Within Groups	141,103	117	1,206		
Total	146,592	119			

Test of Homogeneity of Variances

Q5_AVOIDANCE

Levene Statistic	df1	df2	Sig.
,129	2	117	,879

Multiple Comparisons

Dependent Variable: Q5_AVOIDANCE

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	,33333	,24556	,177	-,1530	,8197
		Coffee	-,18333	,24556	,457	-,6697	,3030
	Apple_pie	No_Scent	-,33333	,24556	,177	-,8197	,1530
		Coffee	-,51667*	,24556	,038	-1,0030	-,0303
	Coffee	No_Scent	,18333	,24556	,457	-,3030	,6697
		Apple_pie	,51667*	,24556	,038	,0303	1,0030
Bonferroni	No_Scent	Apple_pie	,33333	,24556	,532	-,2631	,9298
		Coffee	-,18333	,24556	1,000	-,7798	,4131
	Apple_pie	No_Scent	-,33333	,24556	,532	-,9298	,2631
		Coffee	-,51667	,24556	,113	-1,1131	,0798
	Coffee	No_Scent	,18333	,24556	1,000	-,4131	,7798
		Apple_pie	,51667	,24556	,113	-,0798	1,1131
Tamhane	No_Scent	Apple_pie	,33333	,24546	,446	-,2659	,9326
		Coffee	-,18333	,23585	,824	-,7589	,3922
	Apple_pie	No_Scent	-,33333	,24546	,446	-,9326	,2659
		Coffee	-,51667	,25500	,132	-1,1390	,1056
	Coffee	No_Scent	,18333	,23585	,824	-,3922	,7589
		Apple_pie	,51667	,25500	,132	-,1056	1,1390

*. The mean difference is significant at the 0.05 level.

❖ VARIABLE "INTENTION TO REVISIT/RETURN TO THE STORE"

Descriptives

Q6_revisit

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	6,08	,829	,131	5,81	6,34	5	7
Apple_pie	40	6,28	,905	,143	5,99	6,56	4	7
Coffee	40	6,28	,877	,139	5,99	6,56	4	7
Total	120	6,21	,869	,079	6,05	6,37	4	7

ANOVA

Q6_revisit

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,067	2	,533	,703	,497
Within Groups	88,725	117	,758		
Total	89,792	119			

Test of Homogeneity of Variances

Q6_revisit

Levene Statistic	df1	df2	Sig.
,211	2	117	,810

Multiple Comparisons

Dependent Variable: Q6_revisit

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	-,200	,195	,306	-,59	,19
		Coffee	-,200	,195	,306	-,59	,19
	Apple_pie	No_Scent	,200	,195	,306	-,19	,59
		Coffee	,000	,195	1,000	-,39	,39
	Coffee	No_Scent	,200	,195	,306	-,19	,59
		Apple_pie	,000	,195	1,000	-,39	,39
Bonferroni	No_Scent	Apple_pie	-,200	,195	,919	-,67	,27
		Coffee	-,200	,195	,919	-,67	,27
	Apple_pie	No_Scent	,200	,195	,919	-,27	,67
		Coffee	,000	,195	1,000	-,47	,47
	Coffee	No_Scent	,200	,195	,919	-,27	,67
		Apple_pie	,000	,195	1,000	-,47	,47
Tamhane	No_Scent	Apple_pie	-,200	,194	,666	-,67	,27
		Coffee	-,200	,191	,653	-,67	,27
	Apple_pie	No_Scent	,200	,194	,666	-,27	,67
		Coffee	,000	,199	1,000	-,49	,49
	Coffee	No_Scent	,200	,191	,653	-,27	,67
		Apple_pie	,000	,199	1,000	-,49	,49

- VARIABLE "WORD-OF-MOUTH"

Descriptives

WOM_MEAN

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	40	5,7750	1,00536	,15896	5,4535	6,0965	4,00	7,00
Apple_pie	40	6,1833	,80224	,12685	5,9268	6,4399	4,00	7,00
Coffee	40	6,0833	,81212	,12841	5,8236	6,3431	4,33	7,00
Total	120	6,0139	,88814	,08108	5,8534	6,1744	4,00	7,00

ANOVA

WOM_MEAN

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3,624	2	1,812	2,349	,100
Within Groups	90,242	117	,771		
Total	93,866	119			

Test of Homogeneity of Variances

WOM_MEAN

Levene Statistic	df1	df2	Sig.
3,135	2	117	,047

Multiple Comparisons

Dependent Variable: WOM_MEAN

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	95% Confidence Interval Upper Bound
LSD	No_Scent	Apple_pie	-,40833*	,19638	,040	-,7973	-,0194
		Coffee	-,30833	,19638	,119	-,6973	,0806
	Apple_pie	No_Scent	,40833*	,19638	,040	,0194	,7973
		Coffee	,10000	,19638	,612	-,2889	,4889
	Coffee	No_Scent	,30833	,19638	,119	-,0806	,6973
		Apple_pie	-,10000	,19638	,612	-,4889	,2889
Bonferroni	No_Scent	Apple_pie	-,40833	,19638	,119	-,8853	,0687
		Coffee	-,30833	,19638	,357	-,7853	,1687
	Apple_pie	No_Scent	,40833	,19638	,119	-,0687	,8853
		Coffee	,10000	,19638	1,000	-,3770	,5770
	Coffee	No_Scent	,30833	,19638	,357	-,1687	,7853
		Apple_pie	-,10000	,19638	1,000	-,5770	,3770
Tamhane	No_Scent	Apple_pie	-,40833	,20337	,138	-,9051	,0884
		Coffee	-,30833	,20435	,354	-,8074	,1908
	Apple_pie	No_Scent	,40833	,20337	,138	-,0884	,9051
		Coffee	,10000	,18049	,927	-,3404	,5404
	Coffee	No_Scent	,30833	,20435	,354	-,1908	,8074
		Apple_pie	-,10000	,18049	,927	-,5404	,3404

*. The mean difference is significant at the 0.05 level.

❖ VARIABLE "MONEY SPENT"

Descriptives

MONEY_SPENT_OK

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
No_Scent	13	20,23	18,267	5,066	9,19	31,27	5	68
Apple_pie	21	43,52	29,593	6,458	30,05	56,99	8	120
Coffee	17	31,29	22,665	5,497	19,64	42,95	4	80
Total	51	33,51	26,161	3,663	26,15	40,87	4	120

ANOVA

MONEY_SPENT_OK

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4481,670	2	2240,835	3,617	,034
Within Groups	29739,075	48	619,564		
Total	34220,745	50			

Test of Homogeneity of Variances

MONEY_SPENT_OK

Levene Statistic	df1	df2	Sig.
1,047	2	48	,359

Multiple Comparisons

Dependent Variable: MONEY_SPENT_OK

	(I) Condition_number	(J) Condition_number	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
LSD	No_Scent	Apple_pie	-23,293*	8,784	,011	-40,95	-5,63
		Coffee	-11,063	9,171	,234	-29,50	7,38
	Apple_pie	No_Scent	23,293*	8,784	,011	5,63	40,95
		Coffee	12,230	8,121	,139	-4,10	28,56
	Coffee	No_Scent	11,063	9,171	,234	-7,38	29,50
		Apple_pie	-12,230	8,121	,139	-28,56	4,10
Bonferroni	No_Scent	Apple_pie	-23,293*	8,784	,032	-45,08	-1,50
		Coffee	-11,063	9,171	,701	-33,81	11,69
	Apple_pie	No_Scent	23,293*	8,784	,032	1,50	45,08
		Coffee	12,230	8,121	,416	-7,92	32,38
	Coffee	No_Scent	11,063	9,171	,701	-11,69	33,81
		Apple_pie	-12,230	8,121	,416	-32,38	7,92
Tamhane	No_Scent	Apple_pie	-23,293*	8,208	,023	-43,97	-2,62
		Coffee	-11,063	7,476	,386	-30,05	7,92
	Apple_pie	No_Scent	23,293*	8,208	,023	2,62	43,97
		Coffee	12,230	8,481	,403	-9,01	33,47
	Coffee	No_Scent	11,063	7,476	,386	-7,92	30,05
		Apple_pie	-12,230	8,481	,403	-33,47	9,01

*. The mean difference is significant at the 0.05 level.

➢ APPENDIX 19: SUMMARY OF THE STATISTICALLY SIGNIFICANT EFFECTS ON THE DEPENDENT VARIABLES

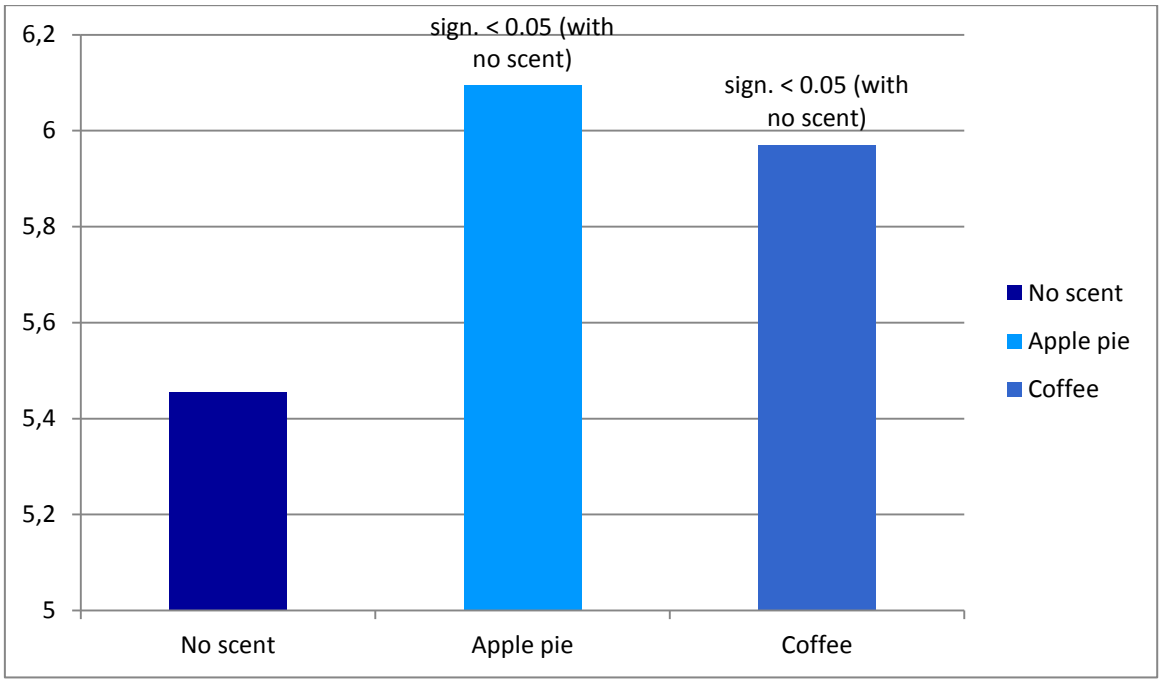


Figure 1: Difference in means for affective responses (pleasure) at the significance level of 5%

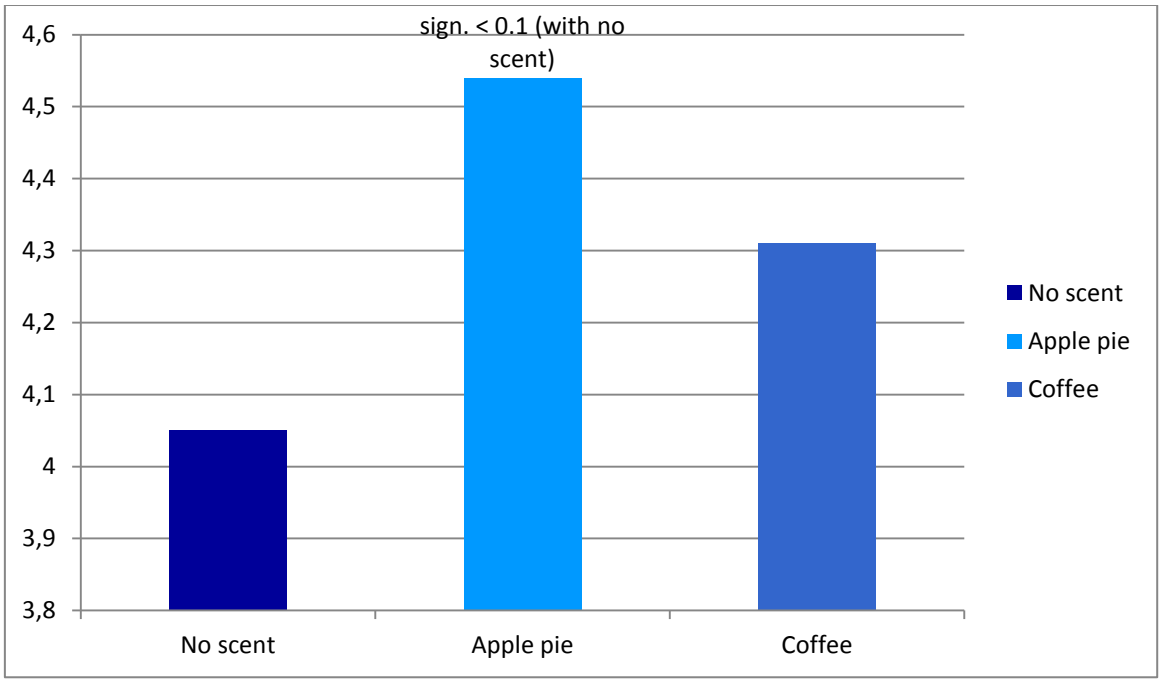


Figure 2: Difference in means for affective responses (arousal) at the significance level of 10%

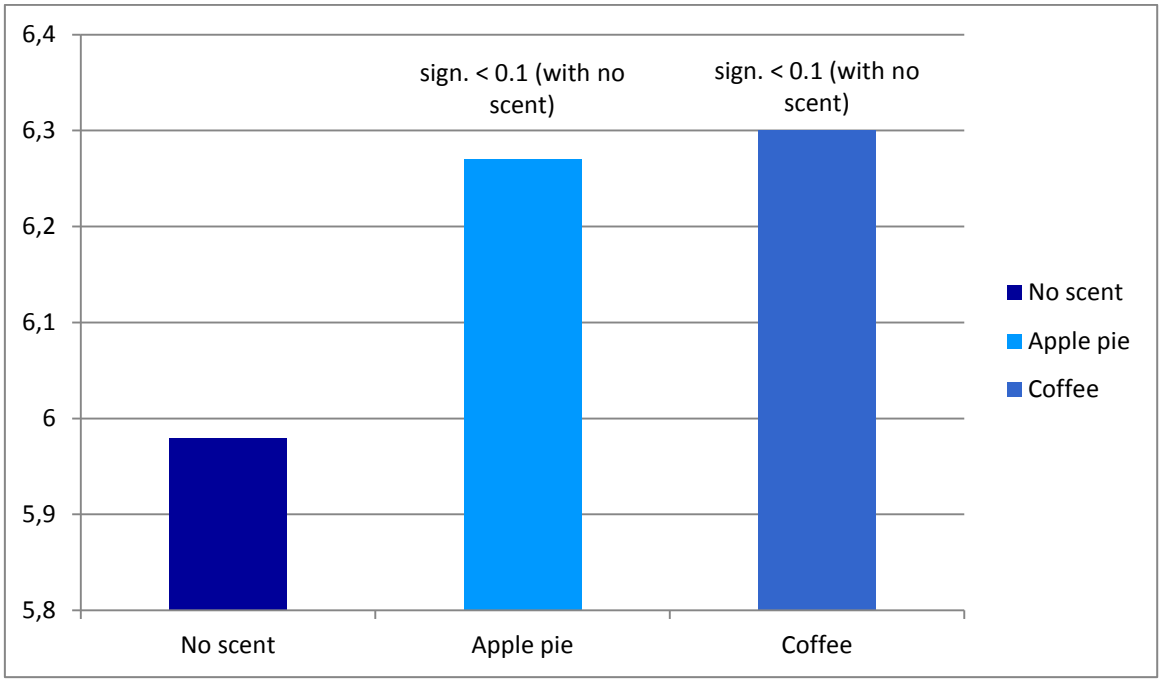


Figure 3: Difference in means for the evaluation of the store environment at the significance level of 10%

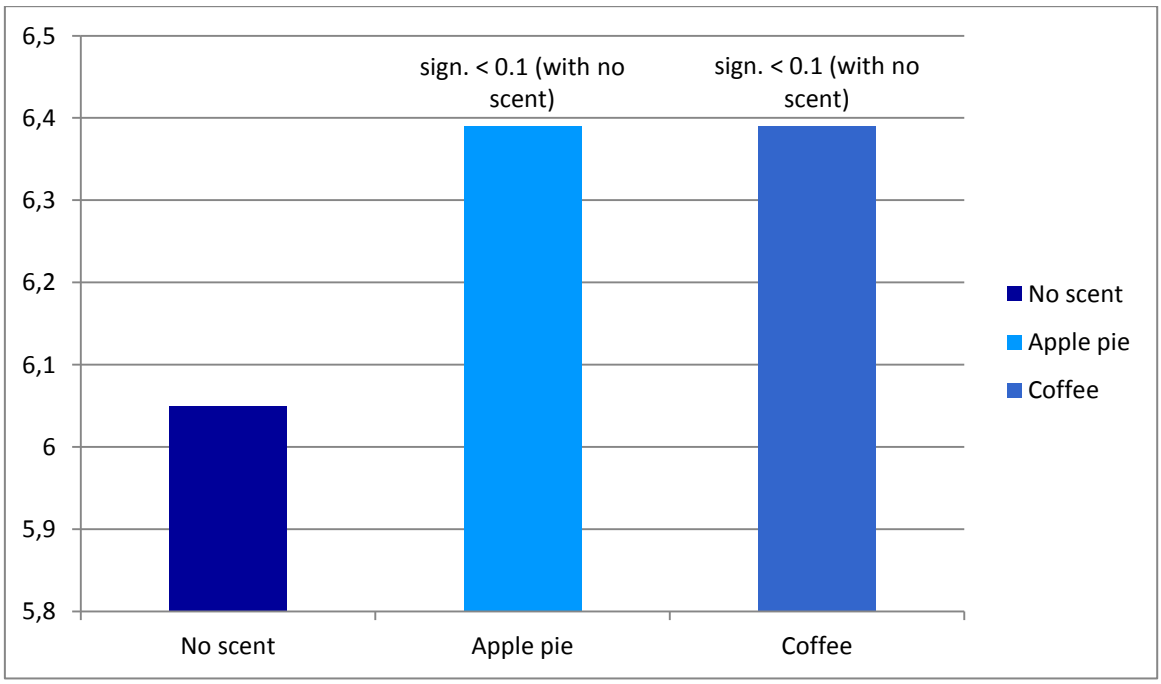


Figure 4: Difference in means for the evaluation of the overall assessment of the store at the significance level of 10%

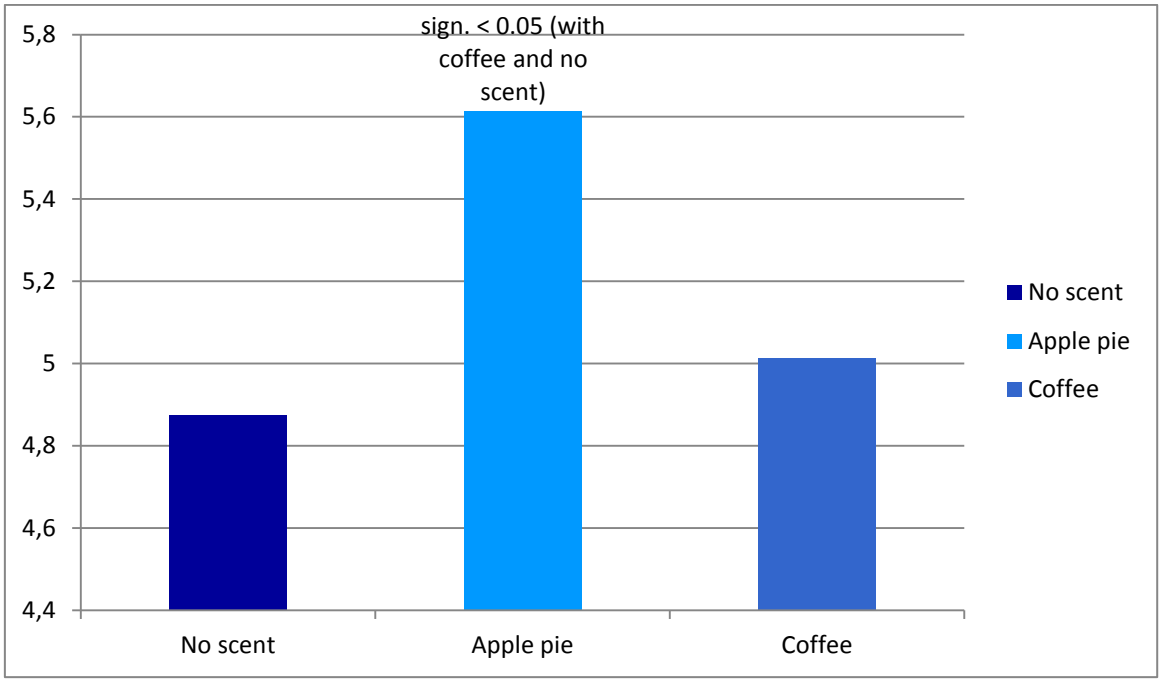


Figure 5: Difference in means for the evaluation of the store's products/offerings (value) at the significance level of 5%

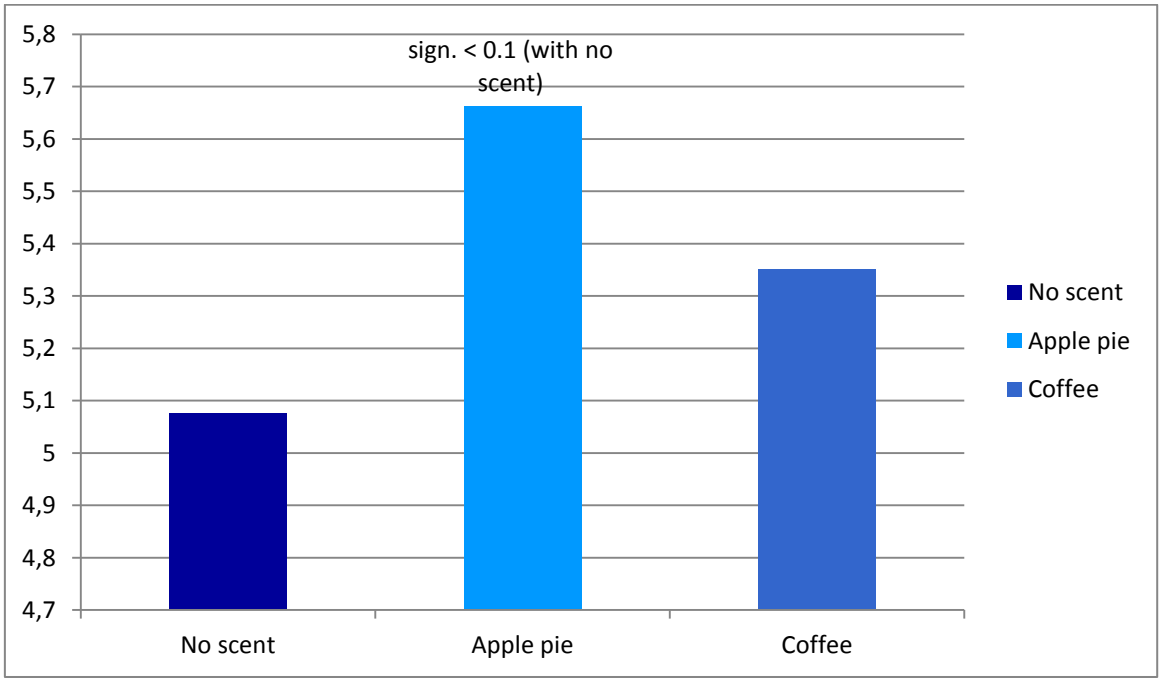


Figure 6: Difference in means for the approach behaviors at the significance level of 10%

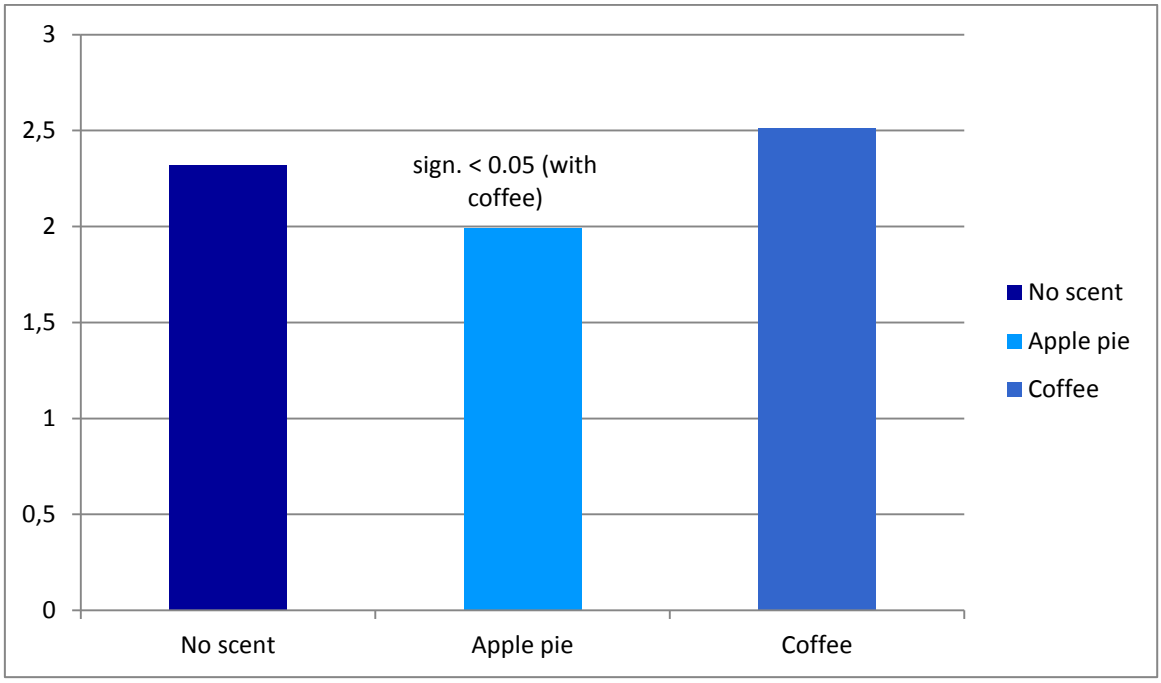


Figure 7: Difference in means for the avoidance behaviors at the significance level of 5%

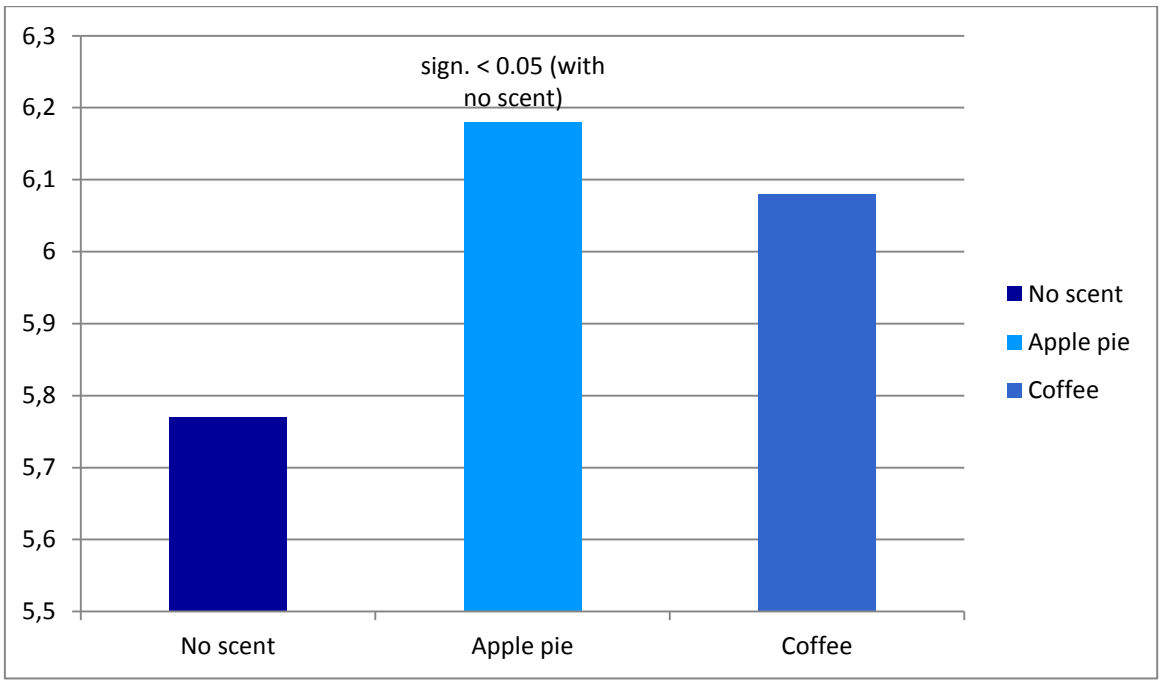


Figure 8: Difference in means for the word-of-mouth generation at the significance level of 5%

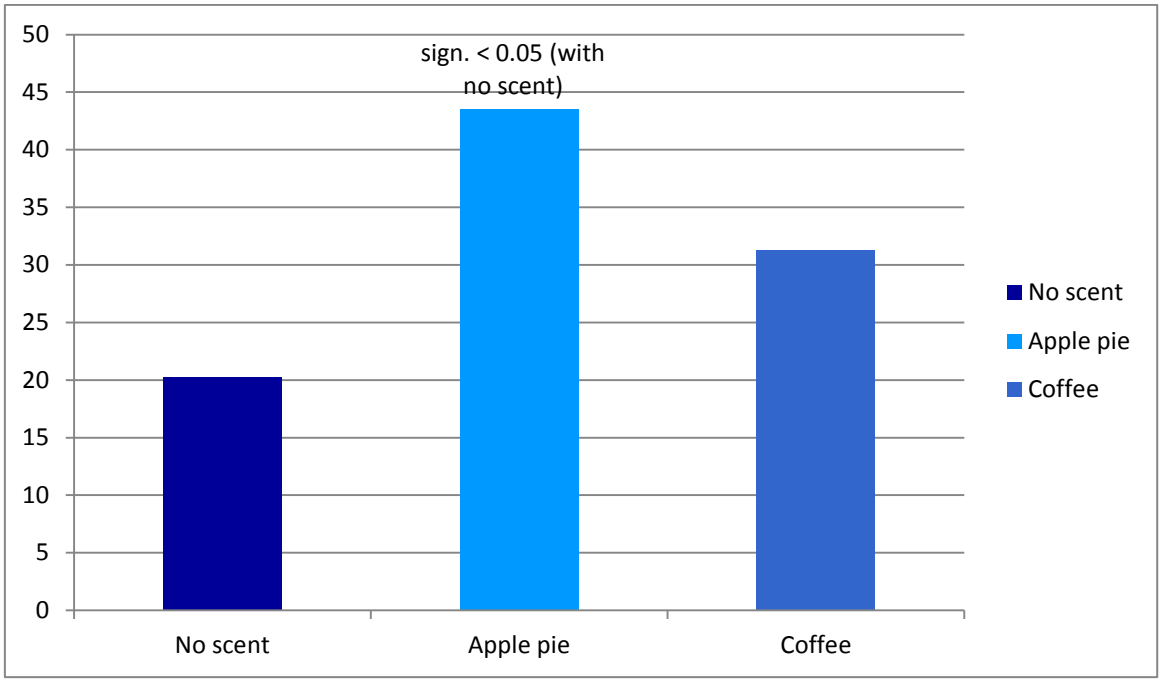


Figure 9: Difference in means for the average price of product(s) purchased at the significance level of 5%

Auteursrechtelijke overeenkomst

Ik/wij verlenen het wereldwijde auteursrecht voor de ingediende eindverhandeling:
The effects on customers' reactions of cross-modal (in)congruity between a store and a store atmospheric: a field experiment in a cookware store using ambient fragrance

Richting: **Master of Management-International Marketing Strategy**
Jaar: **2014**

in alle mogelijke mediaformaten, - bestaande en in de toekomst te ontwikkelen - , aan de Universiteit Hasselt.

Niet tegenstaand deze toekenning van het auteursrecht aan de Universiteit Hasselt behoud ik als auteur het recht om de eindverhandeling, - in zijn geheel of gedeeltelijk -, vrij te reproduceren, (her)publiceren of distribueren zonder de toelating te moeten verkrijgen van de Universiteit Hasselt.

Ik bevestig dat de eindverhandeling mijn origineel werk is, en dat ik het recht heb om de rechten te verlenen die in deze overeenkomst worden beschreven. Ik verklaar tevens dat de eindverhandeling, naar mijn weten, het auteursrecht van anderen niet overtreedt.

Ik verklaar tevens dat ik voor het materiaal in de eindverhandeling dat beschermd wordt door het auteursrecht, de nodige toelatingen heb verkregen zodat ik deze ook aan de Universiteit Hasselt kan overdragen en dat dit duidelijk in de tekst en inhoud van de eindverhandeling werd genotificeerd.

Universiteit Hasselt zal mij als auteur(s) van de eindverhandeling identificeren en zal geen wijzigingen aanbrengen aan de eindverhandeling, uitgezonderd deze toegelaten door deze overeenkomst.

Voor akkoord,

Baleau, Fiona

Datum: **19/08/2014**