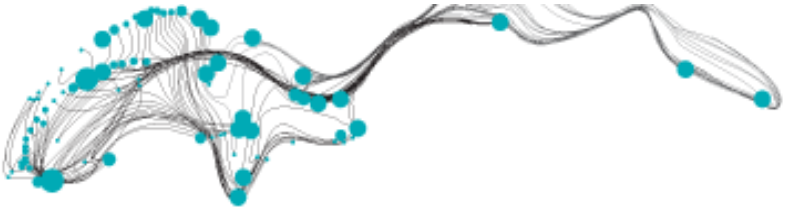


Reading scents - The effect of written scent references in advertisements

Master Thesis Communication Studies

Svenja Breulmann

Student number: s1167642

First examiner: Dr. Anna Fenko

Second examiner: Dr. Svetlana Bialkova

University of Twente

Date: 31 July 2013

Abstract

Olfactory cues in advertisements have been shown to increase memory for product information and to evoke positive emotions and attitudes. Yet including a real scent is not always feasible and it has been suggested that appealing to the olfactory sense by other cues could produce similar effects. Therefore, the current research investigated the effect of written scent references in advertising on memory, affective response, attitude towards the ad and attitude towards the brand. The Elaboration Likelihood Model suggests that the reaction to advertising cues depends on the level of motivation with which a person evaluates the information in the advertisement. For this reason, we expected that in the high motivation to process condition the written scent reference would have a positive effect if it is relevant for the advertised product (e.g. scent is the primary product attribute) and a negative effect if it is not relevant for the product (e.g. scent is an unimportant product attribute). In the low motivation to process condition we assumed that the written scent reference would have a positive effect independent of the type of product that is being advertised.

In a pretest, soap and pen were selected to represent products with scent as a relevant and irrelevant product attribute. In the main study (N = 197) participants' level of motivation to process was manipulated and subsequently they were exposed to different advertisements for fictive brands. Contrary to our expectations, no effect on memory was observed. Also, in the high motivation to process condition the written scent reference had no significant effect. However, in line with our expectations, in the low motivation to process condition, the written scent reference had a positive influence on the dependent variables for both products. It was concluded that a written scent reference is only effective when no conscious evaluation of the ad takes place and in this condition it could function as a peripheral cue.

For advertisers, appealing to the sense of smell by a written scent reference could be a possibility to include scents in advertisements where including an actual scent would be impossible. Moreover, nowadays consumers barely pay attention to advertisements but a written scent reference could still be a way to influence affective responses and attitudes even in a cluttered advertising environment without getting the consumers' full attention.

Table of Contents

Introduction

In the last decade, multisensory research has increasingly gained popularity and has caused a growing interest in the field of sensory marketing among academics and practitioners. Krishna (2012) defined sensory marketing as "marketing that engages the consumer's senses and affects their perception, judgment and behavior" (p.2). More and more marketers have come to an understanding that consumers experience products with all their senses (Schifferstein & Spence, 2007) and abandoned the idea that "we see colors only with our eyes, that we feel softness only with our fingertips, and that we taste the crunch of a potato chip only with our mouths" (Spence, 2012, p.1). For example, it has been found that the perceived crispiness and staleness of potato chips was a function of the sound the chips made when biting into it (Zampini & Spence, 2004).

Product designers have tried to capitalize on this knowledge and have used sensory cues to convey certain attributes of their brand or product (e.g. quality, taste, sophistication, innovativeness) or to influence consumer's perceptions and judgments about products. For example, consumers of wine usually infer the quality to some extent from the packaging of the beverage; e.g. wine that is sold in glass bottles is mostly considered to be of better quality than wine sold in cartons (Spence & Gallace, 2011). Moreover, thick plastic with rounded shapes that produces soft sounds might be more likely to enhance perceived softness of personal care products than a cold metal can with sharp edges (Schifferstein & Spence, 2007). Also, fabric swatches were perceived as significantly softer when an odor emanated from it (Demattè, Sanabria, Sugarman & Spence, 2006).

There are many studies that relate multisensory cues to product perceptions and evaluations and product designers and marketers are increasingly experimenting in this area (Ludden & Schifferstein, 2009). One famous example is Alessi's "Mary Biscuit" designed by Stefano Giovannoni. In contrast to traditional biscuit boxes, this special one is made of plastic, has round edges and resembles the shape of a pillow. Besides, it feels soft and warm when you touch it and produces only soft noises when it is opened or put down. By stimulating audition and touch the box is said to convey friendship and warmth. Additionally, the box is impregnated with a vanilla odor that becomes apparent when opening it. The smell is supposed to enhance the cookie eating experience as well as inducing past memories of visits to one's grandmother for instance (Schifferstein & Spence, 2007).

Apart from its importance for product design, multisensory marketing is increasingly seen as a mean to enhance advertising effectiveness. Today, consumers are bombarded with a vast quantity of information about products available in the marketplace anywhere they go. Companies and brands must work harder than ever to cut through this information clutter to differentiate themselves and gain the attention of the consumer. In this context, multisensory cues in marketing communications appear to be gaining importance (Lwin, Morrin, & Krishna, 2010). Facilitated by technological advancements, new possibilities to include multisensory stimuli in advertising emerged. For example, print advertisements can have a specially designed paper to replicate certain textures or product scents embedded. Some even included taste-test strips (Lwin et al., 2010).

Scientific literature about multisensory marketing suggests that memories of scents tend to persist over long time periods and that oftentimes people associate scents with emotional experiences (Krishna, 2012). Marketers have sought to capitalize on this idea in an attempt to make advertisements more distinct and more memorable by including olfactory cues such as scented panels. Moreover, scent cues have been assumed to elicit stronger and more favorable feelings for the ad and the brand than pictorial cues, for instance (Lwin & Morrin, 2012). Nevertheless "relatively little attention is paid to the information processing implications of acoustic, haptic, gustory, and olfactory input" (Lwin et al., 2010, p. 317). Thus, this current paper tries to shed some light on the use and effects of olfactory cues in advertising.

Theoretical background

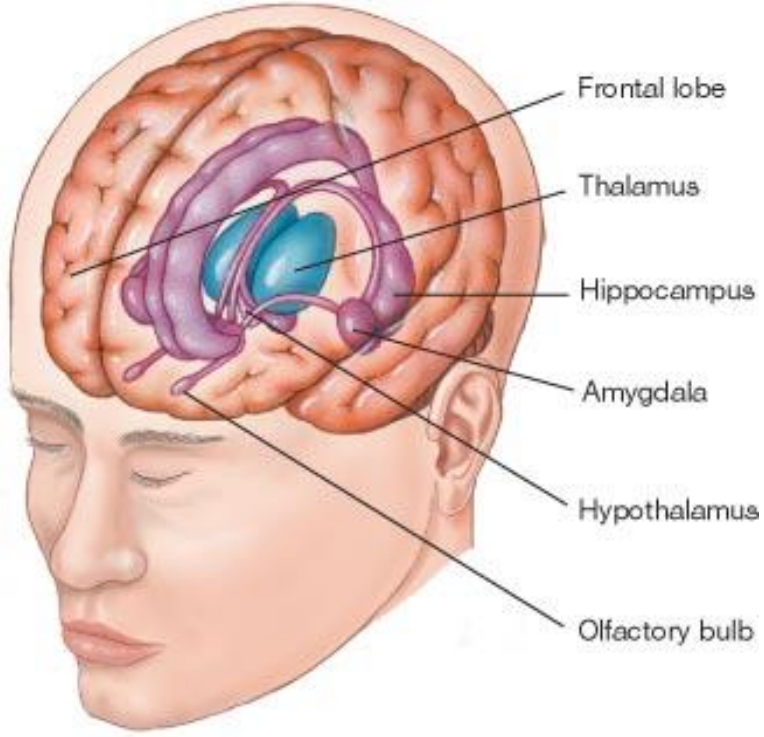
Very often the words “smell” and “scent” are used interchangeably. According to Merriam Webster’s Collegiate Dictionary (2013) both words refer to “the quality that makes a thing perceptible to the olfactory sense. However, while “smell solely implies the sensation without suggestion of quality or character (an odd smell permeated the room), scent applies to the characteristic smell given off by a substance, an animal, or a plant (the scent of lilacs)”. To put in other words, scent describes the distinctive smell of something, while smell is more unspecified. For this reason, this paper will use the term “scent”, because it is about concrete scents respectively written scent references used in advertisements.

The physiology of olfaction

Olfaction is probably the most complex human sense. There are “some 1000 different genes that encode distinct scent receptors” (Krishna, 2012, p.8) which enables humans to smell around 10.000 different scent nuances (Krishna, 2012). As the above mentioned example of “Mary Biscuit” already implied, scents are commonly associated with autobiographical memories often related to emotional experiences and tend to persist over long time periods. Neuroscience helps to explain why encoded information that relates to olfaction appears to be more enduring and long-lasting than information encoded with other sensory stimuli.

Primarily this relationship exists because of the physical and neural closeness of the cerebral systems associated with olfaction and memory, i.e. between the olfactory bulb and the hippocampus (see figure 1) (Krishna, 2012). For this reason, humans have the ability to distinguish among different scents and recognize previously smelled odors even after long time periods (Schab & Crowder, 1995). Memories of scents thus are more persistent and less likely to fade than memories related to other sensory modalities (Krishna, 2012). Besides its proximity to the memory, the olfactory bulb is also closely connected to the cerebral system responsible for the processing of emotional responses, the amygdala (see figure 1) (Cahill, Babinsky, Markowitsch, & McGaugh, 1995). Herz (2004) for example found that memories which were induced by scent cues were more emotional than memories triggered by other cues. For this reason, the sense of smell is commonly considered an emotional sense (Schifferstein & Spence, 2007).

Figure 1. The human brain



Note. Taken from: Aimée (2009, October 18). Anxiety and our brains – part 4: The limbic system [Web log post]. Retrieved from: http://anxiousnomore.blogspot.de/2009/10/anxiety-and-our-brains-part-4-limbic.html

Olfaction and memory

The physical construction of human brains apparently makes memories of olfactory stimuli decay much less and much slower than those of other sensory inputs over time. From this it has been followed that olfaction, in comparison to other sensory modalities, might be especially effective at enhancing memory for associated information about products (Lwin et al., 2010). For example, Lwin et al. (2010) explored whether scents, compared to pictures, could improve recall of verbal information in an advertisement. The researchers manipulated the presence or absence of olfactory stimuli and pictorial stimuli and measured the impact on verbal recall immediately after exposure and after a two weeks delay. Participants were exposed to one of two versions of a direct mailer insert, advertising a fictive brand of moisturizer. Findings suggest that scents, similar to pictures, enhance the ease with which verbal information in the advertisement is retrieved. Participants in the scent condition were able to enumerate more attributes related to the product than those in the no-scent condition. Additionally, the researchers observed that unlike pictorial input, the effect of olfactory

stimuli appears to be greater after some time delay. This means that in the scent condition, participants recalled the information even after some time delay, while pictures did not help recall over time. Lastly, they also showed that one can better remember a picture in an ad for instance if that ad included a smell as well. Moreover, the researchers proposed a potentiating effect, meaning that the ability of visual input in advertisements to improve memory for verbal information is even enhanced (e.g. potentiated) by a scent: "scents may act as a 'smell in the head' that similarly enhance recall of verbal information and also have the capacity to potentiate the effect of pictures on recall" (Lwin et al., 2010, p. 325).

Krishna, Lwin and Morrin (2010) investigated potential effects of scent on consumer memory for associated product information without other modalities involved. Even though their stimulus material was not an actual advertisement, the conclusions can still be applied to advertisements. Scented vs. unscented pencils, a product category which primary attribute is not scent, served as the stimulus materials. Along with the pencils, participants received information about the product (e.g. endorsed with the Green Seal environment standard, contains superior graphite lead, etc.). Then, participant's performance on unaided recall tests immediately after exposure to the pencil product, after a short delay of 24 hours and after a long delay of two weeks was compared. The findings indicated that product scent appeared to increase unaided recall of product information and that this effect would persist over time. Thus, the study proved that a positive relationship between the two variables exists, i.e. memory for associated product information is increased when it is encoded together with a scent.

In sum, what these studies imply for advertisers is that scents might help to cut through the information clutter and help enhance consumer's recall of verbal (and also visual) product and brand information presented in advertisements (Krishna, 2012). The effect has been shown to occur not only for products where scent is the primary attribute (e.g. moisturizer) but also for products which primary characteristic is something different than odor (e.g. pencils) (Krishna et al., 2010). Besides, the memory effect occurred without a reintroduction of the scent as a retrieval cue (i.e. unaided recall). This implies that memory enhancement is a result of sensory input at encoding, i.e. the concurrent encoding of scent-related information at the time of exposure to the advertising information (Krishna et al., 2010).

Olfaction and affective response, attitude towards the ad and attitude towards the brand

Peter and Olsen (2002) defined an affective response as an emotion, a particular feeling, a mood or an evaluation that may differ in terms of arousal and intensity. In the literature, a positive affective response is assumed to affect attitudes and behaviors (Peck & Wiggins, 2006). More specifically, it has been shown that inducing a positive affective response in a person has the potential to reinforce his/her attitude towards an ad and also the attitude towards the brand (Batra & Ray, 1986; Brown, Homer, & Inman, 1998). Both outcomes, e.g. a favorable attitude toward the ad and the advertised brand, are desirable goals which advertisers strive to achieve, especially because of the assumed relationship between attitudes and purchase intention (Ajzen, 1991).

Krishna (2010) suggested that "given the amount of advertisements (ads) that consumers see every day for the thousands of products that are available in the marketplace, it seems that unconscious triggers, like those appealing to the basic senses, may be a more efficient way to appeal to consumers" (p.3). One possibility of evoking a positive affective response is through the sense of smell (Magnini & Karande, 2010). Responses to odors are primarily automatic and stimulate the part of the brain associated with emotional responses (i.e. limbic system) (Ellen & Bone, 1998). In comparison with other sensory modalities, it seems that when scent-related information is encoded it tends to have a stronger association with emotional experiences (Lwin & Morrin, 2012). Therefore, it has been claimed by some authors that there is no other human sensory modality whose perception is as strongly correlated to emotional responses as the sense of smell (Schifferstein & Tanudjaja, 2004). Besides, apart from its ability to enhance memory and recall of associated information, scents are commonly considered to positively influence consumer's attitudes and brand equity and to evoke emotions (Krishna, 2010; Schifferstein & Spence, 2007).

Following this notion, Schifferstein and Desmet (2007) examined the role the different human senses play on people's perception of various everyday products by blocking one of the senses. They found out that when participants were not able to smell the product, the functional judgment of the product did not suffer but the emotional product experience was affected negatively.

Moreover, scent cues have been assumed to elicit stronger and more favorable feelings for the ad and the brand than pictorial cues, for instance. A study of Lwin and Morrin (2012) manipulated scent and picture conditions in a 30-second commercial with the same verbal

information about a fictive spa. After a short delay of five minutes, participants were asked to evaluate the brand and their feelings towards it. The results suggested that although both stimuli (scent and picture) induced a more positive affective evaluation of the advertised brand, the olfactory stimulus had a significantly greater effect. More importantly, the findings revealed that only the presence of a scent could significantly alter consumer's feelings towards the brand. The researchers conclude that "scent creates more emotionally charged memory traces compared with input from the other sensory modalities, in this case, vision, and thus creates stronger feelings for the brand" (p.5).

However, a study of Ellen and Bone (1998) yielded contradictory results. They examined the impact of scented scratch-n-sniff panels in print advertisements on attitude towards the ad. The results indicated that when the scent was congruent with the picture (e.g. floral scent/floral picture) this had no significant effect on attitude. Incongruent scented panels however might induce a negative response. Attitude formation might thus be a function of (in)congruency of the scent with the product that is being advertised.

All in all, there seems to be some reason to believe that olfactory cues in advertisements could positively impact an individual's affective response, attitudes towards the advertisement and the evaluation of the brand. Nevertheless, there are not many studies that examine this relationship and consensus is not yet achieved in this regard.

Written scent references in advertising

The previous discussion implied that including scents in product designs or advertisements appears to be beneficial for companies, because scents enable consumers to recall the information that is presented along with the scent more easily and they presumably cause more favorable attitudes towards the ad and the brand and they elicit positive affective responses. However, adding scent to an advertisement might not be feasible that easily, for example in the case of online advertisements. As an alternative, advertisers might consider making people think of a scent by means of other cues, i.e. stimulating sensory imagery (Schifferstein & Spence, 2007).

One possibility could be to employ words that are loaded with scent associations, i.e. provide a written description of the scent. Reading odor related terms (e.g. cinnamon, garlic, jasmine) has been shown to activate olfactory brain regions (González et al., 2006). In a similar vein, Stevenson and Case (2005) proposed that imagining a scent can produce effects similar to

actual perception of the odor. Maybe, if written olfactory information stimulates the cerebral area associated with olfaction, the same memory effects for concurrent encoding of product information as described earlier occur. For advertisers this would be a valuable insight. Not only would this be a possibility to include scents in advertisements where including an actual scent would be impossible (e.g. online advertising) but it would also provide a lower-cost alternative to more expensive options such as scented panels or paper imbued with a scent. However, there is no empirical evidence to prove the existence of such a relationship.

A study of Magnini and Karande (2010) explored the effect of a written scent reference ("Enjoy the fragrant mountain air") in an ecotourism advertisement on the affective response to the ad. The findings revealed that respondents evaluated the ad with the scent reference significantly more favorably than its counterpart without such a reference. This is a promising result, but further research needs to extend the findings to other product categories for instance.

The different findings from outlined studies indicate that written scent references in advertisements seem to bear some potential for advertisers. A written scent reference might make recall of information presented in the ad more easily. Moreover, it might evoke a positive affective response in the viewer as well as a positive attitude towards the ad and towards the brand.

Relevance of the written scent reference

As the results of the study of Ellen and Bone (1998) implied, advertisements that include a scent cue do not result in a positive affective response and a positive attitude towards the ad and the brand per se. As Schifferstein (2006) explored, there are products which primary attribute is scent (like personal care products) and there are others (like hi-tech or work and leisure products) where scent is virtually unimportant. Accordingly, a scent reference is more relevant for products which have scent as an essential attribute and less relevant or even irrelevant for products for which scent is not a decisive attribute. Studies have shown that when additional information in an advertisement, such as a written scent reference in this case, is perceived as relevant, it is likely to have a positive effect on the viewer's affective response (Heckler & Childers, 1992; Lee & Mason, 1999). Conversely, when the information is perceived as irrelevant this has been shown to negatively affect evaluation of the ad (Heckler & Childers, 1992; Lee & Mason, 1999). Following this reasoning, for products

which have scent as a primary product attribute, like personal care products for instance (Schifferstein, 2006), a written scent reference would be more relevant and thus result in a more favorable affective response, attitude towards the ad and towards the brand than for products where scent is not a decisive product attribute.

The effect of motivation to process

The previous section described that affective response and attitude formation towards the ad and the brand seem to depend on the relevance of the written scent reference for the product that is being advertised. However, the effect of a written scent reference might also be influenced by a person's motivation to process the information (Ellen & Bone, 1998) as will be discussed next.

The Elaboration Likelihood Model (ELM) posits that there are two ways in which advertising cues can influence attitudes (Petty & Cacioppo, 1986). The first one is the so called central route. In this situation, the consumer carefully considers and evaluates the arguments and information included in the message. The ad element is seen as a message argument, which provides information about the advertised product or service (Ellen & Bone, 1998). When the consumer applies the other possibility, the peripheral route, no active information processing or elaboration takes place and attitude formation is based on peripheral cues, like the attractiveness or likability of the source (Petty & Cacioppo, 1986). These nonmessage elements do not provide information about the advertised product or service but evoke positive feelings on a more subconscious level (Ellen & Bone, 1998). In support of this, Janiszewski (1988) found that attitude formation can also occur on a subconscious level and independent of conscious evaluation. According to the ELM, the level of elaboration depends on two factors, namely the motivation and ability to process the information (Petty & Cacioppo, 1986). In their article MacInnis and Jaworski (1989) defined motivation as "the desire to process brand information in the ad" (p. 4). This definition of brand evaluation as the object of motivation is adopted for this research. A person's motivation to process all the information depends on several factors, like involvement for instance (Belch & Belch, 2007).

Research model and hypotheses

The preceding discussion showed that scent cues in advertisements such as scented panels appear to make information presented to the consumer more memorable and easier to retrieve. Also, scents might elicit more favorable affective responses and attitudes towards the ad and towards the brand. Moreover, there seems to be some potential in the idea to include written scent references in advertisements, because it has been found that reading words with strong olfactory associations activates the same brain regions as a real scent (González et al., 2006) and that imagining a scent has similar effects as actual perception of the odors (Stevenson & Case, 2005). Therefore, this research investigates two main things. First, it explores if written scent references in advertisements do have the same memory enhancing effects as a physically present odor. Second, it is investigated if written scent references are able to influence affective responses and attitudes and if this influence depends on the relevance of the written scent reference for the advertised product and the person's motivation to process the information in the ad (see figure 2).

First of all, with regard to memory, the effect of physically present scents has been shown to occur not only for products where scent is the primary attribute (e.g. moisturizer) but also for products which primary characteristic is something different than odor (e.g. pencils) (Krishna et al., 2010). Therefore it is assumed that a written scent references in advertisements enhances memory for product information in advertisements independent of the importance of scent as a product attribute (i.e. the relevance of the written scent reference) and the first hypothesis is stated as follows:

> H1: Written scent references in advertisements enhance memory for product information.

Second, the impact of a written scent reference in advertisements on affective response and attitudes is investigated. More specifically, it is expected that under the central route, when the person is motivated to process the information in the advertisement and the scent reference provides relevant information about the product in the ad (e.g. it is a product where scent is the primary product attribute), a positive affective response and favorable attitude towards the ad and towards the brand will occur (Brown et al., 1998). On the contrary, when scent is not an essential attribute of the advertised product (e.g. a pencil, TV, mobile phone), a scent reference would not add any information about the product and it might cause irritation or incomprehension on behalf of the consumer (Ellen & Bone, 1998; Heckler & Childers, 1992; Lee & Mason, 1999). In this case the written scent reference is expected to have the

reversed effect and the affective response, attitude towards the ad and the brand are expected to be negative. In sum it is expected that:

H2: When motivation to process is high and the written scent reference in the advertisement is relevant for the advertised product

a) affective response will be positive.

b) attitude towards the ad will be positive.

c) attitude towards the brand will be positive.

H3: When motivation to process is high and the written scent reference in the advertisement is not relevant for the advertised product

a) affective response will be negative.

b) attitude towards the ad will be negative.

c) attitude towards the brand will be negative.

If however, the motivation to process the information is low, i.e. under the peripheral route, a scent reference might evoke a positive affective response independent of the type of product that is advertised, e.g. independent of the relevance of the written scent reference, because the person does not evaluate whether the scent reference is relevant or irrelevant information. Due to the close correlation of olfactory cues and emotions in humans, the scent reference could function as a subconscious ad element that evokes positive feelings (Ellen & Bone, 1998; Janiszewski, 1988) as the peripheral route of the ELM suggests. Consequently, in this situation affective response, attitude towards the ad and towards the brand are expected to be positive. Based on this line of reasoning, the research hypotheses are as follows:

H4: When motivation to process is low and the written scent reference in the advertisement is relevant for the advertised product

a) affective response will be positive.

b) attitude towards the ad will be positive.

c) attitude towards the brand will be positive.

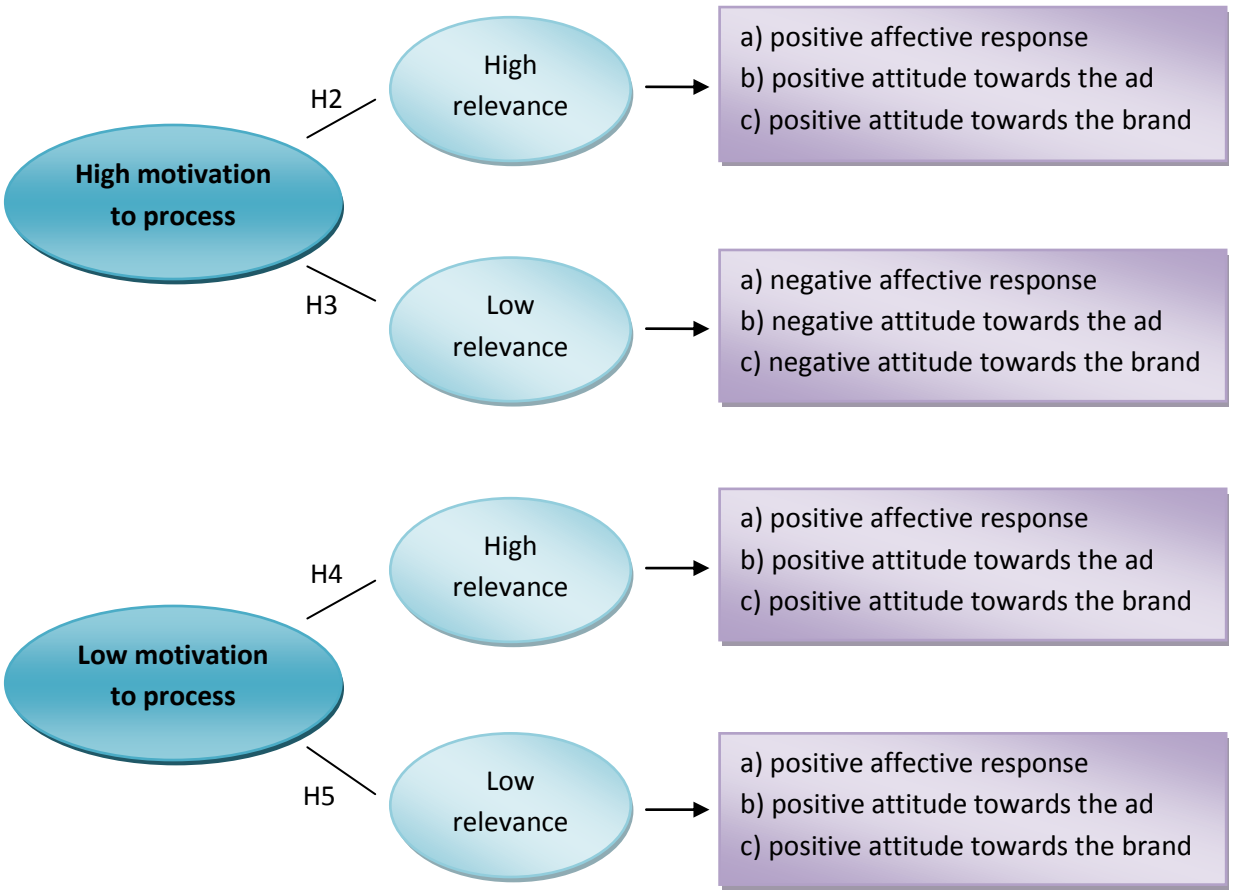
H5: When motivation to process is low and the written scent reference in the advertisement is not relevant for the advertised product

a) affective response will be positive.

b) attitude towards the ad will be positive.

c) attitude towards the brand will be positive.

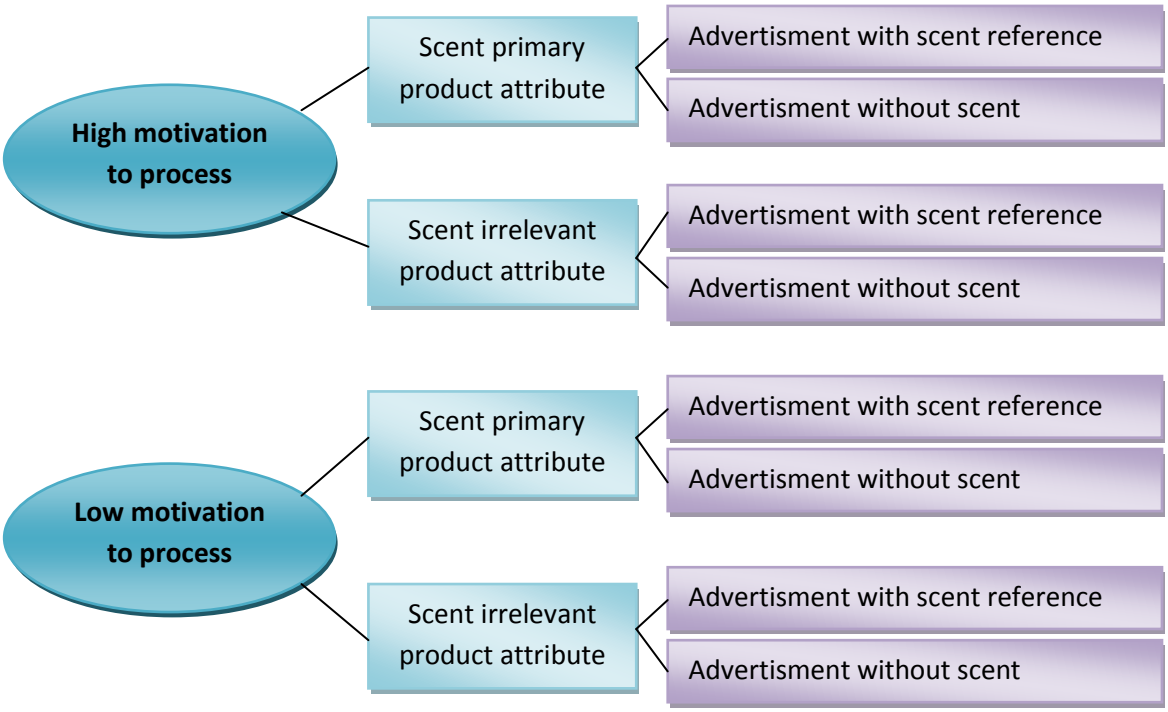
Figure 2. Research model



Method

In order to investigate the assumptions, the study had a 2 (high vs. low motivation to process) x 2 (relevant vs. irrelevant scent reference) x 2 (advertisement with and without scent reference) factorial design. All three factors functioned as between-subject factors. Thus in total, there were eight different conditions as figure 3 shows.

Figure 3. Research conditions



Pretest

As Schifferstein (2006) suggested, there are products whose primary product attribute is scent. Previous studies indicate for example, that moisturizers or facial tissues belong to this kind of products (Krishna et al., 2010). Accordingly, these could be products where a written scent reference is relevant, because scent plays an important role in product evaluation (Lwin et al., 2010; Lwin & Morrin, 2012). On the contrary, a pencil could be chosen as a product, where scent is relatively unimportant and not relevant for product evaluation (Krishna et al., 2010). To find the two products that differ in their importance of scent as a product attribute and to make sure that the manipulation in the main study would be effective, a pretest was administered.

Products

Products included in the pretest had to fulfill the following requirements:

- Products needed to be unisex, e.g. used by both men and women, because in the main study, the advertisements will be assessed by a mixed sample (cf. Schifferstein, 2006)
- With regard to the memory test, the products needed to possess certain features/attributes that can be communicated in an advertisement
- Products with high relevance of scent and products with low relevance of scent should be able to contain the same scent
- Adding a scent to a products from the category where scent is mostly irrelevant should not be too absurd
- Products should be low involvement products (cf. Laurent & Kapferer, 1985)

Based on a brainstorming among members of the researcher's social network, sixteen products were selected for the pretest (see table 1).

Table 1.

Selected products for the pretest.

Products where scent is relevant	**Products where scent is mostly irrelevant but could be added**
Shower gel	Garbage bag
Air freshener	Biscuit box
Dish liquid	Toilet paper
Shampoo	Paper tissue
Soap	Hairbrush
Cleaning agent	Candle
Bed linen	Pen
Bath towel	Sunglasses

Questionnaire

The method used by Schifferstein (2006) was used in the current pretest. Respondents were informed that the goal of the survey was to investigate the role of the different senses for the evaluation of products during usage. For each product, respondents indicated on five-point Likert scales (1 = *not important* at all to 5 = *very important*) how important it is for them how the product feels/smells/looks/sounds. Taste was not included, because none of the selected products was supposed to be put in the mouth. Moreover, it was specified in the instructions that "not important at all" would be for an aspect they never pay attention to or if it is irrelevant (such as sound for a candle for example) while "very important" should be ticked if

it is the aspect they pay attention to first and is most decisive for the product evaluation. The complete questionnaire can be found in Appendix 1.

Respondents

Paper questionnaires were distributed among members of the researcher's social network. 23 persons participated in the pretest. 43.5% of the respondents were male, the remaining 56.5% were female; thus the male/female ratio was approximately balanced. The age of the respondents ranged from 18 to 56 years and on average respondents were 29.48 years old (*SD* = 8.55).

Results

The aim of the pretest was to find two products for the main study. One product which primary product attribute is scent and influences product evaluation decisively and one product where not scent but another modality (e.g. vision, touch or sound) is the most important product attribute. The products that scored highest on scent importance were air freshener (*M* = 4.91, *SD* = 0.29), soap (*M* = 4.78, *SD* = 0.52) and shampoo (*M* = 4.74, *SD* = 0.45). The products with the lowest scores on the importance of scent were sunglasses (*M* = 2.26, *SD* = 1.25), pen (*M* = 2.30, *SD* = 1.15) and hairbrush (*M* = 2.48, *SD* = 1.12). Table 2 provides an overview of the descriptive statistics.

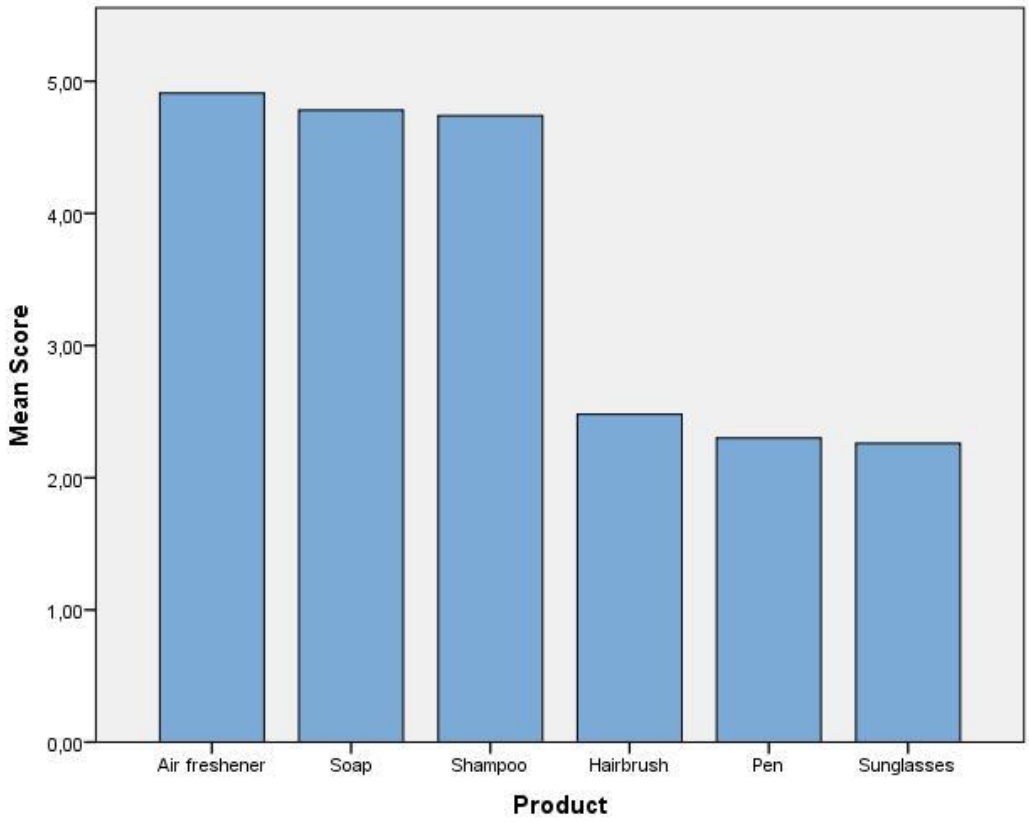
Table 2.

Importance of scent for different products

Product	**M**	**SD**
Air freshener	4.91	0.29
Soap	4.78	0.52
Shampoo	4.74	0.45
Shower gel	4.65	0.57
Bed linen	4.43	0.51
Bath towel	4.43	0.59
Dish liquid	4.39	0.58
Candle	4.09	0.95
Cleaning agent	4.04	0.71
Paper tissue	3.78	0.90
Biscuit box	3.22	1.17
Toilet paper	3.13	1.10
Garbage bag	2.70	1.52
Hairbrush	2.48	1.12
Pen	2.30	1.15
Sunglasses	2.26	1.25

In a first step, one-factor ANOVA with the six products (e.g. the three with the highest and the three with the lowest score) as within-subjects factors and importance of scent as dependent variable and post-hoc Bonferroni adjustment was conducted. The analysis showed that scent was equally important for the "scent-products" air freshener, soap and shampoo, thus no significant differences were found between these three products (p's > .05). The same was found for the three products that scored lowest on scent, sunglasses, pen and hairbrush (p's > .05), i.e. scent was equally unimportant. Follow-up t-tests showed that the three "scent-products" differed significantly from the three "non-scent products" on scent importance (see appendix 2). For example the importance of scent as a product attribute for an air freshener was significantly higher than for a hairbrush, a pen and sunglasses. This means that these six products are equally suitable for the main study so far, because they differ significantly with respect to their importance of scent as a product attribute (see figure 4).

Figure 4. Importance of scent for the six products



In a second step, the products were analyzed separately, to check whether scent is the most important product attribute for the "scent-products" (i.e. significantly higher from all other modalities) and whether scent is significantly less important than another modality for the "non-scent products" (see appendix 3). The results of the ANOVAs on scent importance reveal that scent is significantly more important than the other three modalities touch, sound and vision in case of the three "scent-products" air freshener (touch: $p < 0.001$, sound: $p < 0.001$, vision: $p < 0.001$) soap (touch: $p < 0.01$, sound: $p < 0.001$, vision: $p < 0.001$) and shampoo (touch: $p < 0.001$, sound: $p < 0.001$, vision: $p < 0.001$). Thus technically, all three products would be suitable for the main study. For the "non-scent products" the picture is slightly different. For the hairbrush, scent is not significantly less important than the other three modalities (p's > .05), which means that this product should not be used. However, for sunglasses (touch: $p < 0.001$, vision: $p < 0.001$) and pen (touch: $p < 0.001$, vision: $p < 0.01$), scent scored significantly lower than touch and vision. For both products, sound was equally unimportant as scent (p's > .05). Thus, in the case of sunglasses and pen, other modalities than scent are more important for product evaluation and the two products could be used in the main study.

Conclusion

The analysis showed that air freshener, soap and shampoo are products suitable to represent products with scent as the most important product attribute in the main study. In contrast, a pen or sunglasses could be used as a type of product, where scent does not play a decisive role in product evaluation. Based on these findings, soap was chosen to represent a product where scent is the primary product attribute and a pen was decided to be used as a product where scent is not a relevant product attribute.

Main study

For the main study a 2 (high vs. low motivation to process) x 2 (relevant vs. irrelevant written scent reference) x 2 (advertisement with vs. advertisement without written scent reference) between-subjects factorial design online study was set up.

Sample

In total, 225 people accessed the survey. Incomplete questionnaires were excluded so that the final sample used for statistical analysis included 197 people. Participants were almost equally distributed among the eight research conditions. Overall gender distribution was skewed towards female respondents (78.68%). On average participants were 33.16 years old (*SD* = 10.99). For more detailed information about the sample distribution and the demographical characteristics per research group see appendix 4.

Stimulus material

In the survey, each respondent was exposed to three different advertisements: first one filler advertisement than one of the four target advertisements, depending on the particular research condition, and again a second filler advertisement. In the following, the target advertisements will be discussed first and afterwards the filler advertisements will be explained.

Target advertisements. In the pretest, soap and pen were chosen as the two products which represent a product with scent as a primary product attribute and a product for which scent is an irrelevant product attribute respectively. Subsequently an advertisement was created for a fictive soap brand ("Savonel") and a fictive pen brand ("Skriptel").

Both advertisements were designed in a blue color scheme and only scent neutral pictures were used (e.g. water for the soap advertisement and paper for the pen advertisement) in order to rule out the alternative explanation that the picture and not the scent reference caused possible differences in the dependent variables (cf. Demattè, Sanabrina & Spence, 2009; Sakai, Imada, Saito, Kobayakawa, Deguchi, 2005). Additionally, the advertisements showed a picture of the product (e.g. a soap dispenser and a pen) with the brand name written on it and the ads included five product attributes each. The attributes used were common for the product type, because new or extraordinary could have biased the memory measurement. Finally, the headline contained the written scent reference. The scent reference was put in a prominent place so that participants would notice it. Possible scent words needed to be simple and concrete, so that the written scent reference would evoke associations. Jasmine, lemon or rose for example are scent words, with strong olfactory associations (Gonzáles et al., 2006).

For a complete list please look at appendix 5. It was decided to use “roses” in this study, because it was assumed that the scent of roses is very common and probably known by men and women. Finally, for each target product (e.g. soap and pen) two versions of the advertisement were created. One contained a written scent reference and the second was the same advertisement apart from that there was no written scent reference.

Thus in total, four target advertisements were created for the different research conditions. The two versions for the soap advertisement can be seen in figure 5 and the two versions for the pen advertisements in figure 6.

Figure 5. Target advertisement 1 (soap with written scent reference) and 2 (soap without written scent reference)

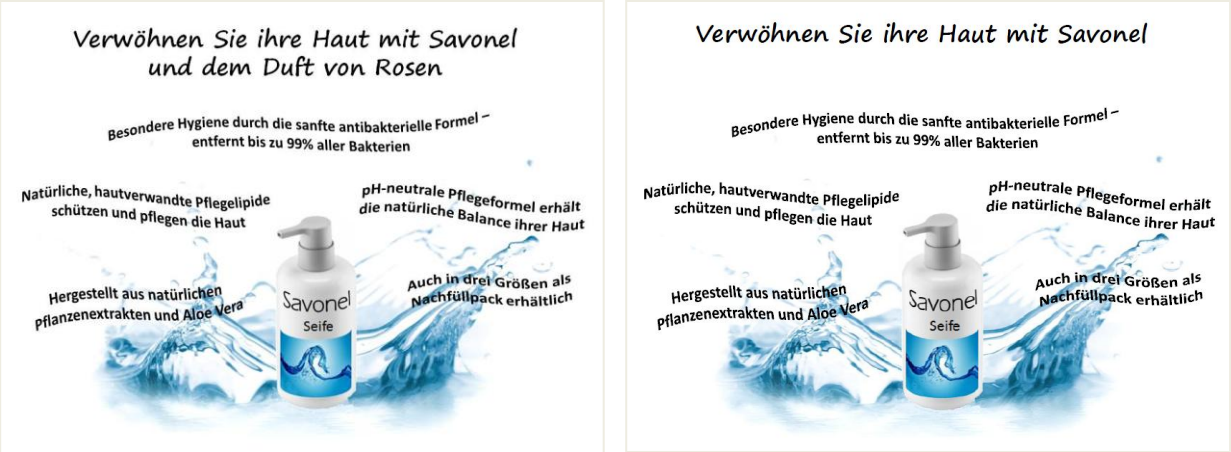


Figure 6. Target advertisement 3 (pen with written scent reference) and 4 (pen without written scent reference)

Filler advertisements. Depending on the particular condition, each participant was exposed to one of the four target advertisements shown before as well as to two filler advertisements; otherwise memory enhancing effects could hardly be measured. Thus, additional advertisements for a towel and for a thermos flask were designed and can be seen in figure 7. Similar to the target ads they contained a picture of the product with the fictive brand name, a headline and five product attributes. The products were randomly chosen; they only needed to be approximately in the same price range as soap and a pen.

Figure 7. Filler advertisement 1 (towels) and 2 (thermos flask)

Thus, in total each participant was exposed to three advertisements, the filler advertisements were the same for all of them, only the target ad differed according to the research condition (see figure 8).

Figure 8. Sequence of advertisements in the survey

The survey

The survey was pretested by three independent probes to check for clarity, text comprehension and question formulation. All scales and stimulus materials were translated into German by the researcher before, because the sample solely consisted of German speaking persons. Subsequently, the questionnaire was adapted according to the feedback of the probes. The complete survey can be found in appendix 6.

Memory. Each participant was exposed to three different advertisements, one target ad and two filler ads. Each ad contained five product attributes, thus in total there were 15 attributes. To test how well participants remembered the five attributes from the target advertisement (either soap or pen) they were presented a list with ten attributes and they were asked to tick those attributes they think were in the advertisement. The number of correctly indentified product attributes built the memory score, with 5 being the highest possible score as there were five attributes in the advertisement.

Affective response. Peter and Olsen (2002) defined an affective response as an emotion, a particular feeling, a mood or an evaluation that may differ in terms of arousal and intensity. According to the Stimulus-Organism-Response framework of Mehrabian and Russell (1974) individuals' emotional reactions can be classified along three primary dimensions, namely pleasure, arousal and dominance. The first dimension, pleasure, refers to whether or not something makes people feel happy, contended and satisfied. Arousal indicates how much the individual feels stimulated. Finally, dominance means the extent to which an individual feels dominant (e.g. in control) or submissive (e.g. under control) (Yalch & Spangenberg, 2000). Therefore, the PAD-scale of Mehrabian and Russell (1974) was used to measure those three dimensions as emotional reactions to the advertisement. The scale consisted of 18 five-point semantic differential items, six items for each construct. The six items composing the pleasure scale yielded a high reliability score of α = .83, the six items of the arousal scale an acceptable score of α = .70. From the dominance scale item one was not included in order to increase the reliability score to α = .68, which is still rather mediocre. All reliability scores can be found in table 3. Responses to the items were averaged in order to receive a composite score for pleasure, arousal and dominance each.

Attitude towards the ad. Mitchell and Olsen (1981) suggested that attitude towards the ad represents the person's evaluation of the overall advertising stimulus. To measure this construct, Lee and Mason's (1999) scale was used. Respondents were asked to indicate their level of agreement on a five-point Likert scale (1= *completely disagree* to 5 = *completely*

agree) with five statements, namely: I like the ad; the ad is appealing to me; the ad is attractive to me; the ad is interesting to me, I think the ad is bad. Cronbach's alpha for the five items was high at α = .94. Responses to these five items were averaged, with item 5 reversely coded, in order to create an overall composite attitude towards the ad index.

Attitude towards the product. In this study fictive brands were used, because otherwise preexisting attitudes and opinions might have biased the outcomes. Therefore rather than attitude toward the brand, the participants' attitude towards the product was measured. Attitude towards the product can be defined as an individual's internal evaluation of the product (Mitchell & Olsen, 1981). Peracchio and Meyers-Levy's (1994) scale, which measures a person's evaluation of a product was used. Originally, the scale consisted of nine five-point semantic differential items. One item was deleted from the scale, namely "well made vs. poorly made" because the products in questions (e.g. soap and pen) do not require crafting skills and therefore it would be useless to ask this question. The remaining eight items yielded a high reliability score of α = .91. Again, responses were summed and averaged to form a total attitude towards the product score.

Purchase intention. Attitudes are assumed to influence behavior. More precisely, in the framework of Fishbein and Ajzen (1975) attitudes determine behavioral intentions relative to the object and Batra and Ray (1986) suggested that affective responses influence purchase intentions. Therefore as a further dependent variable respondents were asked about their inclination to purchase the product. Based on Baker and Churchill (1977) participants gave their level of agreement with four questions on a five-point scale (1 = *definitely not* to 5 = *definitely yes*). Items yielded a high reliability score of α = .86. The averaged responses created the total purchase intention score.

Level of involvement with the product. The Elaboration Likelihood Model states that the level of elaboration of advertising information depends on the motivation to process the information among others (Petty & Cacioppo, 1986). Belch and Belch (2007) propose that people's level of involvement with the product influences their motivation to process the information. Involvement refers to "the general level of interest in the object of the centrality of the object to the person's ego-structure" (Day, 1970, p.45). Accordingly, in marketing, products are often classified into high and low involvement products. Low involvement products for example are those with little connection to the consumer's important values and little commitment to brands (e.g. toothpaste), while high involvement products are less frequently purchased and the consumer is more brand conscious (e.g. automobiles)

(Lastovicka & Gardner, 1979). Laurent and Kapferer (1985) found that high involvement leads to extensive processing of information. Therefore, the products used in this study (e.g. soap and pen) were assumed to be low involvement products in order for the manipulation of the level of motivation to process the information in the presented advertisements to work. Following the example of Pieters, Rosbergen and Hartog (1996) in order to check whether respondents' involvement with soap and pens is actually low they were asked six questions from the Consumer Involvement Profile (Kapferer & Laurent, 1985). The level of agreement with the items was indicated on a five-point Likert scale (1= *completely disagree* to 5 = *completely agree*). Cronbach's alpha for these six items was α = .82, representing a high reliability of the scale. Responses were averaged, with items one and four reversely coded, to create a composite involvement score.

Motivation to process. To check whether the manipulation in the instructions worked, respondents had to indicate how much they agree with the statement "I was motivated to evaluate the information in the advertisements" on a five-point Likert scale (1= *completely disagree* to 5 = *completely agree*) (Pieters et al., 1996).

Demographic variables. Finally, respondents were requested to state their gender and their age.

Table 3.

Constructs and corresponding reliability scores

Construct	**Number of items**	**α**
Affective response		
Pleasure	6	.83
Arousal	6	.70
Dominance	5	.68
Attitude towards the ad	5	.94
Attitude towards the product	8	.91
Purchase intention	4	.86

Procedure

There are situations in which including an actual scent in a marketing communication is virtually impossible, for example in the case of online advertisements. Therefore, the method used for this research was a digital survey. The survey was sent out to members of the social network of the researcher and they were asked to fill in the survey and forward it to members of their social networks as well. In order to increase the people's motivation to take part in the survey and fill in the whole questionnaire, they were offered the chance to win one of three 10€ vouchers at amazon.de after completion of the whole survey. Additionally, all participants were informed that there are no wrong answers and that the survey is completely anonymous. It took approximately ten minutes to fill in the questionnaire.

Participants clicked on the link which randomly assigned them to one of the eight research conditions. First of all, after the link was opened, participants were provided with the instructions which aimed at manipulating their motivation to process the information in the advertisements. Following a similar procedure as Pieters et al. (1996) in the introduction all participants were told that the goal of the survey was to test a new method for testing draft versions of advertisements for new products and that they are going to see three different advertisements in the following. Subsequently, people in the high motivation to process conditions were told to look at the ads and read through the information carefully and thoroughly at their own pace. Afterwards, there would be questions about one of the three ads. People in the low motivation to process condition were told to have a quick look at the ads and that they would be asked some questions afterwards.

Next, participants were exposed to the stimulus material. First, they were shown the first filler advertisement, then one of the four target advertisements and finally the second filler advertisement. Participants saw one ad at a time and by clicking on "next" they could proceed to the next one. Thus, they could look at the ads at their own pace. Subsequently, subjects were told that they would be asked some questions about the soap/pen advertisement they had just seen and the dependent variables were measured as described previously. Finally, respondents were thanked for their participation and those who wished to win the voucher could enter their email address.

Results

Manipulation checks

The two target products soap and pen used in the survey were assumed to be both low involvement products. In order to check this assumption, the respondents' level of involvement with soap or pen respectively was measured. The lowest score 1 would mean involvement is very low, while the highest score 5 would indicate high involvement with the product. The scales had a good reliability with $\alpha = .82$. The analysis showed that scores for both products were relatively low. The mean score for soap was 2.74 ($SD = 0.75$) and for pen 2.42 ($SD = 0.82$). A t-test however revealed that product involvement was significantly lower for the pen than for the soap, $t(195) = 2.90$, $p < .01$. Despite this result, both products can still be assumed to be low involving.

In order to check if the level of motivation to process manipulation resulted in the expected high respectively low motivation to process, participant's responses to the question "I was motivated to evaluate the information listed in the advertisement carefully and thoroughly" were used as an indicator. A t-test between the two conditions showed that the subjects were significantly less motivated to evaluate the information in the low motivation to process condition ($M = 2.95$, $SD = 1.25$) than those in the high motivation to process condition ($M = 3.36$, $SD = 1.12$), $t(191.65) = 2.43$, $p < .01$. Even though, the mean in the high motivation to process condition was only slightly higher than the neutral point of three and in the low motivation to process condition only slightly lower than the neutral point, the analysis showed that the respondent's level of motivation to process in the high motivation to process condition was significantly higher than in the low motivation to process condition. Thus, the manipulation seemed to be successful.

Memory

In order to investigate if the presence of the written scent reference made the information in the advertisement more memorable an ANOVA with the three independent factors motivation to process (low/high), product (soap/pen), and reference (no/yes) and memory as the dependent variable was performed (see appendix 7). The analysis showed a significant main effect for product type on memory, $F(1,16) = 32.61$, $p < .001$ and level of motivation on memory $F(1,16) = 5.53$, $p < .05$. Looking at the means (see table 4), the attributes of the pen were better remembered than the attributes of the soap. Moreover, in the high motivation to

process condition respondents remembered more attributes correctly than in the low motivation to process conditions.

Table 4.

Mean scores of correctly remembered attributes per product type and per level of motivation

		M (SD)
Product		
	Soap	3.15 (1.15)
	Pen	4.02 (1.01)
Level of motivation to process		
	Low	3.42 (1.19)
	High	3.77 (1.11)

However, no significant effect of reference on memory was found, $p > .05$. Also, no significant interaction effects were found between product and motivation, between product and reference, between motivation and reference, nor between product, motivation and reference (all p's > .05). Therefore, hypothesis 1 which stated that the presence of a written scent reference contributes to the enhancement of the memory was rejected. When the attributes in the advertisement were presented together with a written scent reference, participants did not remember more attributes compared to the respondents who were exposed to an advertisement without scent reference.

Affective response, attitude towards the ad, attitude towards the product and purchase intention

To test if a written scent reference in an advertisement influences a person's affective response (e.g. pleasure, arousal, dominance), attitude towards the ad, attitude towards the product and purchase intention and how the variables depend on the type of product, e.g. the relevance of the scent reference, and the person's motivation to process the information in the advertisement, a MANOVA was conducted. The analysis included the three independent variables motivation to process (low/high), product (soap/pen), and reference (no/yes) and the six dependent variables pleasure, arousal, dominance, attitude towards the ad, attitude towards the product and purchase intention.

A significant main effect was found only for product, $F(6,184) = 3.26$, $p < .01$. Motivation and reference were not significant (p's > .05). In the subsequent follow-up ANOVAs with

product type (soap/pen) as independent variable and pleasure, arousal, dominance, attitude towards the ad, attitude towards the product and purchase intention as dependent variables (see appendix 8) product type was found to have a significant influence on dominance $F(1,189) = 5.45$, $p < .05$, but not for the other two affective response dimensions pleasure and arousal (p's > .05). Subjects felt more dominant when they were exposed to a pen advertisement ($M = 3.17$, $SD = 0.41$) than to a soap advertisement ($M = 3.05$, $SD = 0.36$) but their level of pleasure and arousal did not differ. But since the reliability of the dominance scale was not very high, this finding might be random and was neglected. Furthermore, the product type had a significant effect on attitude towards the product, $F(1,189) = 5.20$, $p < .05$. Respondents found the pen ($M = 2.97$, $SD = 0.79$) was of better quality and more appealing for instance than the soap ($M = 2.73$, $SD = 0.65$). Attitude towards the ad and purchase intention were both not significant (p's > .05).

The MANOVA further revealed a significant interaction effect between motivation and reference, $F(6,184) = 2.71$, $p < .05$. The other interaction effects between product and motivation, between product and reference, and between product, motivation and reference, were not found to be significant (all p's > .05). ANOVAs with motivation (low/high) and reference (no/yes) as independent variables and pleasure, arousal, dominance, attitude towards the ad, attitude towards the product and purchase intention as dependent variables were used to look more closely at the interaction between the level of motivation to process and presence or absence of the written scent reference (see appendix 9). Since it was expected that the level of motivation to process influences the reaction towards the written scent reference, results are resumed separately for high and low motivation to process.

High motivation to process

It was assumed that when people's motivation to process the information in the advertisement was high, a written scent reference would have a positive effect when scent is the primary attribute of the advertised product, e.g. soap (hypotheses 2a, 2b and 2c) and that it would have the opposite effect when scent is irrelevant for the advertised product, e.g. pen (hypotheses 3a, 3b and 3c).

The analysis showed that when respondents' were told to evaluate the information in the advertisements carefully and thoroughly, none of the dependent variables pleasure, arousal, dominance, attitude towards the ad and purchase intention differed significantly between the groups (p's > .05). A significant effect could only be found for attitude towards the product. In line with the hypothesis, participants had a significantly more positive attitude toward the

product, when the advertisements did not contain a written scent reference (M = 3.05, SD = 0.66) compared to the advertisements with the scent reference (M = 2.72, SD = 0.74), $F(1,189) = 4.48$, $p < .05$. However, when looking at the two products separately (see figure 9, c), this negative influence manifested only in case of the pen. This product was evaluated worse with the scent reference (M = 2.72, SD = 0.81) than without it (M = 3.23, SD = 0.65), $t(49) = -2.49$, $p < .001$. For soap, it did not have an effect in either direction ($p > .05$). Table 5 summarizes the agreement of the findings with the hypotheses.

Low motivation to process

In the low motivation to process condition, it was expected that a written scent reference would have a positive effect on the affective response, attitude towards the ad, attitude towards the product and purchase intention independent of their relevance for the advertised product (hypotheses 4a, 4b, 4c, 5a, 5b and 5c).

Pleasure in the low motivation to process condition was significantly higher when the advertisement contained a written scent reference (M = 3.40, SD = 0.58) than when it did not include a written scent reference (M = 3.09, SD = 0.50), $F(1,189) = 7.92$, $p < .01$. This effect was significant for both products (see figure 10, a). In line with the expectations, respondents' exposed to the soap advertisement with written scent reference (M = 3.31, SD = 0.61) felt more pleasure than those with no scent reference in the ad (M = 3.05, SD = 0.34), $t(32.57) = 1.79$, $p < .05$. For the pen as well, pleasure was higher for advertisements with scent reference (M = 3.49, SD = 0.54) than without it (M = 3.12, SD = 0.61), $t(49) = 2.26$, $p < .05$. The second dimension, arousal, was not significantly different ($p > .05$). Finally, even though the respondents felt more dominant when they were exposed to an advertisement with the written scent reference (M = 3.16, SD = 0.42) than without the reference (M = 3.00, SD = 0.28), this significance was only marginal, $F(1,189) = 4.05$, $p = .046$. Yet, again this finding was not considered due to the scale's mediocre reliability.

Additionally, like presumed, respondents had a more positive attitude towards the advertisements with a scent reference (M = 3.27, SD = 0.91) than towards the advertisements without the reference (M = 2.52, SD = 0.97). This difference was statistically significant, $F(1,189) = 14.52$, $p < .001$. Looking at the two products separately (see figure 10, b), the soap advertisement with scent reference (M = 3.16, SD = 1.00) was liked more than the soap advertisement that did not mention the scent (M = 2.46, SD = 0.86), $t(44) = 2.53$, $p < .01$. The same is true for the pen advertisement. The ad with the scent reference (M = 3.39, SD = 0.82)

was preferred over the version without scent reference (M = 2.57, SD = 1.06), $t(49) = 3.01$, $p < .01$.

Furthermore, the interaction effect between motivation and reference was found to significantly influence respondents' attitude towards the product. Again supporting the assumption, when respondents received the instructions to have a quick look at the advertisements, they had a more positive attitude towards the product when the advertisement included the scent reference (M = 3.04, SD = 0.78) compared to when the ad did not mention the scent (M = 2.64, SD = 0.683), $F(1,189) = 8.19$, $p < .01$. Again, this applied to both products (see figure 10, c). For soap attitude towards the product was more positive when the scent was named (M = 2.89, SD = 0.71) than when it was not (M = 2.52, SD = 0.54), $t(44) = 2.00$, $p < .05$. The same was true for the pen. People found the pen more appealing when the information was presented together with a scent reference (M = 3.19, SD = 0.83) than when it was lacking (M = 2.73, SD = 0.78), $t(49) = 2.02$, $p < .05$.

Finally, it was investigated if the written scent reference influences the respondents' intention to purchase the advertised product. The results of the analysis indicated that purchase intentions were higher when the production information was combined with a written scent reference (M = 2.63, SD = 0.71) in comparison with when the scent reference was missing (M = 2.28, SD = 0.69), $F(1,189) = 6.03$, $p < .05$. Yet, the assumption is only partly supported as a look at the products separately reveals (see figure 10, d). Purchase intention was only increased by the scent reference in case of the soap. Subjects were more likely to purchase the soap with the scent reference (M = 2.63, SD = 0.77) than when it was not included (M = 2.23, SD = 0.64), $t(44) = 1.91$, $p < .05$. For the pen the difference was not significant ($p > .05$). Table 5 summarizes the agreement of the findings with the hypotheses.

Table 5.

Summary of hypotheses

Hypothesis			**F**	**t**
H1	A written scent reference enhances memory	Rejected	1.19	
H2	High motivation to process, relevant scent reference			
	a) Positive affective response	Rejected		-0.30
	b) Positive attitude towards the ad	Rejected		-1.00
	c) Positive attitude towards the product	Rejected		-0.50
H3	High motivation to process, irrelevant scent reference			
	a) Negative affective response	Rejected		-0.67
	b) Negative attitude towards the ad	Rejected		-1.45
	c) Negative attitude towards the product	**Confirmed**		**-2.49****
H4	Low motivation to process, relevant scent reference			
	a) Positive affective response	**(Partly) Confirmed**		**1.79***
	b) Positive attitude towards the ad	**Confirmed**		**2.53****
	c) Positive attitude towards the product	**Confirmed**		**2.00***
H5	Low motivation to process, irrelevant scent reference			
	a) Positive affective response	**(Partly) Confirmed**		**2.26***
	b) Positive attitude towards the ad	**Confirmed**		**3.01****
	c) Positive attitude towards the product	**Confirmed**		**2.02***

Note. *p < .05, **p < .01, ***p < .001

Looking at the overall picture and even though most of the results were not significant in the high motivation to process condition, the results still indicate a general pattern (see figure 9). On all of the four dependent variables pleasure, attitude towards the ad, attitude towards the product and purchase intention, the written scent reference had a negative effect for both the soap and the pen. Under the low motivation to process condition on the contrary, the data showed a reversed pattern (see figure 10). The written scent reference had a significant positive influence on all of the four dependent variables.

Figure 9. Mean scores in the high motivation to process condition

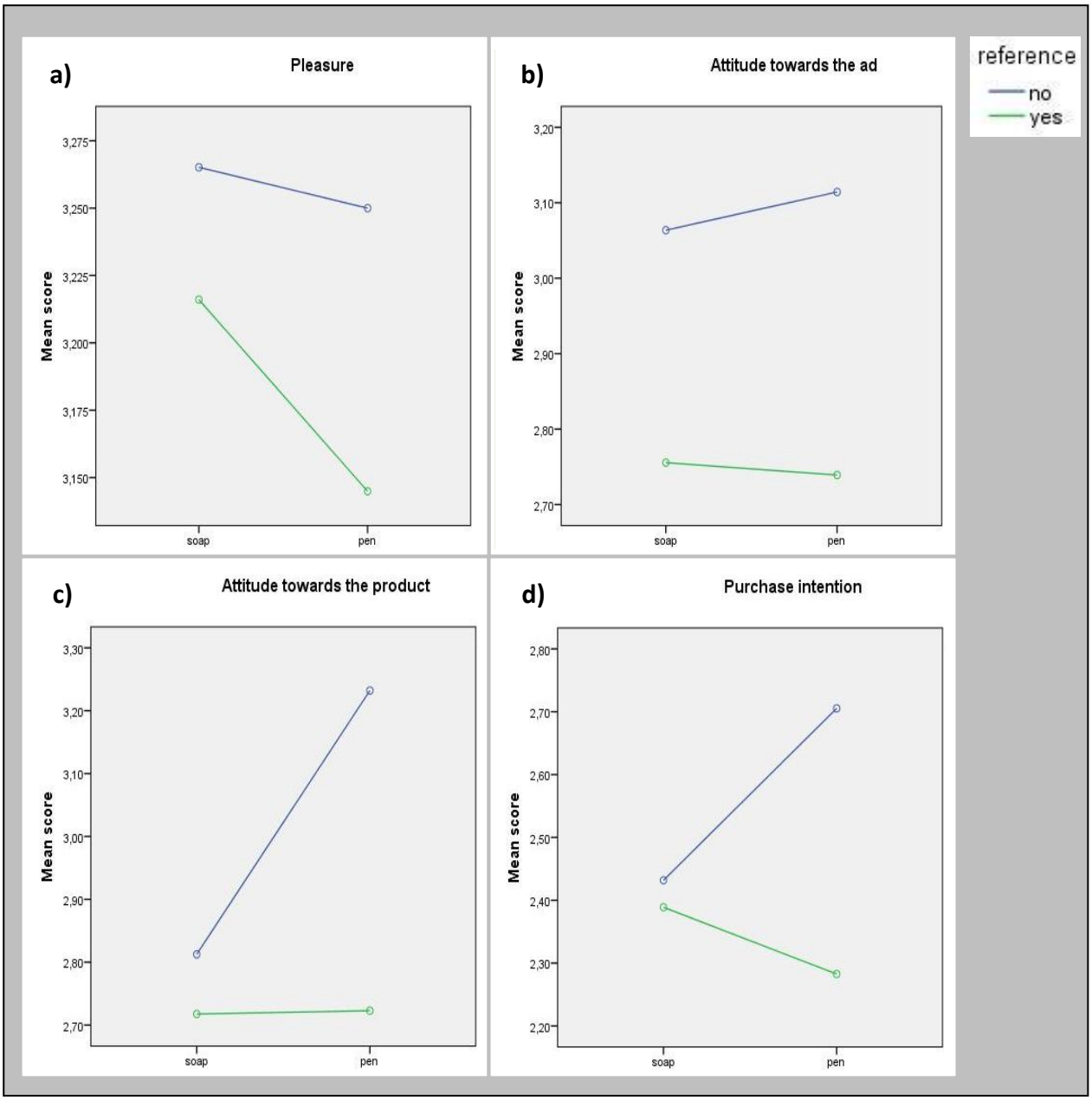
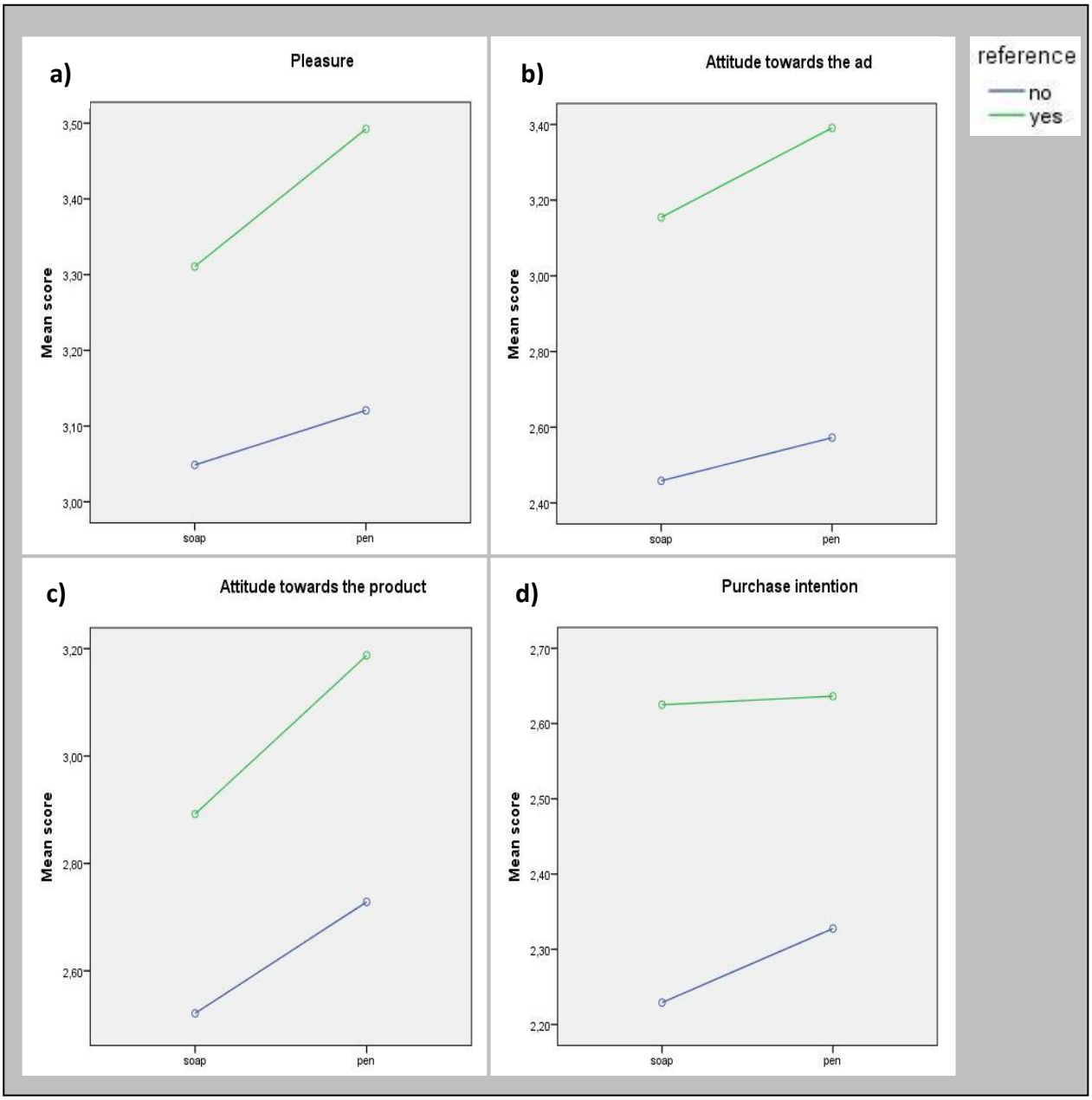


Figure 10. Mean scores in the low motivation to process condition



Discussion

Memory

With regard to memory, the findings showed that the people did not remember the product information in the advertisements better when it was accompanied by a written scent reference. Therefore, the assumption that a written scent reference might function similar to a physically present odor was rejected.

It seems that the mere presence of a word with strong olfactory associations does not make the information presented in an advertisement more memorable. A possible reason why the written scent reference did not work as expected might be because it is processed together with the product information via the same cognitive subsystem for verbal (written) information (Paivio, 2007) and not via a second system. The information was encoded only via one system so that a second trace was lacking. According to the Dual Coding Theory (DTC) pictures have a memory enhancing effect for verbal, e.g. written, information because the human brain processes pictures and written information via two independent cognitive subsystems (Paivio, 2007). According to Paivio (2007) incoming information is processed sequentially by the verbal system while visual input is processed more holistically by the imaginal system. Additionally, it has been shown that visual and verbal information is processed in different areas of the brain supporting the idea that both systems appear to function independently (Childers & Jiang, 2008). When incoming information is encoded via the two different systems this appears to increase the accessibility of the information during retrieval and several studies have found evidence that pictures increase the memory for verbal information (cf. Wyer, Huang & Jiang, 2008). Therefore, it is generally accepted that the more information is processed during encoding the deeper the memory trace will be (Craik & Tulving, 1975). Probably the presence of a real scent functions similarly to a picture because it has been claimed that olfaction has its own relatively independent, nonverbal code (Bensafi et al., 2003). Thus, if the verbal information is presented together with a scent the information is encoded via both systems, making the memory trace deeper and increasing the accessibility of the information at retrieval. However, in this study the second memory trace was missing which probably explains the absence of significant effects of the written scent reference on memory.

Besides, the written scent reference was encoded together with a lot of other written information (each participant saw three ads with in total fifteen attributes) and very likely

people did not focus extensively on the written scent reference and did not really imagine the scent. In the study that found that reading words with strong olfactory associations activates olfactory brain regions the scent words were the only thing respondents were exposed to (Gonzàles et al., 2006). Perhaps the written scent reference was not prominent enough in the advertisement to activate the olfactory regions of the brain and enhancing participants' memory.

Affective response, attitude towards the ad, attitude towards the product and purchase intention

The Elaboration Likelihood Model suggests that the reaction to advertising cues depends on the level of motivation with which a person evaluates the information in the advertisement. Therefore, it was expected that in the high motivation to process condition the written scent reference would have a positive effect if it is relevant for the advertised product (e.g. scent is the primary product attribute) and a negative effect if it is not relevant for the product (e.g. scent is an unimportant product attribute), while in the low motivation to process condition the written scent reference would have a positive effect independent of the type of product that is being advertised.

Low motivation to process

In line with the expectations, when people did not engage in careful consideration of the soap advertisement, the written scent reference increased the level of pleasure, improved the attitude towards the ad, the attitude towards the product as well as the respondents' intention to buy the product. Also when subjects were exposed to the pen advertisement the version that included a written scent reference evoked a more positive affective response, the ad was evaluated more positively and also the product was judged more favorably compared to the counterpart without the reference.

Yet, purchase intentions for the pen were not significantly increased by the written scent reference. It seems that even though people liked the pen ad and the product, the written scent reference did not affect their willingness to purchase it. Probably, the decision if one would buy the product evoked more cognitive thoughts. The pretest showed that feel and look are the decisive product attributes of a pen and thus a purchase intention might be based more on these factors, while the scent is neglected. Therefore, when asked if they would buy the pen, respondents might not have considered the written scent reference at all which could explain

why there was no effect on people's purchase intentions in this case (Ludden & Schifferstein, 2009).

Overall, it seems that when people do not engage in deep elaboration of the advertisements they do not evaluate whether the scent reference is relevant for the advertised product or not and reactions are positive independent of the product type. In line with the ELM and the findings of Magnini and Karande (2010), in this motivational state consumers appear to rely on peripheral cues to form affective responses and attitudes and a written scent reference appears to function as such a peripheral cue.

High motivation to process

Surprisingly, the findings of the comparison of the groups exposed to the soap advertisement in the high motivation to process condition did not support the expectations. For a product which primary product attribute is scent, the written scent reference had no significant positive effect on none of the dependent measures. Actually on the contrary, even though the differences were not significant, when the advertisement contained a written scent reference it had a negative influence on all dependent measures. For the product with scent as an unimportant product attribute (e.g. the pen), the general negative influence of the written scent reference was apparent as well. Yet, against the expectations differences between the groups were not significant for pleasure, attitude towards the ad and purchase intention. Only the attitude towards the product was significantly less favorable when the advertisement mentioned the scent reference. In the following, these findings are discussed.

Affective response. In the current study the written scent reference had no effect on the respondents' affective response when they motivation to process was high. An explanation for this could be that respondents were more cognitively involved and therefore experienced no affective response. A high motivation to process is assumed to lead to a more careful consideration and evaluation of the information in the advertisement (Petty, Cacioppo & Schumann, 1983) and Greenwald and Leavitt (1984) suggested that people who engage in deeper and more critical elaboration of an advertisement experience less affective response. This might explain why no significant differences were observed in this study. Probably, because respondents were more cognitively involved when they were told to elaborate the advertisements thoroughly, the written scent reference did not induce a stronger affective response than the advertisements without scent reference.

Attitude towards the ad. In the present study, the written scent reference did not significantly influence the evaluation of the advertisements. In the literature it has been

suggested that attitude towards the ad is largely determined by the emotions or affective response evoked by the advertisement and not a purely cognitive evaluative judgment (Batra & Ray, 1986; MacKenzie & Lutz, 1989). Since in the high motivation to process condition consumers are presumed to experience less affective response (Greenwald & Leavitt, 1984) this might be one explanation why no differences in attitude towards the ad were observed.

Furthermore, Mitchell and Olsen (1981) suggested that attitude towards the ad represents the person's evaluation of the overall advertising stimulus. Thus, there are many factors that might influence a person's attitude towards an ad (cf. Muehling & McCann, 1993). Mitchell and Olsen (1981) supported this idea and argued that visual aspects of a commercial were the major factors which influenced attitude towards an ad. Perhaps, there was no difference in attitude towards the ad because when asked about how they find the advertisement people rather focused on the overall ad execution, e.g. the pictures, colors etc. Maybe the scent reference was only a minor element that did not change the overall evaluation of the advertisement.

It is also possible that no effects were found because consumers focused more in the product attributes and neglected the headline. This explanation is supported by Celsi and Olsen (1988) who claimed that consumers tend to direct their attention towards the element in the advertisement that most likely contains arguments, which would probably be the lower section containing the product attributes in this case. Furthermore, Petty et al. (1983) concluded that under high motivation the strength of the information about the product determines evaluations rather than peripheral cues. Since the advertisements only differed with respect to the written scent reference but included the exact same product attributes this might be why no significant effect could be found.

Attitude towards the product. With regard to the pen, the negative influence of the written scent reference on attitude towards the product was confirmed. However, the written scent reference had no effect on the attitude towards the soap.

It seems that when the scent reference has no relevance for the advertised product the reference somehow "bothers" or irritates the consumer, just like expected. People might find it strange that a pen has a certain odor and the written scent reference might make no sense to them. Lee and Mason (1999) supported this conclusion because they suggested that when consumers are exposed to irrelevant information, they have difficulties to relate this

information to the message and as a consequence become frustrated and accordingly evaluate the product less favorable.

An explanation why the written scent reference did not result in a more positive evaluation of the soap might be found in the expectancy disconfirmation model (Oliver, 1980). Maybe, because scent is the primary product attribute of soaps, respondents expected to be informed about the scent of the soap or at least it was not unusual that the ad mentioned how the soap smelled. It is very common that soaps respectively their dispensers or packages carry information about their odor on it. Hence, consumers could find it normal that an advertisement for soap included a scent reference, informing them how the soap smells. Accordingly, the scent reference rather confirmed than exceeded their expectations, which could explain why no significant effects were observed. Future research might investigate this hypothesis and explore the effect of a written scent reference on other products which have scent as the primary product attribute.

Purchase intention. Finally, the written scent reference did not alter the respondents' willingness to purchase neither the soap nor the pen. With respect to the soap, the expectancy disconfirmation model might provide and explanation why it had no influence again. Since scent is the primary product attribute of soap, it is common that communications (e.g. dispensers, packaging, and advertisements) include how it smells. Thus, the written scent reference was not unusual and it rather confirmed the consumers' expectations so that it had no influence on their purchase intention.

Interestingly, even though the attitude towards the pen was negative in case of the pen, the written scent reference did not significantly deteriorate purchase intentions. Scent is an irrelevant product attribute of a pen and it might be just for that reason that a significant effect was missing (Ludden & Schifferstein, 2009). The pretest showed that touch, thus the way it feels, is the most important product attribute of a pen. Also it is more important how it looks than how it smells. Hence, when stating their purchase intentions respondents might just not have attached importance to the way the pen smells and based their decision rather on the way it looked and the attributes describing the way it lies in the hand. This could be reason why no significant difference was found.

Implications

The present study showed that a written scent reference in an advertisement only seems to be effective when consumers' motivation to process the information in the advertisement is low. In this case the written scent reference appears to function as a peripheral cue that affects the consumers' affective response and attitudes on a more subconscious level simply by the associations and emotions it evokes. Because low motivation to process does not induce cognitive elaboration and it is not evaluated whether the reference is relevant for the advertised product, the effect has been shown to occur independent of the type of product. If however, consumers evaluate the advertisement and the information carefully, the scent reference makes no difference; the results indicate that it might even have a deteriorating effect. Thus, a written scent reference seems to function as a peripheral cue that evokes positive affective responses and attitudes but only when no cognitive elaboration takes place.

First of all, this present study has some theoretical implications. Generally, the findings provide support for Krishna (2010) who claimed that it might be more efficient to use unconscious cues which appeal to the basic senses. This research however adds an important restriction to the literature, namely it emphasizes the importance of the consumers' motivation to process. If this variable would not be considered, effects of peripheral cues such as written scent references could not be detected. Future studies should take this into account.

Moreover, for advertisers the findings are valuable as well, because it has been shown that appealing to the sense of smell by a written scent reference could be a possibility to include scents in advertisements where including an actual scent would be impossible (e.g. online advertising). Also, a written scent reference would be a lower-cost alternative to more expensive options such as scented panels or paper imbued with a scent.

Additionally, a written scent reference could be a way to influence attitudes even in a cluttered advertising environment without getting the consumers' full attention. Today, consumers are exposed to an incredibly large number of advertisements and stimuli everywhere. And since it is virtually impossible to attend to all of these stimuli and attention is a limited capacity mostly consumers' motivation to process all the information in the advertisements is low. For example, for online advertisers the findings of this research might be beneficial. Usually, online advertisements get little or only marginal attention (Drèze & Hussherr, 2003). Therefore, consumers' motivation to process the information in the advertisements is probably low and in this condition peripheral cues, e.g. written scent references, are likely to be effective. Hence, advertisers might consider applying written scent

references in online advertisements. The same is true for TV commercials. They almost never get undivided attention. However, in this state, attitudes are based on peripheral cues which influences consumers subconsciously like a written scent reference for instance as this research has shown.

Furthermore, the advertising context might gain importance for the application of a written scent reference. A low involving program might cause a low motivation to process; the state in which the written scent reference is likely to be effective. Thus, an advertisement with written scent reference might function in a low involving context but not in a high involving one.

Yet, written scent references might only work for low involvement products. If a product is high involving the consumers' motivation to process the information is likely to be high as well. In this condition, the written scent reference had no effect in this research. Therefore, before considering including a written scent reference in an advertisement, marketers should consider consumers' level of involvement with the product.

Limitations and future research

Even though the results of the present study are encouraging because they confirmed several expectations the findings are only preliminary. Follow-up research is needed to validate the findings and increase their generalizability.

First of all, the method used in the present study was an online survey, which respondents could fill in basically anywhere they wished. For this reason, there might have been ambient scents (e.g. food, cleaning agent) that influenced respondents' olfactory perception (e.g. Bosmans, 2006; Michon, Chebat & Turley, 2005). Future studies might exclude this alternative explanation by conducting an experiment in a controlled environment with no ambient scent possibly interfering with the written scent reference.

Secondly, the study should be replicated using different products. Since this study used two assumedly low involvement products it could be interesting to find out whether a written scent reference would have a different effect if high involvement products were used. Possibly, high involvement products also induce a high motivation to process in which case the scent reference has no effect according to the findings of this study. Future research should explore this.

Additionally, attitudes based on peripheral cues are assumed to be volatile and transient (Petty & Cacioppo, 1986) and conclusions about long-term effects cannot be made based on the findings of this study. In this regard, more research is needed as well.

Furthermore, the study could not proof that a written scent reference enhances memory for product information. Nevertheless, future research in this area could be worthwhile. This study focused on the short-term effects of a written scent reference and it might be interesting to explore its long-term effects. Lwin et al. (2010) for example found that when verbal information is presented together with an odor, memory for the verbal information is improved but only after some time delay. They concluded that because memories acquired via the sense of smell are more long lasting and persistent than memories acquired via other modalities, the full potential of olfactory cues might only be discovered in the long term. Maybe, the written scent reference has a similar pattern and it is only effective after a time delay. Also it might be interesting to try other products or other scent references. Future research should approach these questions.

Moreover, with regard to the affective and attitudinal outcomes future research needs to rule out several alternative explanations which were ignored in this study. First of all, the issue of scent pleasantness should be addressed. Consumers have difficulties in defining an odor apart from describing it as pleasant or unpleasant (Richardson & Gesualdo, 1989). Ehrlichmann and Halpern (1988) suggested that when an odor is perceived as pleasant an associated object is also perceived to be pleasant. Unpleasant odors however might cause associated objects to be perceived as unpleasant. This study did not control for scent pleasantness, i.e. it was not examined whether respondents perceive the scent of roses as pleasant or unpleasant. Future studies might explore whether the effects of written scent references are different for pleasant and unpleasant scents.

Besides, Ellen and Bone (1998) put forward that reactions to odors may vary extensively among persons, depending on their associations with that specific odor. In this research the odor “roses” was used because it had strong olfactory associations (Gonzàles et al., 2006) but it was not relevant if the associations were positive or negative. Furthermore, it has not been considered whether the scent “roses” is considered appropriate for the products soap and pen. Future studies in this area should explore if scents which evoke positive and negative associations affect respondents differently. Also it could be investigated if written scent references which are considered appropriate respectively inappropriate for the advertised product play a role.

With regard to stimulus design the study has some limitations as well and the topic of cue fit respectively congruency needs to be addressed. Cue fit refers to how relevant or appropriate the cue is perceived to other elements of the ad, e.g. verbal and nonverbal components (MacInnis & Park, 1991). Ellen and Bone (1998) investigated the effect of scented scratch-n-sniff panels in print advertisements where scent is not the decisive product attribute. In their study, when the scent was congruent with the picture (e.g. floral scent/floral picture) this had no significant effect on attitude towards the ad and towards the brand. Incongruent scented panels (e.g. pine scent/floral picture) however induced a negative response. Hence, attitude formation appears to be a function of (in)congruency of the scent with the pictures in the advertisement.

Even though the pictures used in the advertisements were assumed to be scent neutral it is possible that they still evoked olfactory associations which interfered with the written scent reference. Consumers might have perceived both elements as incongruent. Maybe, the water for instance made respondents think of a different odor, for example ocean breeze. Future research might explore the effects of written scent reference with no picture in the advertisement. Because it has been found that congruent pictures and colors enable better odor identification and discrimination (Gottfried & Dolan, 2003; Stevenson & Oaten, 2008) it might also be interesting to see if the scent reference in combination with a congruent picture (e.g. the word roses and a picture of roses) or a red color scheme could evoke stronger reactions. Perhaps, when the written scent reference is supported by a congruent visual this might enable respondents to imagine the odor more easily. Therefore, the interplay of written scent references and visual stimuli could also merit future research interests.

Finally, gender should be included as a variable in future studies. The big majority of the participants in this study were female (78.68 %) and Doty, Applebaum, Zusho and Settle (1985) found that women can identify odors much better than men. Therefore, one might assume that a written scent reference might work more effectively on women than on men. Future research should test this hypothesis by testing the effects of a written scent reference in a male and a female sample for instance.

Conclusion

It could be concluded that a written scent reference functions as a peripheral cue in advertisements which consumers rely on to form affective responses and attitudes when no cognitive elaboration takes place. The written scent reference seems to work for both a product with scent as a primary product attribute and a product where scent does not play a decisive role for product evaluation. When consumers are more cognitively involved and evaluate the advertisement and the information carefully, the scent reference makes no difference; it might even have a deteriorating effect for both product types. Besides, no memory effect could be observed in this study and therefore it could be concluded that a written scent reference cannot replace a real odor in this regard.

For advertisers the findings imply that a written scent reference could be a possibility to include olfactory cues in advertisements where including an actual scent would be impossible. Moreover, it could be a way to influence attitudes especially in a cluttered advertising environment despite of a superficial processing motivation. On the contrary, just because of this low motivation and limited attention for advertisements a written scent reference appears to be effective and positively influences people's response to an advertisement. Yet, the findings are only tentative and more research should increase their generalizability by using other products and written scent references for instance.

References

Aimée (2009, October 18). Anxiety and our brains – part 4: The limbic system [Web log post]. Retrieved from: http://anxiousnomore.blogspot.de/2009/10/anxiety-and-our-brains-part-4-limbic.html

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*, 179-211.

Baker, M.J., & Churchill, G.A., Jr. (1977). The impact of physically attractive models on advertising evaluations. *Journal of Marketing Research*, *14*(4), 538-555.

Batra, R., & Ray, M.L. (1986). Responses mediating acceptance of advertising. *Journal of Consumer Research*, *13*(2), 234-249.

Belch, G., & Belch, M. (2007). *Advertising and promotion: An integrated marketing communication perspective*. Boston: McGraw-Hill/Irwin.

Bensafi, M., Porter, J., Pouliot, S., Mainland, J., Johnson, B., Zelano, C., … Sobel, N. (2003). Olfactomotor activity during imagery mimics that during perception. *Nature Neuroscience*, *6*(11), 1142-1144.

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

Brown, S.P., Homer, P.M., & Inman, J.J. (1998). A meta-analysis of relationships between ad-evoked feelings and advertising responses. *Journal of Marketing Research*, *25*, 114-126.

Cahill, L., Babinsky, R., Markowitsch, H.J., & McGaugh, J.L. (1995). The amygdala and emotional memory. *Nature*, *377*(6547), 295-296.

Celsi, R.I., & Olsen, J.C. (1988). The role of involvement in attention and comprehension processes. *Journal of Consumer Research*, *15*, 210-224.

Childers, T.L., & Jiang, Y. (2008). Neurobiological perspectives on the nature of visual and verbal processes. *Journal of Consumer Psychology*, *18*(4), 264-269. doi: 10.1016/j.jcps.2008.09.010

Craik, F.I.M., & Tulving, E. (1975). Depth of processing and the retention of words in episodic memory. *Journal of Experimental Psychology: General*, *104*(3), 268-294

Day, G.S. (1970). *Buyer attitude and brand choice*. New York: Free Press.

Dematte, M.L., Sanabria, D., Sugarman, R., & Spence, C. (2006). Cross-modal interactions between olfaction and touch. *Chemical senses*, *31*, 291-300. doi:10.1093/chemse/bjj031

Dematte, M.L., Sanabrina,D., & Spence, C. (2009). Olfactory discrimination: When vision matters? *Chemical Senses*, *34*(2), 103-109. doi: 10.1093/chemse/bjn055

Doty, R., Applebaum, S., Zusho, H., & Settle, G. (1985). Sex differences in odor identification ability: A cross-cultural analysis. *Neuropsychologia*, *23*, 667-672.

Drèze, X., & Hussherr, F.-X. (2003). Internet advertising: Is anybody watching? *Journal of Interactive Marketing*, *17*(4), 8-23. doi: 0.1002/dir.10063

Ehrlichmann, 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), 769-779.

Ellen, P.S., & Bone, P.F. (1998). Does it matter if it smells? Olfactory stimuli as advertising executional cues. *Journal of Advertising*, *27*(4), 29-39.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research.* Reading, MA: Addison-Wesley.

González, J., Barros-Loscertales, A., Pulvermüller, F., Meseguer, V., Sanjuán, A., Belloch, V., & Ávila, C. (2006). Reading cinnamon activates olfactory brain regions. *NeuroImage*, *32*, 906-912. doi: 10.1016/j.neuroimage.2006.03.037

Gottfried, J.A., & Dolan, R.J. (2003). The nose smells what the eye sees: Crossmodal visual facilitation of human olfactory perception. *Neuron*, *39*, 375-386.

Greenwald, A.G., & Leavitt, C. (1984). Audience involvement in advertising: Four levels. *Journal of Consumer Research*, *11*(1), 581-592.

Heckler, S.E., & Childers, T.L. (1992). The role of expectancy and relevancy in memory for verbal and visual information: What is incongruency? *Journal of Consumer Research, 18*(4), 475-492.

Herz, R.S. (2004). A naturalistic analysis of autobiographical memories triggered by olfactory, visual, and auditory stimuli. *Chemical Senses, 29*(3), 217-224.

Janiszewski, C. (1988). Preconscious processing effects: The independence of attitude formation and conscious thought. *Journal of Consumer Research*, *15*, 199-209.

Kapferer, J.-N., & Laurent, G. (1985). Consumer involvement profiles: A new practical approach to consumer involvement. *Journal of Advertising Research, 25*(6), 48-56.

Krishna, A. (2010). *Sensory marketing: research on the sensuality of products.* New York: Taylor and Francis Group.

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. doi: 10.1016/j.jcps.2011.08.003

Krishna, A., Lwin, M.O., & Morrin, M. (2010). Product scent and memory. *Journal of Consumer Research, 37*(1), 57-67. doi: 10.1086/649909

Lastovicka, J. L., & Gardner, D.M. (1979). Components of Involvement. In J. C. Maloney, & B. Silverman (Eds.), *Attitude Research Plays for High Stakes* (pp. 53-73). Chicago: American Marketing Association

Laurent, G., & Kapferer, J.-N. (1985). Measuring consumer involvement profiles. *Journal of Marketing Research, 22*(1), 41-53.

Lee, Y., & Mason, C. (1999). Responses to information inconcruency in advertising: The role of expectancy, relevancy, and humor. *Journal of Consumer Research, 26*, 156-169.

Ludden, G.D.S., & Schifferstein, H.N.J. (2009). Should Mary smell like biscuit? Investigating scents in product design. *International Journal of Design, 3*(3), 1-12.

Lwin, M.O., & Morrin, M. (2012). Scenting movie theatre commercials: The impact of scent and pictures on brand evaluation and ad recall. *Journal of Consumer Behavior*. *11*(3), 364-372. doi: 10.1002/cb.1368

Lwin, M.O., Morrin, M., & Krishna, A. (2010). Exploring the superadditive effects of scent and pictures on verbal recall: An extension of dual coding theory. *Journal of Consumer Psychology, 20*(3), 317-326. doi: 10.1016/j.jcps.2010.04.001

MacInnis, D.J., & Jaworski, B.J. (1989). Information processing from advertisements: Toward and integrative framework. *Journal of Marketing, 53,* 1-23.

MacInnis, D.J., & Park, C.W. (1991). The differential role of characteristics of music on high- and low-involvement on consumers' processing of ads. *Journal of Consumer Research, 18,* 161-173.

MacKenzie, S.B., & Lutz, R.J. (1989). An empirical examination of the structural antecedents of attitude toward the ad in an advertising pretesting context. *Journal of Marketing, 53*(2), 48-65.

Magnini, V.P., & Karande, K. (2010). An experimental investigation into the use of written smell references in ecotourism advertisements. *Journal of Hospitality & Tourism Research, 34*(3), 279-293. doi: 10.1177/1096348009350636

Mehrabian, A., & Russell, J.A. (1974). *An approach to environmental psychology*. Cambridge, MA: The MIT Press.

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,* 576-583. doi: 10.1016/j.jbusres.2003.07.004

Mitchell, A.A., & Olsen, J.C. (1981). Are product attribute beliefs the only mediator of advertising effects on brand attitude? *Journal of Marketing Research, 18*(3), 318-332.

Muehling, D.D., & McCann, M. (1993). Attitude toward the ad: A review. *Journal of Current Issues and Research in Advertising, 15*(2), 25-58.

Oliver, R.L. (1980). A cognitive model of the antecedents and consequences of satisfaction decisions. *Journal of Marketing Research, 17*(4), 460-469.

Paivio, A. (2007). *Mind and its evolution: A dual coding theoretical interpretation*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Peck, J., & Wiggins, J. (2006). It just feels good: Customers' affective response to touch and influence on persuasion. *Journal of Marketing, 70,* 56-69.

Perracchio, L.A., & Meyers-Levy, J. (1994). How ambiguous cropped objects in ad photos can affect product evaluations. *Journal of Consumer Research*, *21*(1), 190-204.

Peter, J., & Olsen, J. (2002). *Consumer behavior and marketing strategy*. Boston: McGraw-Hill/Irwin.

Petty, R.E., & Cacioppo, J.T. (1986). *Communication and persuasion: Central and peripheral routes to attitude change*. New York: Springer Verlag.

Petty, R.E., Cacioppo, J.T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research*, *10*, 135-146.

Pieters, R.G.M., Rosbergen, E., & Hartog, M. (1996). Visual attention to advertising: The impact of motivation and repetition. *Advances in Consumer Research*, *23*, 242-248.

Richardson, H.T.E., & Gesualdo, M.Z. (1989). Cognition and olfaction: A review. *Psychological Bulletin*, *105*(3), 352-360

Sakai, N., Imada, S., Saito, S., Kobayakawa, T., & Deguchi, Y. (2005). The effect of visual images on perception of odors. *Chemical Senses*, *30*, i244-i245. doi: 10.1093/chemse/bjh205

Scent (2013). In Merriam-Webster's Collegiate Dictionary. Retrieved May 20, 2013, from http://www.merriam-webster.com/dictionary/scent

Schab, F.R., & Crowder, R.G. (1995). Implicit measures of odor memory. In F.R. Schab & R.G. Crowder (Eds.), Memory for odors (pp.72-91). Florence, KY: Psychology Press.

Schifferstein, H.N.J. (2006) The relative importance of sensory modalities in product usage: A study of self-reports. *Acta Psychologica*, *121*, 41-64. doi: 10.1016/j.actpsy.2005.06.004

Schifferstein, H.N.J., & Desmet, P.M.A. (2007). The effects of sensory impairments on product experience and personal well-being. *Ergonomics*, *50*(2), 2026-2048. doi: 10.1080/00140130701524056

Schifferstein, H.N.J., & Spence, C. (2007). Multisensory product experience. In H.N.J. Schifferstein, & P. Hekkert (Eds.), *Product Experience* (pp. 1-37). The Netherlands: Elsevier.

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

Smell (2013). In Merriam-Webster's Collegiate Dictionary. Retrieved May 20, 2013, from http://www.merriam-webster.com/dictionary/smell

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. doi: 10.1016/j.jcps.2011.09.004

Spence, C., & Gallace, A. (2011). Multisensory design: Reaching out to touch the consumer. *Psychology & Marketing*, *28*(3), 267-308. doi: 10.1002/mar.20392

Stevenson, R.J., & Case, T.I. (2005). Olfactory imagery: A review. *Psychonomic Bulletin & Review*, *12*(2), 244-264.

Stevenson, R.J., & Oaten, M. (2008). The effect of appropriate and inappropriate stimulus color on odor discrimination. *Perception & Psychophysics*, *70*(4), 640-646. doi: 10.3758/PP.70.4.640

Wyer, R.S., Jr., Hung, I.W., & Jiang, Y. (2008). Visual and verbal processing strategies in comprehension and judgment. *Journal of Consumer Psychology*, *18*, 244-257. doi: 10.1016/j.jcps.2008.09.002

Yalch, R.F., & Spangenberg, E.R. (2000). The effects of music in a retail setting on real and perceived shopping times. *Journal of Business Research*, *49*(2), 139-147. doi: 10.1016/S0148-2963(99)00003-X

Zampini, M., & Spence, C. (2004). The role of auditory cues in modulating the perceived crispiness and staleness of potato chips. *Journal of Sensory Studies*, *19*(5), 347-363. doi: 10.1111/j.1745-459x.2004.080403.x

Appendix 1 – Questionnaire Pretest

The goal of the survey is to investigate the role of the different senses for the evaluation of products during usage. Please indicate for each of the products, how important it is to you how it feels, smells, sounds and looks. “Very unimportant” would be for an aspect they never pay attention to or if it is irrelevant (such as sound for a candle for example) while “very important” should be ticked if it is the aspect you pay attention to first and is most decisive for your product evaluation.

1. How important is it to you how a ***shower gel***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

2. How important is it to you how an ***air freshener***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

3. How important is it to you how a ***dish liquid***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

4. How important is it to you how a ***shampoo***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

5. How important is it to you how a ***soap***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

6. How important is it to you how a ***cleaning agent***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

7. How important is it to you how a ***bed linen***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

8. How important is it to you how a ***bath towel***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

9. How important is it to you how a ***garbage bag***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

10. How important is it to you how a ***biscuit box***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

11. How important is it to you how a ***toilet paper***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

12. How important is it to you how a ***paper tissue***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

13. How important is it to you how a ***hairbrush***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

14. How important is it to you how a ***candle***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

15. How important is it to you how a ***pen***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

16. How important is it to you how ***sunglasses***…

	1 = Not important at all	2 = unimportant	3 = Somewhat important	4 = important	5 = very important
feels	◯	◯	◯	◯	◯
Smells	◯	◯	◯	◯	◯
Sounds	◯	◯	◯	◯	◯
Looks	◯	◯	◯	◯	◯

17. What is your age?

_____ years

18. What is your gender?

◯ Male
◯ Female
◯

Appendix 2 – Results pretest, comparison scent- vs. non-scent products

Scent-product	Non-scent product	T	df	Sig (two-sided)
Air freshener	Hairbrush	-10.386	22	< .001
	Pen	-10.909	22	< .001
	Sunglasses	-10.155	22	< .001
Soap	Hairbrush	-9.831	22	< .001
	Pen	-10.364	22	< .001
	Sunglasses	-9.657	22	< .001
Shampoo	Hairbrush	-9.660	22	< .001
	Pen	-10,197	22	< .001
	Sunglasses	-9,503	22	< .001

Appendix 3 – Results pretest, separate analysis of products

Product	Modality	T	df	Sig (two-sided)
Air freshener (scent)	Touch	-16.612	22	< .001
	Sound	-10.929	22	< .001
	Look	-8.405	22	< .001
Soap (scent)	Touch	-3.312	22	< .01
	Sound	-11.324	22	< .001
	Look	-6.371	22	< .001
Shampoo (scent)	Touch	-7.360	22	< .001
	Sound	-14.223	22	< .001
	Look	-7.965	22	< .001
Hairbrush (scent)	Touch	1.742	22	.096
	Sound	-1.014	22	.321
	Look	1.584	22	.127
Pen (scent)	Touch	10.379	22	< .001
	Sound	1.325	22	.199
	Look	6.075	22	< .001
Sunglasses (scent)	Touch	8.807	22	< .001
	Sound	-1.940	22	.065
	Look	62.020	22	< .001

Appendix 4 – Sample distribution

Research group	Manipulation	Number		Age		Gender	
		n	%	M	SD	n male (%)	n female (%)
1	High motivation to process, soap with reference	27	13.7	33.3	11.21	10 (37)	17(63)
2	High motivation to process, soap without reference	22	11.2	33.64	11.11	2 (9.1)	20 (90.9)
3	High motivation to process, pen with reference	23	11.7	32.13	10.52	9 (39.1)	14 (60.9)
4	High motivation to process, pen without reference	28	14.2	29.89	10.08	4 (14.3)	24 (85.7)
5	Low motivation to process, soap with reference	22	11.2	34.91	11.20	4 (18.2)	18 (81.8)
6	Low motivation to process, soap without reference	24	12.2	37.58	11.40	5 (20.8)	19 (79.2)
7	Low motivation to process, pen with reference	22	11.2	35.09	12.42	5 (22.7)	17 (77.3)
8	Low motivation to process, pen without reference	29	14.7	30.17	9.60	3 (10.3)	26 (89.7)
Total		**197**	**100**	**33.16**	**10.99**	**42 (21.32)**	**155 (78.68)**

Appendix 5 – Words with strong olfactory associations

Experimental items: Spanish words with strong olfactory associations (mean rating = 6.00 on a 1–7 scale) and their English translations

Aguarrás	(Turpentine)	Fétido	(Fetid)	Perfume	(Perfume)
Ajo	(Garlic)	Flor	(Flower)	Peste	(Foul smell)
Alcanfor	(Camphor)	Halitosis	(Halitosis)	Pies	(Feet)
Amoniaco	(Ammonia)	Heces	(Faeces)	Pintura	(Painting)
Anís	(Anise)	Hedor	(Stink)	Podrido	(Rotten)
Aroma	(Aroma)	Incienso	(Incense)	Pólvora	(Gunpowder)
Azahar	(Orange blossom)	Jabón	(Soap)	Pútrido	(Putrid)
Barniz	(Varnish)	Jazmín	(Jasmine)	Rancio	(Rancid)
Basura	(Rubbish)	Lavanda	(Lavender)	Resina	(Resin)
Betún	(Bitumen)	Lejía	(Bleach)	Retrete	(Bathroom)
Caca	(Poo)	Letrina	(Latrine)	Romero	(Rosemary)
Café	(Coffee)	Limón	(Lemon)	Rosa	(Rose)
Canela	(Cinnamon)	Maloliente	(Stinking)	Sándalo	(Sandal)
Clavel	(Carnation)	Menta	(Mint)	Sardina	(Sardine)
Cloaca	(Sewer)	Mentol	(Menthol)	Sobaco	(Armpit)
Colonia	(Cologne)	Mierda	(Shit)	Sudor	(Sweat)
Establo	(Cowshed)	Orégano	(Oregano)	Tufo	(Fug)
Eucalipto	(Eucalyptus)	Orina	(Urine)	Vainilla	(Vanilla)
Excremento	(Excrement)	Pachulí	(Patchouli)	Vinagre	(Vinegar)
Fecal	(Faecal)	Pedo	(Fart)	Vómito	(Vomit)

Note. Taken from: González, J., Barros-Loscertales, A., Pulvermüller, F., Meseguer, V., Sanjuán, A., Belloch, V., & Ávila, C. (2006). Reading cinnamon activates olfactory brain regions. *NeuroImage*, *32*, 906-912. doi: 10.1016/j.neuroimage.2006.03.037

Appendix 6 – Main study questionnaire

High motivation to process condition:

Welcome!

Thank you for your participation in this study. In the context of my Master program Communication Science I am testing a new method for testing draft versions of advertisements for new products.

In the following you will see three different advertisements. Please, look at the ads and read through the information carefully and thoroughly at your own pace. Afterwards you will be asked questions about one of the three ads.

Don't be irritated if questions might sound similar to you, this is due to scientific procedures. There are no wrong answers and the questionnaire is completely anonymous. It will take approximately 10 minutes to complete the survey.

If you fill in the complete questionnaire you have the chance to win one of three 10€ vouchers at amazon.de. Please click on "next" to start the survey.

Low motivation to process condition:

Thank you for your participation in this study. In the context of my Master program Communication Science I am testing a new method for testing draft versions of advertisements for new products.

In the following you will see three different advertisements. Please, have a quick look at them. Afterwards you will be asked some questions.

Don't be irritated if questions might sound similar to you, this is due to scientific procedures. There are no wrong answers and the questionnaire is completely anonymous. It will take approximately 10 minutes to complete the survey.

If you fill in the complete questionnaire you have the chance to win one of three 10€ vouchers at amazon.de. Please click on "next" to start the survey.

>> Exposure to three advertisements (8 different groups)

High motivation to process				*Low motivation to process*			
Scent primary product attribute		*Scent irrelevant product attribute*		*Scent primary product attribute*		*Scent irrelevant product attribute*	
1.Soap with reference *2.Towel* *3.Thermos flask*	*1.Soap without reference* *2.Towel* *3.Themos flask*	*1.Pen with reference* *2.Towel* *3.Thermos flask*	*1.Pen without reference* *2.Towel* *3.Thermos flask*	*1.Soap with reference* *2.Towel* *3.Thermos flask*	*1.Soap without reference* *2.Towel* *3.Themos flask*	*1.Pen with reference* *2.Towel* *3.Thermos flask*	*1.Pen without reference* *2.Towel* *3.Thermos flask*

Now, please answer the following questions. All questions refer to the soap/pen advertisement that you have just seen. Remember that there are no wrong answers.

1. Which of the following attributes were named in the soap/pen ad? Please tick those attributes you think were in the advertisement.

Soap:

○	Contains vitamin C and E
○	Easy to dose due to its practical dispenser
○	Made from pure plant extracts and Aloe Vera
○	The combination of silk proteins an argan oil makes your skin soft and smooth
○	pH-neutral care formula preserves the natural balance of your skin
○	Especially hygienic because of its mild antiseptic formula that helps eliminate up to 99% of all bacteria
○	Dermatologically tested
○	Also available as refill pack in three sizes
○	Natural, next-to-skin lipids protect and nourish your skin
○	Contains moisturizing ingredients/substances so that it does not dry out your skin

Pen:

○	Ergonomically designed and stresses the wrist 15% less
○	Made from stainless steel
○	No smearing thanks to quick-drying and waterproof ink
○	Lies comfortably in the hand
○	Ball point is replaceable and available in three sizes
○	Safe grip for fatigue-proof writing thanks to the anti-slip gripping zone
○	Can also be used for the operation of smartphones and tablets
○	Requires less pressure for a comfortable and smooth writing process
○	Suitable for right-handed as well as left-handed people
○	The push mechanism prevents ink from drying out

2. How did you feel when you saw the soap/pen advertisement?

Happy	○	○	○	○	○	Unhappy
Pleased	○	○	○	○	○	Annoyed
Satisfied	○	○	○	○	○	Unsatisfied
Contented	○	○	○	○	○	Melancholic
Hopeful	○	○	○	○	○	Despairing
Relaxed	○	○	○	○	○	Bored
Stimulated	○	○	○	○	○	Relaxed
Excited	○	○	○	○	○	Calm
Frenzied	○	○	○	○	○	Sluggish
Jittery	○	○	○	○	○	Dull
Wide-awake	○	○	○	○	○	Sleepy
Aroused	○	○	○	○	○	Unaroused
Controlling	○	○	○	○	○	Controlled
Influential	○	○	○	○	○	Influenced
In control	○	○	○	○	○	Cared-for
Important	○	○	○	○	○	Awed
Dominant	○	○	○	○	○	Submissive
Autonomous	○	○	○	○	○	Guided

3. How much do you agree with the following statements about the soap/pen advertisement?

	Completely disagree	**Don't agree**	**Neutral**	**Agree**	**Completely agree**
I like the ad	○	○	○	○	○
The ad is appealing to me	○	○	○	○	○
The ad is attractive to me	○	○	○	○	○
The ad is interesting to me	○	○	○	○	○
I think the ad is bad	○	○	○	○	○

4. What do you think about the soap/pen which you have seen in the advertisement?

I would not purchase this product	○	○	○	○	○	I would purchase this product
Mediocre product	○	○	○	○	○	Exceptional product
Not at all high quality	○	○	○	○	○	Extremely high quality
Poor value	○	○	○	○	○	Excellent value
Boring	○	○	○	○	○	Exciting
Not a worthwhile product	○	○	○	○	○	A worthwhile product
Unappealing product	○	○	○	○	○	Appealing product
Common	○	○	○	○	○	Unique

5. How much do you agree with the following statements about the soap/pen?

	Definitely not	Probably not	Maybe	Probably yes	Definitely yes
Would you like to try this product?	○	○	○	○	○
Would you buy this product if you happened to see it in a store?	○	○	○	○	○
Would you actively seek out this product (in a store in order to purchase it)?	○	○	○	○	○
I would patronize this product.	○	○	○	○	○

6. How much do you agree with the following statements?

	Completely disagree	Don't agree	Neutral	Agree	Completely agree
When I purchase a brand of soap/pen, it's not a big deal if I make a mistake?	○	○	○	○	○
It is really annoying to purchase a soap/pen that is not suitable	○	○	○	○	○
A poor choice of soap/pen would be upsetting	○	○	○	○	○
I am indifferent to the soap/pen I use	○	○	○	○	○
I attach a great importance to soap/pen	○	○	○	○	○
I have a strong interest in soap/pen	○	○	○	○	○

7. How much do you agree with the following statement?

	Completely disagree	Don't agree	Neutral	Agree	Completely agree
I was motivated to evaluate the information listed in the advertisement carefully and thoroughly.	○	○	○	○	○

8. What is your gender?

○	Male
○	Female

9. How old are you?

[ ] years

Thank you very much for participating in this survey. If you want the chance to win one of three 10€ vouchers at amazon.de, please fill in your e-mail address in the designated area below. This information will only be used for the purpose of informing you in case you win. Afterwards the information will be deleted.

[ ]

You can close this window now.

Appendix 7 – Results ANOVA effect of written scent reference on memory

	Type III Sum of Squares	df	Mean Square	F	Sig.
Product	36.818	1	36.818	32.605	.000
Motivation	6.249	1	6.249	5.534	.020
Reference	1.342	1	1.342	1.188	.277
Product*Motivation	1.934	1	1.934	1.713	.192
Product*Reference	0.117	1	0.117	0.104	.748
Motivation*Reference	2.480	1	2.480	2.196	.140
Product*Motivation*Reference	0.580	1	0.580	0.513	.475

Appendix 8 – Results ANOVA with product as independent variable

Table 1

Test of Between-Subject Effects

Dependent variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Pleasure	0.085	1	0.085	0.282	.596
Arousal	0.258	1	0.258	1.060	.304
Dominance	0.787	1	0.787	5.445	.021
Attitude toward the ad	0.450	1	0.450	0.476	.491
Attitude toward the product	2.619	1	2.619	5.201	.024
Purchase intention	0.233	1	0.233	0.474	.492

Table 2

Group statistics

Dependent variable		M (SD)
Dominance	Soap	3.05 (0.362)
	Pen	3.17 (0.414)
Attitude toward the product	Soap	2.73 (0.649)
	Pen	2.96 (0.793)

Appendix 9 – Results ANOVA with motivation and reference as independent variables

Table 1

Test of Between-Subject Effects

Dependent variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Pleasure	1.888	1	1.888	6.223	.013
Arousal	0.437	1	0.437	1.793	.182
Dominance	0.104	1	0.104	0.717	.398
Attitude toward the ad	14.695	1	14.695	15.532	.000
Attitude toward the product	6.259	1	6.259	12.429	.001
Purchase intention	4.166	1	4.166	8.451	.004

Table 2

*Group statistics motivation*reference*

Dependent variable	Motivation to process	Reference	M (SD)
Pleasure	Low	no	3.08 (0.504)
		yes	3.40 (0.576)
	High	no	3.26 (0.529)
		yes	3.18 (0.584)
Attitude toward the ad	Low	no	2.52 (0.967)
		yes	3.27 (0.912)
	High	no	3.09 (0.945)
		yes	2.75 (1.025)
Attitude toward the product	Low	no	2.63 (0.683)
		yes	3.04 (0.780)
	High	no	3.05 (0.660)
		yes	2.72 (0.744)
Purchase intention	Low	no	2.28 (0.692)
		yes	2.63 (0.708)
	High	no	2.59 (0.694)
		yes	2.34 (0.705)