The Moderating Effects of Stimuli in Consumer Research:

A Meta-Theoretical Approach

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Abstract

This study investigates the moderating influence of stimuli on four different types of relationships between cognitive and affective consumer responses: cognitive-cognitive, cognitive-affective, affective-affective, and affective-cognitive. Based on two experimental studies, which manipulate scent (n=164) and physical surroundings (n=160) as moderating stimuli, we find support for the proposition that a positive stimuli is more likely to positively moderate relationships between consumer responses that are on the same dimension (i.e., affective with affective or cognitive with cognitive) than relationships between consumer responses that are on different dimensions (i.e., affective with cognitive or cognitive with affective).

Keywords: Cognitive response, affective response, moderator, scent, physical surroundings.

Introduction

In recent years, consumer researchers have become increasingly interested in investigating the role of moderating variables when studying consumer behaviour. In 2010, more than 75 peer reviewed journal articles dealing with consumer behaviour included a least one of the terms 'moderating/moderate/moderates/moderator' in their title, and more than 150 articles included one of the terms in their abstract. A moderating effect is commonly conceptualised as a third (moderating) variable, which changes the relationship between two related variables. Specifically, a moderating variable "systematically modifies either the form and/or strength of the relationship between a predictor and a criterion variable" (Sharma, Durand, and Gur-Arie 1981, p. 291). Moderating variables may, for instance, include demographic and socioeconomics variables (e.g., gender, age, income), contextual variables (e.g., time-pressure, physical surroundings), and psychographic variables (e.g., self-esteem, self-efficacy).

In this study, we investigate the moderating influence of *stimuli* on four different types of relationships between cognitive and affective consumer responses: (1) cognitive-cognitive, (2) cognitive-affective, (3) affective-affective, and (4) affective-cognitive. In general, stimuli can be described as any sensory input, which arouses a consumer's sensory organs (Parducci 1984). Past research has long recognized the importance of stimuli in influencing individuals' thoughts, feelings, and behaviour. Stimuli suggested to influence judgments, emotions, and intentions include, but are not limited to, colour (Miller and Kahn 2005), packaging design (Clement 2007), scent (Baron 1997; Bone and Jantrania 1992), physical surroundings (Sayed, Farrag, and Belk 2003), motion pictures (Gazley, Clark, and Sinha 2011), social surroundings (Zhao and Xie 2011), and weather (Sun, Govind, and Garg 2009). More generally speaking, prior research suggests that upon presentation of stimuli, the consumer attends to some portion of these stimuli evoking cognitive and affective responses (Compeau, Grewal, and Monroe 1998). A cognitive response includes the knowledge, opinions, beliefs, and/or thoughts that individuals produce when exposed to a specific stimulus. An affective response is a feeling state that occurs in response to a specific stimulus. An affective response is differentiated from general affect, in that the former is a specific response to stimuli, whereas the latter is a more global feeling state that may or may not have been induced by particular stimuli (Compeau, Grewal, and Monroe 1998; Fishbein and Azjen 1998).

Given the wide use of stimuli, it is surprising that no studies known to us have yet investigated the overall power and significance of stimuli on *relationships* between consumers'

cognitive and affective responses. Hence, the purpose of this study is to extend prior analyses concerning the influence of stimuli on consumer responses. Specifically, based on prior consumer behaviour and psychology research (e.g., Parayitam and Dooley 2009; Trafimow and Sheeran 1998; Eagly, Mladinic, and Otto 1994; Berkowitz 1993) we suggest that when consumers are exposed to a positive stimulus a positive moderating effect is *more* likely to occur when the relationship to be moderated is a cognitive-cognitive relationship or an affective-affective relationship, respectively, and *less* likely to occur when the relationship to be moderated is a cognitive-affective relationship or an affective-cognitive relationship, respectively. In this study, we define a positive stimulus as a stimulus that is likely to invoke positive cognitive and affective responses.

The contributions of this study to the consumer marketing literature are twofold. Our study provides substantial insights into the moderating role of stimuli on relationships between consumer cognitive and affective responses. Moreover, we demonstrate that consumer researchers should carefully consider whether detected moderating effects may be partially caused by a 'dimension effect', i.e., the moderated relationship consists of responses that are on same dimensions, or, alternatively, whether a lack of moderating effects may be caused by responses that are on different dimensions.

Two experimental studies tested our proposals. In both studies, respondents' were presented to a food product along with a manipulated (moderating) stimulus (*Study 1*: scent (n=164); *Study 2*: physical surroundings (n=160)). Food is known to potentially evoke both cognitive and emotional responses. As suggested by Zajonc and Marcus (1982), and supported by Grunert's theory of eating as emotional self-regulation (1993), "one of the clearest manifestations of the puzzling interplay of cognitive and affective influences is found in food preferences" (p. 123).

Theoretical Framework and Research Hypotheses

Theoretical framework

When exposed to stimuli, individuals are believed to form cognitive and affective structures, which are seen as the interrelationships among cognitive and affective responses, respectively (Carrillat et al. 2009). Within the cognitive and affective structure, individuals' responses can be classified according to their hierarchical level. Berkowitz (1993) identifies two distinct types of

affect: low-order affective reactions (responses) and high-order affective reactions (responses). While a low-order affective response is elicited by "relatively basic and automatic associative processes" (Berkowitz 1993) (e.g., seeing a food product may induce a pleasure-feeling), a high-order affective response comes from a more deliberate and strategic cognitive processing (e.g., 'how would I feel eating this product'). A distinction can also be made between low-order and high-order cognitive responses. Cognitive decision-making relies, in part, on the ability of decision-makers to understand what they expect from the product/how they judge the product (low-order cognitive response), and how they intend to react based on their expectation/judgment (high-order cognitive response) (Marshall 2003; Fishbein and Azjen 1998).

The distinction between low-order and high-order cognitive and affective responses, respectively, is incorporated into our conceptual model (Figure 1).

Insert Figure 1 about here

It should be recognized, however, that making a complete separation between cognitive and affective responses is hardly possible. Even *if* such a separation would be possible, the separation would hardly remain for long since cognitive and affective responses are likely to influence each other (Sun and Zhang 2006; Dörner et al. 1998) and since they 'function conjointly' (Zajonc 1984; Zajonc and Marcus 1982), a proposition that is supported by LeDoux's (1989) neurophysiological findings. Also, in order to produce an affective response some rudimentary cognitive analysis of stimulus is necessary to allow the organism to recognize the stimulus (Swann et al. 1987). Nevertheless, it seems reasonable to assume that some responses are 'more affective' and some are 'more cognitive' (Berg et al. 2006; Trafimow and Sheeran 1998; Eagly, Mladinic, and Otto 1994). Indeed, individuals' cognitive and affective responses when interacting with a product or service can be quite different. For instance, one might understand that taking a medicine is useful and necessary for one's health; nevertheless, one can at the same time consider it unpleasant due to its smell and taste (Sun and Zhang 2006). If we accept that affect and cognition are to a considerable extent separate components of individuals' mental processes, it follows that it should be possible to investigate relationships between cognitive/affective low-order responses and cognitive/affective high-order responses.

Research hypothesis

While some contributions make a clear distinction between cognitive and affective response processes (e.g., Petty and Cacioppo, 1986), most scholars recognize that a parallel activation of both kinds of processes is possible (e.g., Sloman 2002). This line of reasoning is consistent with dual processing theory, which regards human thinking as an interplay between heuristic processes, which do not require much effort, and analytic and evaluative processes that demand cognitive effort (Franssens and De Neys 2009; Jacobs and Klaczynski 2002). In this regard, past research indicates that it should be easier to compare responses to each other if they are on the same dimension (i.e., affective with affective or cognitive with cognitive) than if they are on different dimensions (i.e., affective with cognitive) (Trafimow and Sheeran 1998). As an extension of past research, we expect that an external positive stimulus (i.e., a moderating sensory variable) that arouses individuals' processing resources would be more favourably integrated in responses that are on the same dimension compared to responses that are on different dimensions.

Our expectation is based on the following arguments. First, according to the effort-accuracy framework of cognition proposed by Payne (1982) the primary objectives of a decision maker are to maximize the quality of her/his actions (accuracy) and to minimize cognitive effort. Cognitive effort is the amount of cognitive resources - including perception, memory, and judgment - devoted to a particular or activity. Thus, in the presence of a positively moderating stimulus, it seems sensible that a first-order cognitive response is more likely to increase its influence on a second-order cognitive response than a second-order affective response, and vice versa. This is because integrating a stimulus into relationships between responses that are on the same dimension should be expected to be less resource-demanding than integrating a stimulus into relationships between responses that are on different dimensions.

Second, integrating affective responses with each other is likely to result in a general concept of 'how I feel about performing the behaviour' (i.e., an affect concept) and comparing cognitive responses with each other is likely to result in a general concept of 'whether it is to my advantage or disadvantage to perform the behaviour' (i.e., a cognition concept). Hence, since a decision can be made on the basis of considering just these two concepts rather than having to consider a large set of responses that may align on different dimensions (Trafimow and Sheeran 1998) consumers should be expected to be more likely to concentrate their resources on relationships that are on the same dimension. In a similar vein, Berg et al. (2006) demonstrated

that individuals' type of focus (affective vs. cognitive) renders affective or cognitive information more salient. Also, people who focus on affect have been found to show greater affect-behaviour consistency whereas people who focus on cognition show greater cognition-behaviour consistency (Crites, Fabrigar, and Petty 1994; Millar and Tesser 1986). Hence, in order to maintain consistencies between responses, we would expect consumers' to positively adjust the relationships between low-order and second-order cognitive and affective responses, respectively, when exposed to a positive stimulus. Based on the above reasoning we hypothesize as follows:

> *A positive sensory stimuli is more likely to positively moderate relationships between consumer responses that are on the same dimension (i.e., affective with affective or cognitive with cognitive) than relationships between consumer responses that are on different dimensions (i.e., affective with cognitive).*

Our research hypothesis concerns the moderating influence of a *positive* stimulus on the relationships between cognitive and affective dimensions. Although not investigated in the present study, we would also expect that a negative sensory stimulus would be more likely to negatively moderate relationships between consumer responses that are on the same dimension (i.e., affective with affective or cognitive with cognitive) than relationships between consumer responses that are on different dimensions (i.e., affective with cognitive). This is because a negative stimulus invokes negative cognitive and affective responses. Hence, in order to avoid inconsistencies between responses, we would expect consumers' to negatively adjust the relationships between low-order and second-order cognitive and affective responses, respectively.

It is well recognized that moderator effects are difficult to detect in nonexperimental studies (McClelland and Judd 1993; Steenkamp and Geyskens 2006). In simulation studies, McClelland and Judd (1993) show that "91% of the simulated field studies made Type II errors by failing to reject a false null hypothesis" (p. 319). Hence, we believe that controlled laboratory settings would provide stronger evidence than nonexperimental studies (e.g., surveys, interviews) for investigating the existence of the postulated moderating effects and therefore tested our research hypothesis with two experimental studies.

Study 1

In study 1, 'scent' was manipulated as a moderating variable to test our study proposals. Of the five senses, smell can be considered to be the most closely attached to emotional reactions because smell is connected to the limbic system in the brain, which is the seat for immediate human emotions (Michon, Chebat and Turley 2005). Previous research has found that when individuals are exposed to scent they often form cognitive responses, which in turn may induce other cognitive responses and/or affective responses (Doucé and Janssens 2011). Also, individuals exposed to scent may form affective responses, which in turn may induce other affective responses (Kotler 1974; Babin and Darden 1996; Baron 1997) and/or cognitive responses (Baron and Thomley 1994; Baron 1997).

Methodology

Scent can be classified into two distinct types according to whether the scent originates from a particular object/product (i.e., nonambient scent) or whether it is generally present in the environment (i.e., ambient scent), for example in a retail store. The nonambient scent type can further be divided into congruent scent (i.e., scent that can naturally be related to the specific product, for example a coffee package scented with a coffee scent) and incongruent scent (i.e., scent that cannot naturally be related to the specific product, for instance a coffee package scented with a lavender scent) (Mattila and Wirtz 2001; Bone and Ellen 1999). This study concerns the nonambient congruent scent type.

164 graduate students at a large Scandinavian business school participated in the experiment. In the experiment, scent type was manipulated as a between subjects factor, with subjects randomly assigned to either a congruent (n=80) or an unscented (n=84) condition. The product used in the experiment was potato chips and the congruent scent was a 'potato chips scent'. An expert in the field developed the scent, which during the experiment were sprayed homogeneously on the package of the potato chips. Each respondent was exposed to a new package. Several criteria guided the selection of the food product:

(1) At the time of the experiment, the product was at the introductory stage in the marketplace and was not well known among consumers. We wished to avoid well-known and established product-brands in the study since respondents may already have gained experiences towards such brands and may therefore 'know' the performance of the products in advance

(Render and O'Connor 1976; Dodds 1991). (2) The product should not require any complex cooking procedures so that the manipulated scents could realistically be transferred to a desire (or no desire) to eat and/or buy the product. (3) The product used should have a product-specific scent. That is, most consumers should relate the (congruent) scent to the product and not to other kinds of products.

Procedure

One at the time subjects were welcomed and were guided to a neutral room containing two chairs, one table with a package of chips (either congruent scented or not scented), and a shelf comprising additional ten packages of chips. The package was sprayed with the chips scent before the respondent entered the room so that s/he would not be alert to the role of scent in the experiment. Before a new respondent entered the room in which the experiments were conducted, the room was very carefully aired to ensure homogeneous input treatments across respondents. After the respondent was seated s/he was asked to take a look at the package of chips found on the table. Like in a potential buying situation the respondent was allowed to touch the package. A new package of chips was utilized for every new respondent to ensure homogenous treatments within experimental cells. After evaluating the chips product, the respondent was asked to complete a questionnaire containing the constructs applied in this study. During the completion of the questionnaire the respondent was seated with the manipulated chips package in front of her/him, to ensure that the respondent was continuously exposed to the manipulated scent.

Measurements

Multiple-item scales were constructed for all the latent metric variables (including two affective responses and two cognitive responses, respectively) applied in this study. The final items for each construct are summarized in the Appendix.

Affective responses. (1) Low-order affective response: Consumer research has produced a number of scales for measuring consumer emotions, among these Izard's (1977) Differential Emotions Scale (DES) that includes ten basic emotions (interest, enjoyment, surprise, distress, anger, disgust, contempt, fear, shame/shyness, and guilt), and Mehrabian and Russel's (1974) PAD-Scale that includes three more general emotional dimensions: pleasure, arousal, and dominance. In the present study the pleasure dimension of Mehrabian and Russel's PAD-Scale was used to represent emotions. Other researchers (e.g., Chebat and Michon 2003) have

previously used this dimension of the PAD-Scale successfully in relation to experiments dealing with manipulations of scent. (2) High-order affective response: High-order affective reactions come from a deliberate cognitive processing of the consumer's emotions. Guided by this notion and by previous research dealing with consumers' high-order affective responses (e.g., Compeau, Grewal, and Monroe 1998; Trafimow and Sheeran 1998), the construct 'eating pleasantness' represented the high-order affective response in the study. Three items derived from Compeau, Grewal, and Monroe (1998) measured eating pleasantness with each item asking respondents to report how they would feel eating the chips. A sample item from this scale is 'I would enjoy eating these chips'.

Cognitive responses. (1) Low-order cognitive response: In short, a cognitive construct can be understood as "generalized beliefs about how things work" (Lazarus 1991, p. 820). Guided by this notion and by previous research dealing with consumers' judgments of food products (e.g., Hansen 2005; Steenkamp 1989) three items measured 'product judgment'. A sample item from this scale is 'a good/bad product'. (2) High-order cognitive response: The construct 'Willingness to buy' (WtB) was used to represent the high-order cognitive response in the study: Two items captured respondents' willingness to buy the chips. A sample item from this scale is: 'When compared to other kinds of potato chips it is"… [(1) much more unlikely to (7) much more likely]…that I would buy this product'.

Pretest and manipulation check

Olfactory stimuli are likely to follow an inverted U-shape function: as scents get more intense, reactions tend to become more negative (Spangenberg, Crowley, and Henderson 1996; Henion, 1971). That is, a scent in low concentrations may invoke a pleasant feeling while the same scent in high concentrations may be considered nauseating. It was therefore important that the concentration of scent used in the experiments was balanced so that it would reach the olfactory system - but not to a degree where it might cause negative reactions. An expert in the field (an experienced developer of scents) developed both the scent and provided guidance as to what concentration would be appropriate (during the experiments the scent was sprayed homogeneously on the packages of the potato chips using an advanced instrument).

A pre-test involving ten additional students (unrelated to the main sample and instructed not to reveal their participation) were exposed to the suggested concentration of chips-scent. The respondents were asked to characterize the scent on each of the three dimensions: (1)

Sensible/non-sensible, (2) low concentration/medium concentration/high concentration and (3) likely to invoke negative emotions/unlikely to invoke negative emotions. All respondents were capable of sensing the concentration when sprayed on the chips-package and all respondents agreed that the concentration was 'medium' and 'unlikely to invoke negative emotions'.

A more formal manipulation check of the variation in scent suggests that the scent condition successfully invoked a positive stimulus perception among respondents. On the averaged scale, respondents in the scent condition had a significantly higher pleasure-feeling than respondents in the no scent condition ($mean_{congruent\ scent}$=3.69 vs. $mean_{no\ scent}$=3.23, $p_{diff.}$<.01). Moreover, our results show that respondents exposed to the congruent scent condition more positively judged the chips product than respondents exposed to the no scent condition ($mean_{congruent\ scent}$=5.00 vs. $mean_{no\ scent}$=4.48, $p_{diff.}$<.01).

Results

Validation of measurements

Confirmatory factor analysis (CFA) was conducted on the four latent factors, with each indicator specified to load on its hypothesized latent factor. Raw data was used as input for the maximum likelihood estimation procedure (Gerbing and Anderson 1988). Table 1 summarizes the CFA results.

Insert Table 1 about here

The measurement model yields a chi-square of 124.08 (d.f.=59, p<.01). The root mean square error of approximation (RMSEA=.077), the comparative fit index (CFI=.93) and the normed fit index (NFI=.92) show an acceptable degree of fit of the measurement model (Bagozzi snd Yi 1988). Composite reliability, which represents the shared variance among observed items measuring an underlying construct (Workman, Homburg, and Jensen 2003) was examined. All reliabilities exceeded .70, indicating good reliability of measured constructs (Bagozzi and Yi 1988). Finally, extracted variance was greater than .5 for all latent constructs, which satisfies the threshold value recommended by Fornell and Larcker (1981).

In order to investigate discriminant validity the method proposed by Fornell and Larcker (1981) was applied. According to this method, the extracted variance for each individual

construct should be greater than the squared correlation (i.e., shared variance) between constructs. An examination of Table 2 shows that the extracted variance for each of the constructs exceeded the squared correlation.

Insert Table 2 about here

Moreover, to further test discriminant validity, the baseline measurement model was compared to alternative models where covariances between pairs of constructs were constrained to unity (Anderson and Gerbing 1988). In every case, the restricted model had a significant (p<.05) poorer fit than the unrestricted model suggesting sufficient discriminant validity.

A CFA approach to Harmon's one-factor test was used as a diagnostic technique for assessing the extent to which common method bias may pose a serious threat to the analysis and interpretation of the data (Kandemir, Yaprak, and Cavusgil 2006; Ramani and Kumar 2008). Common method variance is a known limitation when using self-report measures. The single latent factor accounting for all the manifest variables yielded a chi-square value of 487.01 (d.f.=65, p<.01). A chi-square difference test between the chi-square values of the two models suggested that the fit of the one-factor model was significantly worse than the fit of the four-factor model ($\Delta\chi^2$=362.93, Δd.f.=6, p<.01) indicating that the measurement model was robust to common method variance.

Hypothesis testing

Initially, an index was formed for each of the four latent study constructs by averaging its items (Brockman and Morgan, 2006). Next, a path analysis was applied for the purpose of testing our research hypothesis (model fit: χ^2=12.89, d.f.=8, p-value=.12; GFI=.97; CFI=.98; RMSEA=.034). The congruent scent x pleasure interaction was positively (although not significantly) related to eating pleasantness (β=.16, p-value=.23) and was negatively related to willingness to buy (β=-.32, p-value=.01). Also, the congruent scent x judgment interaction was positively related to willingness to buy (β=.28, p-value=.03) and negatively related to eating pleasantness (β=-.27, p-value=.05) (Table 3).

Insert Table 3 about here

Scent marginally (and positively) moderated the investigated affective-affective response relationship and positively moderated the investigated cognitive-cognitive response relationship, respectively. Also, consistent with our predictions, scent neither positively moderated the investigated affective-cognitive response relationship nor the investigated cognitive-affective response relationship. In summary, the results of study 1 partially support our research hypothesis.

In order to assess whether scent is a pure or quasi moderator a second model, which also allowed scent to directly influence eating pleasantness and willingness to buy, was specified and tested (Sharma, Durand, and Gur-Arie 1981; Ambrose, Hess, and Ganesan 2007). If scent is a pure moderator, it would only exert moderating effects. If scent is a quasi moderator, it would exert moderating effects, as well as direct effects. The results show that scent does not directly influence eating pleasantness (β=.30, *p*-value=.29) or willingness to buy (β=-.25, *p*-value=.36). Moreover, in the second model the moderating effects were identical to the effects obtained in the first model. Hence, we conclude that scent acts as a pure moderator in the detected three significant interaction effects.

Study 2

In order to provide an additional investigation of our research hypothesis 'physical surroundings' was manipulated in study 2. While study 1 concerned a manipulated food buying situation, study 2 manipulated a food usage situation. As suggested by Hansen (1996, 1998) we usually organize the physical surroundings differently in different food usage situations, and we may have learned to associate elegant physical surroundings with high quality food and with positive emotions. Objects and acts are the important tangible parts of culture. How we act and how we arrange food in different situations have socially constituted meanings, over and above instrumental utility, and these meanings play an important role for the consumer's identity and for how consumers perceive certain food products (e.g., Dittmar 1992; Miele 1999).

Methodology

Subjects were 160 students from a large Scandinavian business school. On the basis of an exploratory study (n=20), two different usage situations were constructed and manipulated. One usage situation was constructed to represent elegant physical surroundings and one usage

situation was constructed to represent less elegant physical surroundings. The manipulation of the physical surroundings in the experiment is displayed in Figure 2. The food product included in the study was (unbranded) solid cheese.

Insert Figure 2 about here

Pretest and manipulation check

Manipulation checks of the variation in the physical surroundings were carried out in two ways. Initially, another 20 students were asked to compare the two types of surroundings. All subjects perceived the manipulated elegant surroundings to be more elegant than the manipulated less elegant surroundings. Like other people, graduate students have all been part of a socialization process and have all learned about the basic cultural rules which guide the arrangements of food related situations. It can therefore be assumed that graduate students are well accustomed to "elegant dining" since elegant dining is a widespread part of many food cultures and since food culture is "transmitted very well to children" (Rozin 1996, p. 96). Next, we investigated the ability of the manipulated elegant physical surroundings to function as a positive stimulus. Our results show that respondents exposed to the elegant physical surroundings had a higher pleasure-feeling ($mean_{\text{elegant physical surroundings}}$=6.27 vs. $mean_{\text{less elegant physical surroundings}}$=5.87, $p_{\text{diff.}}$<.01) and also that they did more positively judge the cheese product ($mean_{\text{elegant physical surroundings}}$ =4.92 vs. $mean_{\text{less elegant physical surroundings}}$ =4.21, , $p_{\text{diff.}}$<.01).

Procedure

One at a time, subjects were welcomed and were accompanied to a room for the purpose of the variation in the physical surroundings. The subject was given time (approx. 1 min.) to obtain an impression of the physical surroundings present. After the subject was seated s/he was asked to spread a slice of white bread with butter and cheese. After tasting the cheese, the subject was asked to answer the questions related to scales applied in this study.

Measurements

Similar to study 1, multiple-item scales were constructed for the four latent metric variables (including two affective responses and two cognitive responses, respectively) applied in this study. The four constructs included in study 2 were similar to the constructs applied in study 1,

and apart from a few modifications the measurement items were identical to the items used in study 2 (see Appendix).

Validation of measurements

Similar to study 1, a CFA was conducted on the four latent factors, with each indicator specified to load on its hypothesized latent factor. Raw data was used as input for the maximum likelihood estimation procedure. Table 1 summarizes the CFA results.

The measurement model yields reasonable fit statistics: χ^2 =133.22 (d.f.=59, p<.01), CFI=.92, NFI=.91, RMSEA=.078, suggesting an acceptable degree of fit of the measurement model. All composite reliabilities exceeded .70 extracted variance was greater than .5 for all latent constructs, which satisfies the threshold value recommended by Fornell and Larcker (1981).

An examination of Table 2 shows that the extracted variance for each of the constructs exceeded the squared correlation. Similar to study 1, the baseline measurement model was compared to alternative models where covariances between pairs of constructs were constrained to unity. In every case, the restricted model had a significant (p<.05) poorer fit than the unrestricted model suggesting sufficient discriminant validity.

The single latent factor (i.e., Harmon's one-factor) accounting for all the manifest variables yielded a chi-square value of 413.18 (d.f.=65, p<.01). A chi-square difference test between the chi-square values of the two models suggested that the fit of the one-factor model was significantly worse than the fit of the four-factor model ($\Delta\chi^2$=279.96, Δd.f.=6, p<.01) indicating that common method variance does not appear a problem in this study.

Hypothesis testing

Initially, an index was formed for each of the four latent study constructs by averaging its items. Next, a path analysis was applied for the purpose of testing our research hypothesis (model fit: χ^2=51.48, d.f.=8, p-value<.01; GFI=.96; CFI=.95; RMSEA=.079). The physical surroundings x pleasure interaction was positively related to eating pleasantness (β=.56, p-value=.02) and was negatively (although not significant) related to willingness to buy (β=-.37, p-value=.14). Also, the physical surroundings x judgment interaction was positively related to willingness to buy (β=.64, p-value<.01) and negatively (although only marginally significant) related to eating pleasantness (β=-.13, p-value=.06) (Table 3).

As expected physical surroundings positively moderated both the investigated affective-affective response relationship and the investigated cognitive-cognitive response relationship. Also, consistent with our predictions, physical surroundings did neither positively moderate the investigated affective-cognitive response relationship nor the investigated cognitive-affective response relationship. In summary, the results of study 2 fully support our research hypothesis.

Similar to study 1, a second model assessed whether physical surroundings is a pure or quasi moderator. The results indicate that physical surroundings directly influences eating pleasantness ((β=.47, *p*-value<.01), but that it does not affect willingness to buy (β=-.32, *p*-value=.21). Hence, we conclude that physical surroundings acts as a quasi moderator with respect to the relationships involving eating pleasantness.

Discussion

Findings

This study investigated the role of stimuli as moderating variables on relationships between low-order and high-order cognitive and affective responses. Specifically, we hypothesized that a positive sensory stimuli is more likely to positively moderate relationships between consumer responses that are on the same dimension (i.e., affective with affective or cognitive with cognitive) than relationships between consumer responses that are on different dimensions (i.e., affective with cognitive). The results from our two experimental studies provided reasonable support for our hypothesis. In study 1, scent positively moderated the relationship between the investigated low and high-order cognitive responses and also positively (although marginally) moderated the relationship between the investigated low and high-order affective responses. Moreover, scent neither positively moderated the relationship between low-order cognitive response and high-order affective response nor the relationship between low-order affective response and high-order cognitive response. In study 2, physical surroundings positively moderated the relationship between the investigated low and high-order cognitive responses and also positively moderated the relationship between the investigated low and high-order affective responses. Consistent with our proposals, physical surroundings neither positively moderated the relationship between low-order cognitive response and high-order affective response nor the relationship between low-order affective response and high-order cognitive response. Hence, our findings support the suggestion of dual processing theory that consumer decision making is

generally supported by heuristic and analytic processes (e.g., Missier, Mäntylä, and Bruin 2010). Specifically, we found that scent and physical surrounding were both capable of invoking cognitive and affective low-order responses, which in turn were related to both cognitive and affective high-order responses.

Implications

Notably, this study provides further evidence for the usefulness of the distinction between affective and cognitive based responses. The finding that a positive stimulus is more likely to positively moderate relationships between consumer responses that are on the same dimension provides important guidance for store and restaurant managers, among others. When seeking to improve, for instance, the shopping environment by modifying its physical design or by scenting a product/physical area, it is important that managers carefully investigate the degree to which such stimuli are likely to evoke positive cognitive and/or affective responses. If a stimulus is more likely to evoke a positive cognitive response managers may wish to stress the presence of product characteristics that can be related to cognitive high-order responses (e.g., 'this product is a bargain', 'take three for the price of two', and the like). If, on the other hand, a stimulus is more likely to evoke a positive affective response managers may wish to stress the presence of product characteristics that can be related to affective high-order responses (e.g., 'eating this product will make you happy', 'a product you will enjoy', and the like). In addition, managers could seek to influence the low-order response (cognitive vs. affective) taken by consumers in buying and/or usage situations. Such 'manipulation' attempts may be especially important in incidents where consumers' low-order responses are 'blurred', i.e., when it is less obvious whether cognitive or affective low-order responses are predominant. Specifically, managers may seek to induce an affective or cognitive focus, respectively, by providing either positive affective information or positive cognitive information when promoting the product (see Berg et al. 2006).

Future research

Although not formally hypothesized in the present research our results indicate that exposing consumers to a positive stimulus may even backfire in incidents where consumers are likely to develop relationships between low-order and high-order responses that are on different dimensions (i.e., affective with cognitive or cognitive with affective). Across the two studies, we found that in three (although only marginally significant) out of four incidents a positive stimulus

negatively moderated relationships between responses that were on different dimensions. This is an interesting observation, which needs further attention by future research in order to determine whether these results could be ascribed to a general tendency, whether they are dependent upon the type of stimulus, or whether they are more likely to be a side-effect being specifically related the present studies. Although perhaps less relevant for practical purposes, future research may also wish to deliberately manipulate *negative* stimuli in order to further increase our understanding of the moderating effects of stimuli on relationships between cognitive and affective low-order and second-order responses. An additional direction for future research is to focus more directly on the type relationships (i.e., cognitive with cognitive, affective with affective, or cognitive with affective) included in a research model. More specifically, a type 2 error may very well arise in incidents where the relationships to be moderated are specified as cognitive with affective, especially if no compelling reason guides this specification. Hence, we suggest that future research takes into account whether a lack of (expected) moderation may be due to such a 'dimension effect'. In this regard, it is not suggested that the present study provides a definitive background understanding of the complexity of the proposed moderating effects. Future research should therefore regard the propositions put forward in this study as starting points for a further understanding of the role of stimuli in moderating relationships between cognitive and affective low-order and second-order responses, which is clearly an under-researched topic.

We also tested whether the manipulated stimuli in studies 1 and 2 could be regarded as pure or quasi moderators, respectively. In study 1, we found that scent was a pure moderator in relation to the detected significant interaction effects, while in study 2 physical surroundings were found both to moderate the specified relationships between low-order and high-order cognitive and affective responses and to directly influence the specified high-order affective response. Hence, in study 2 physical surroundings was a quasi moderator. While no conclusive evidence can be derived solely from the conducted studies regarding whether our research propositions hold true regardless of the type of moderation (i.e., in study 1 our research hypothesis was partially supported and in study 2 it was fully supported), future research may wish to further investigate this aspect by systematically pre-testing and manipulating a range of pure and quasi moderators.

Conclusion

The present paper demonstrated that when consumers are exposed to a positive stimulus a positive moderating effect is *more* likely to occur when the relationship to be moderated is a cognitive-cognitive relationship or an affective-affective relationship, respectively, and *less* likely to occur when the relationship to be moderated is a cognitive-affective relationship or an affective-cognitive relationship, respectively. Further, the paper points out that managers attempting to use a sensory stimulus to influence consumers' intentional behaviour need to consider the relationship between low-order response types (affective vs. cognitive) and the type of intentional behaviour (affective vs. cognitive) that they seek to affect.

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Table 1

Confirmatory factor analysis results – studies 1 and 2

Construct/indicator	Standardized factor loading[a] *Study 1/study 2*	Critical ratio *Study 1/study 2*	Composite reliability *Study 1/study 2*	Extracted variance *Study 1/study 2*
Pleasure			.84 / .84	.52 / .51
X1	.65 / .71	- / -		
X2	.70 / .69	8.96 / 8.02		
X3	.77 / .74	9.25 / 8.45		
X4	.86 / .80	10.28 / 9.02		
X5	.59 / .60	7.12 / 6.90		
X6	# / #	# / #		
Product judgment			.76 / .77	.52 / .52
X7	.70 / .75	- / -		
X8	.84 / .72	9.56 / 8.30		
X9	.61 / .70	7.48 / 7.88		
Eating pleasantness			.76 / .76	.52 / .51
X10	.59 / .65	- / -		
X11	.78 / .69	8.59 / 7.54		
X12	.77 /. 80	8.52 / 8.60		
Willingness to buy			.87 / .80	.78 / .67
X13	.92 / .84	- / -		
X14	.84 / .80	10.25 / 9.17		

[a] One item for each construct was set to 1.

Model fit statistics:
Study 1: χ^2 =124.08 (d.f.=59, p<.01), CFI=.93, NFI=.92, RMSEA=.076.
Study 2: χ^2 =133.22 (d.f.=59, p<.01), CFI=.92, NFI=.91, RMSEA=.078.

Item deleted due to low (<.50) item-total correlation.

Table 2. Discriminant Validity of Constructs – Studies 1 and 2

	Study 1				*Study 2*			
Construct	1	2	3	4	1	2	3	4
1. Pleasure	.52				.51			
2. Product judgment	<.01	.52			.18	.52		
3. Eating pleasantness	.03	.31	.52		.16	.47	.55	
4. Willingness to buy	<.01	.38	.34	.78	.06	.32	.27	.67

Notes

Diagonals represent average amount of extracted variance for each construct.

Non-diagonals represent the shared variance between constructs
(calculated as the squares of correlations between constructs).

Table 3. Results – Studies 1 and 2

ESTIMATED STANDARDIZED COEFFICIENTS

	Study 1								*Study 2*							
	Dependent Constructs								Dependent Constructs							
	Pleasure		Judgment		Eating pleasantness		Willingness to buy		Pleasure		Judgment		Eating pleasantness		Willingness to buy	
Independent Constructs	β(SE)	*t*-Value	β(SE)	*t*-Value	β(SE)	*t*-Value	β(SE)	*t*-Value	β(SE)	*t*-Value	β(SE)	*t*-Value	β(SE)	*t*-Value	β(SE)	*t*-Value
Direct Effects																
Scent	.22(.08)	2.83[a]	.14(.09)	1.81[c]	- -	-	- -	-	- -	-	- -	-	- -	-	- -	-
Physical surroundings (PS)	- -	-	- -	-	- -	-	- -	-	.27(.12)	3.49[a]	.16(.12)	3.49[b]	- -	-	- -	-
Pleasure	- -	-	- -	-	.07(.08)	1.08	.05(.09)	.89	- -	-	- -	-	.06(.13)	.61	.19(.23)	1.75[c]
Product judgment	- -	-	- -	-	.58(.08)	9.14[a]	.63(.09)	10.47[a]	- -	-	- -	-	.44(.09)	5.34[a]	.13(.16)	1.45
Moderating Effects																
Scent x Pleasure	- -	-	- -	-	.16(.05)	1.82	-.32(.06)	-2.45[b]	- -	-	- -	-	- -	-	- -	-
Scent x Product judgment	- -	-	- -	-	-.27(.04)	-1.99[b]	.28.(05)	2.20[b]	- -	-	- -	-	- -	-	- -	-
PS x Pleasure	- -	-	- -	-	- -	-	- -	-	- -	-	- -	-	.56(.19)	2.30[b]	-.37(.33)	-1.46
PS x Product Judgment.	- -	-	- -	-	- -	-	- -	-	- -	-	- -	-	-.43(.08)	-1.89[c]	.64(.14)	2.73[a]

Notes

[a]Significant on the 1% level; [b]significant on the 5% level; [c]significant on the 10% level.

Model fit:
Study 1: χ^2=12.89 (d.f.=8, *p*=.12); GFI=.97; CFI=.98; RMSEA=.034.
Study 1: χ^2=51.48 (d.f.=8, *p*<.01); GFI=.96; CFI=.95; RMSEA=.079.

Figure 1. Conceptual Model

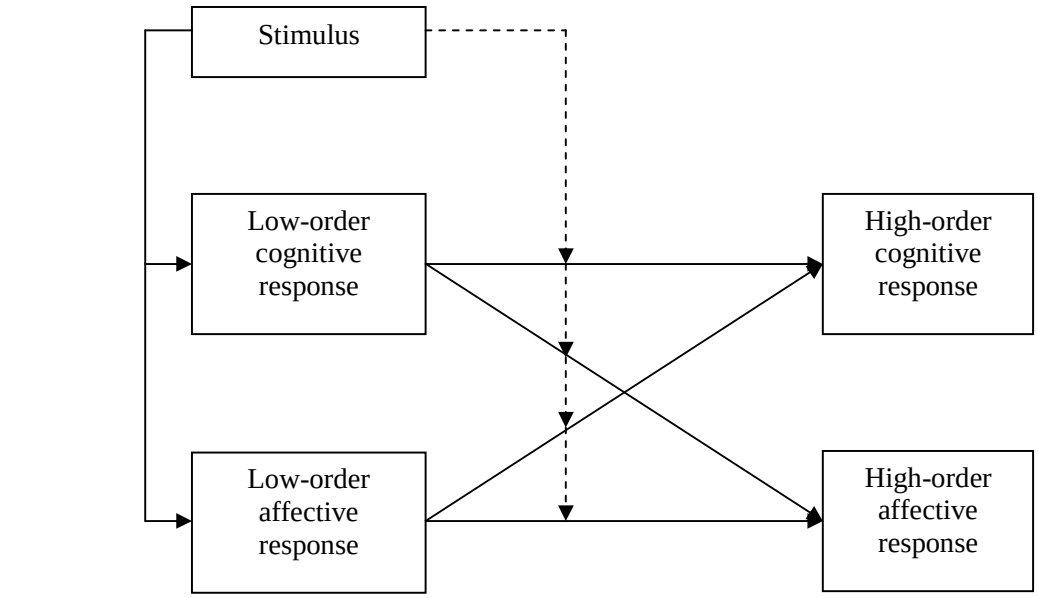

Figure 2. Manipulation of Physical Surroundings – Study 2

Less elegant surroundings	Elegant surroundings
Identical elements	
1 table	1 table
1 plate	1 plate
4 chairs	4 chairs
1 knife	1 knife
1 dish	1 dish
Unidentical elements	
neon light	2 candlelights
1 bottle of water	1 elegant bottle of water
1 ordinary glass	1 elegant glass
1 packet of butter	butter served in slices
	2 small picturesque lamps
	1 white damask tablecloth
	1 flower in a vase

Appendix

Items used to measure the constructs in studies 1 and 2

Pleasure (low-order affective response)
X1. Happy-unhappy
X2. Pleased-annoyed
X3. Satisfied-unsatisfied
X4. Contended-melancholic
X5. Hopeful-despairing
X6. Relaxed-bored#

Product judgment (low-order cognitive response)
X7. Good/bad product
X8. Attractive/non-attractive product
X9. Low/high quality*

Eating pleasantness (high-order affective response)
X10. I will enjoy eating this product
X11. Eating this product is appealing to me
X12. Eating this product will provide me with a tasteful experience

Willingness to buy (high-order cognitive response)
X13. Very unlikely/very likely
X14. Compared to other kinds of potato chips/solid cheese

* Reverse coded.
# Item deleted (in both studies) due to low (<.5) item-total correlation.