



Master Thesis

A SHOP TO REMEMBER:

The Interplay of Music, Color, and Shopping
Motivation on Consumer's Response and
Memory in a Retail Setting

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Abstract

To date, a number of atmospheric stimuli have been shown to affect consumers' cognitive, affective, and behavioral responses. In the present study, these atmospheric effects are integrated and extended by incorporating memory into Mehrabian-Russell (M-R) Model. Specifically, this study experimentally investigates the effects of two different atmospheric stimuli—in-store music and store interior color—and motivational orientation on consumers' emotional states, behavioral responses, and memories in a retail setting. Realistic 3D visualization video simulations of a fictitious clothing store and role-playing scenarios are employed to simulate the situation. A 2 (music: stimulating vs. calming) x 2 (color: blue vs. red) x 2 (shopping motivation: task-oriented vs. recreational consumer) between-subjects factorial design is implemented to test the hypotheses. The findings revealed that shopping motivation moderates the effect of store color on emotional states and behavioral responses. While task-oriented consumers show greater approach tendency for the blue-colored store, recreational consumers tend to approach the red-colored one. Furthermore, consumers' memories are marginally enhanced in the red-colored, as compared to the blue-colored, store environment. Nevertheless, the presence of stimulating music lowers dominance and, in turn, negatively affects consumer behavioral responses. These findings are discussed along with the methodological limitations and potential implications for retail practitioners.

Keywords: retail, atmospherics, music, color, shopping motivation

1. Introduction

Nowadays, it is important for retailers to differentiate their retail offerings amid the fierce retail markets competition. Store environment is one of the elements that can be used to make a distinction. Since it is difficult to duplicate, store environment is an effective differentiation tool that could provide retailers with a competitive advantage in the marketplace (Turley & Chebat, 2002). Furthermore, a store atmosphere can be tailored to meet consumers' needs by adjusting various atmospheric stimuli, such as music, lighting, color, and product display into a meaningful environment (Turley & Chebat, 2002). Therefore, by understanding the effect of environmental stimuli on consumers, retailers can use it as one of their marketing strategies to create a positive shopping experience (d'Astous, 2000).

In order to understand how environmental stimuli influence consumers, the Mehrabian and Russell's (1974) Stimulus-Organism-Response (S-O-R) framework is often used as a basis to explain this process. Applying the S-O-R paradigm, numerous studies of retail environments have demonstrated that various atmospheric variables can influence consumers' emotions, which subsequently determines their likelihood of approaching or avoiding the environments. (e.g., Doucé & Janssens, 2013; Dubelaar & Oppewal, 2011). In other words, this model posits that emotion mediates the effect of atmospherics on consumer behaviors (Mehrabian & Russell, 1974). However, besides affecting consumer behavior, a growing body of evidence supports the notion that emotional states linked to arousal affect memory processes, in which high arousal stimuli have been reported to strengthen individuals' recall performance (Cahill & McGaugh, 1998; Liu, Graham, & Zorawski, 2008; Judde & Rickard, 2010). The underlying mechanism can be explained by the *emotional arousal hypothesis* that posits exposure to the arousing stimuli induce hormonal changes in the brain that leads to memory enhancement (Cahill & McGaugh, 1998). Consequently, since atmospheric elements have abilities to heighten or lessen the degrees of arousal (Gabrielsson & Lindström, 2010; Van Hagen, Galetzka, & Pruyn, 2014), it is reasonable to speculate that these elements might also have a potential to improve consumers' memories regarding the elements in the shopping environments. Taking this possibility into consideration, the present study thereby seeks to extend the Mehrabian and Russell (M-R) Model by incorporating memory as an additional outcome variable.

It is also worth noting that in real-life settings consumers are simultaneously exposed to different environmental variables—including invisible (*ambient*) elements, such as music and scent, and visible (*design*) elements, such as color and interior design—when entering a

store. As a result, the store environment is processed holistically and various atmospheric variables can interact with each other as an entity in affecting consumers (Mattila & Wirtz, 2001; Cheng, Wu, & Yen, 2009). Nevertheless, according to Mari and Poggesi's (2013) comprehensive literature review of new research paths on the servicescapes, research regarding the influence of multiple environmental stimuli on consumers' responses are limited. As such, there is still a need for research that explores the interactive effects of different environmental elements. Moreover, since store atmospherics interact with personal characteristics (Turley & Milliman, 2000), it is essential to understand the preferences and expectations of consumers towards the environment. As established in prior studies, different intentions of shopping activity (i.e., goal oriented or recreational purposes) are differently affected by environmental stimuli (Kaltcheva & Weitz, 2006; Van Rompay, Tanja-Dijkstra, Verhoeven, & van Es, 2012; Doucé & Janssens, 2013). Given these facts, research aims at better understanding on how various environmental stimuli influence different types of consumers is needed.

To address the aforementioned research gap, the present study therefore aims to explore the effect of two different stimuli and consumers' shopping motivations in retail contexts. Specifically, this study attempts to test if two atmospheric variables (i.e., in-store music and store interior color) and motivational orientation affect consumers' pleasure, arousal, and dominance (PAD) and how these in turn induce approach/avoidance behaviors and their memory within the store environment. In addition, the joint effects of all these variables are explored.

The remainder of this study is organized as follows. First, the concept of retail atmospherics and its effects are discussed. In the subsequent section, the moderating role of shopping motivation and possible interactions is addressed. Afterwards, the methodology and results are explained. Lastly, limitations and implications are presented.

2. Theoretical framework

This section explains the proposed constructs, relationships, and hypotheses, together with the framework of this research. At first, the concept of retail atmospherics is introduced, followed by an environmental psychology model that underlies the relationship between environmental stimuli and consumers' responses. Afterwards, the effect of music and color on emotion and memory, as well as the role of shopping motivation are discussed and hypothesized. At the end of this section, the plausible interactions between all variables are presented.

2.1 Retail atmospherics

Retail atmospherics refers to all of the physical and non-physical elements of a store adjusted by the retailer in order to increase positive shopper behavior to the retailer (Eroglu & Machleit, 1989). The first work on the effects of environmental stimuli in retail settings is published in Kotler's (1973) atmospherics study. He suggests that store environments can be designed to produce specific emotional effects on the consumers and ultimately enhance their purchase possibility. Work in this area was further popularized by Donovan and Rossiter (1982), who applied the Mehrabian-Russell (M-R) model to investigate consumers' responses on retail atmospherics. Since then, there has been a growing recognition among researchers within this area (e.g. Mattila & Wirtz, 2001; Douc   & Janssens, 2013).

In order to categorize environmental features in the atmospherics study, Baker (1986) presents a typology classifying the service environment elements into three categories: ambient elements, design elements, and social elements. Ambient elements are intangible background conditions that tend to affect the nonvisual senses, such as music, smell, lighting, and scent, while design elements are store environmental that are more visual in nature, namely color, furnishings, spatial layout, and materials. Social elements are related to the number of people in the service setting and the interaction between consumers and employees. The present study, particularly, focuses on the music as one of the ambient elements and color as one of the design elements in the store environments.

Turley and Milliman's (2000) review shows that retailers can modify various atmospheric elements to influence a wide range of shopping behaviors in diverse retail formats, for example slow tempo music leads people to walk slower in supermarket, a prominent display can significantly influence sales, brighter stores cause more handling and examination but do not influence sales or time spent in the store, and consumers shopping in

stores with larger assortments tend to be more sensitive to in-store promotions. In addition, Turley and Milliman (2000) also find that consumers' responses are determined by the interaction of store atmospherics with consumers' characteristics. For example, consumers with different shopping orientations (task-oriented versus recreational) can react differently to the same retail environment (Kaltcheva & Weitz, 2006). Thus, it is preferably to take consumers' characteristics into account when assessing the effects of retail atmospherics.

2.2 The Mehrabian & Russell Model

The Mehrabian and Russells (1974) environmental psychology model is the basis of most researchers on the effects of environmental factors on shopping behavior. Their framework is based on the Stimulus-Organism-Response (S-O-R) paradigm, which explains that environmental stimuli (S) affect an internal emotional reaction of people (O) and in turn influence consumers' behavioral response to the environment (R). In Figure 1 the Mehrabian-Russell Model is shown.

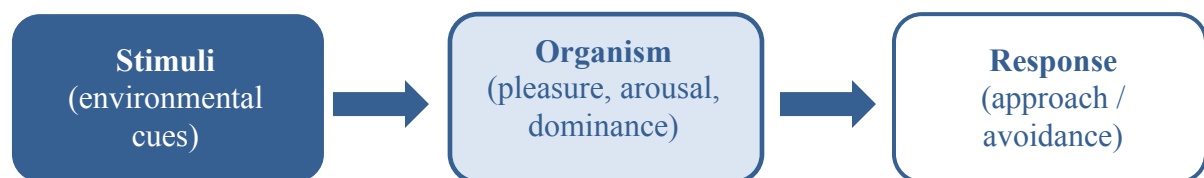


Figure 1. The Mehrabian-Russell Model

In retail contexts, *the stimuli* consist of various atmospheric elements, such as color, music, scent, display window, and store layouts. *The organism* relates to emotional responses of three fundamental dimensions: pleasure, arousal, and dominance (PAD). Pleasure refers to the degree to which a person feels happy, good, or satisfied in the environment; arousal refers to the degree to which a person feels alert, excited, stimulated, or active in the situation; and dominance refers to the extent to which a person has a sense of control over the situation.

According to this model, consumers' emotional states mediate the effect of store atmospherics on *the response* which can be either approach or avoidance behavior. Approach behavior is all the favorable behaviors elicited by the environment, such as willingness to remain in the store, explore the area, and want to return there. Avoidance behavior, by contrast, is all the undesirable behaviors evoked by the environment, such as desire to leave the store, look at few numbers of items, and do not want to return there. In most cases,

pleasure/displeasure determines the approach/avoidance behavior in the environment. While more pleasure leads to more approach, more displeasure triggers more avoidance tendency.

It should be noted that, in the past, dominance dimension has been disregarded from M-R Model due to the theoretical reasons (Russell & Pratt, 1980) and the lack of empirical support (Donovan & Rossiter, 1982; Donovan, Rossiter, Marcoolyn & Nesdale, 1994); hence, subsequent literatures have mainly focused on pleasure and arousal dimensions (e.g., Kaltcheva & Weitz, 2006; Dubelaar & Oppewal, 2011). However, the role of dominance has been reconsidered in the recent investigation (Mari & Poggesi, 2013), with several studies show that dominance has effects on consumer behavior (Foxall & yani-de-Soriano, 2005; Van Rompay, Galetzka, Pruyn & Garcia, 2008; Van Rompay et al., 2012), especially in settings where consumers have to complete specific task. Accordingly, the dominance dimension will be included in this study.

2.3 Stimuli-influenced emotion

As noted in previous section, various atmospheric stimuli have various functions in influencing the subjective experience of consumers, especially their emotional states, i.e. pleasure, arousal, and dominance (Mehrabian & Russell, 1974). Specifically, the following brief review of atmospherics research describe how music and color are perceived differently by individuals and how these, in turn, affect their emotional responses.

2.3.1 Emotional responses to music

Music has been considered as one of the most valuable and effective atmospheric elements in retail settings. The use of music has also been shown to influence consumers' emotional responses (van der Zwaag, Westerink, & van den Broek, 2011; Van Hagen et al., 2014). Among factors affecting emotional responses in music, the volume and tempo of music can evoke a stimulating effect, i.e. arousal (Husain, Thompson, & Schellenberg, 2002; Gabrielsson & Lindström, 2010; van der Zwaag et al., 2011). Arousal is defined as "level of activation or neurophysiological alertness in response to sensory stimuli" (Coutinho & Cangelosi, 2011, p.294). Specifically, music with higher volume arouses more than one with lower volume, just as fast music stimulates more strongly than slow music. For example, Coutinho and Cangelost (2011) found that loud, fast, higher pitch and sharper sounds related

with the increased subjective arousal. In that case, a relationship between listening to stimulating music and listeners perceiving higher levels of activation does exist.

Likewise, several studies have also shown that slow tempo and soft music evoke the opposite effect of fast and loud music on emotion. Support for this appears in the classic study by Hevner (1937) who reports that people associate slow tempo music with tranquil, sentimental, and/or solemn feelings, while fast tempo music is associated with exhilarating and/or joyous feelings. Similar result is shown for soft music that is perceived as peaceful, tranquil, and serious, while loudness can suggest excitement and triumphant (Bruner, 1990). Finally, Oakes (2003) also reports that slow paced music evokes greater relaxation than the fast paced music. In addition, it is argued that slow (fast) tempo music has a calming (activating) effect because people tend to adjust their body to the tempo of music (Van Hagen, 2011). Overall, different type of music may increase or decrease consumer's degree of arousal and in turn stimulate or relax consumers in certain environment.

According to Berlyne's (1971) theory of musical preference, highly arousing music is defined as loud, unpredictable, with an up-tempo, whereas low arousal music is calm, monotonous, with a slow tempo. Accordingly, in the present study music with fast tempo and high volume is classified as stimulating music, whereas music with slow tempo and low volume is classified as calming music.

2.3.2 Emotional responses to color

In addition to music, color is an essential element in building store atmosphere and hence it plays a role in affecting consumers' emotional states and behaviors. Generally, previous color studies have established that warm colors, such as red and yellow, elicit higher arousal qualities than cool colors, such as blue and green (Valdez & Mehrabian, 1994; Stone, 2003; Küller, Mikellides, & Janssens, 2009). This implies that warm colors tend to produce active feelings, while cool colors tend to be soothing (Levy, 1984). For instance, red color triggers vigor, anger, and tension associations, whereas blue color relates to comfort, peace, and calm (Levy, 1984; Stone, 2003). Accordingly, with its stimulating potential, warm colors are suitable in creating vibrant atmospheres, whereas cool colors are applicable for creating relaxing atmospheres. However, albeit warm and cool colors have been shown to produce different sensations, both feelings of excitement and relaxation are pleasant and likely to lead to favorable attitudes (Gorn, Chattopadhyay, Yi, & Dahl, 1997).

With regard to the impact of colors in the store interior on consumers, the most cited empirical study was conducted by Bellizzi, Crowley, and Hasty (1983). In their first experiment, they tested the physical attraction of the colors on individuals by covering walls with fabric panels in five colors, i.e. red, yellow, green, blue and white. Upon entering the experimental room, it was recorded where and how individuals sat in relation to this colored wall. The results showed that individuals were likely to be physically drawn to the warm colors over the cool colors, regardless of color preference. Interestingly, in their second experiment, where background colors of projected furniture store interior were manipulated, the red interior was perceived as negative, tense, and arousing. On the contrary, blue interior was perceived as positive, cool, and calming. In accordance with these findings, other studies have revealed that cool colors, especially blue, are consistently preferred over warm colors (Valdez & Mehrabian, 1994; Madden, Hewett, & Roth, 2000; Yildirim, Akalin-Baskaya & Hidayetoglu, 2007). In conclusion, while warm colors, especially red, are exciting and arousing; cool colors, especially blue, are relaxing and less arousing.

2.4. Emotion-facilitated memory

Besides affecting behavior, the arousal dimension of emotion has been found to be the critical factor contributing to the facilitation of memory (McGaugh, 2004; Liu et al., 2008; Judde & Rickard, 2010). According to the emotional arousal hypothesis, neurobiological mechanisms that accompany emotional arousal mediate the effect of emotional states on memory (Cahill & McGaugh, 1998). Specifically, when individuals experience arousing events or stimuli, hormonal changes in the brain lead to memory enhancement by increasing noradrenergic activation within the amygdala (McGaugh, 2004). Following this line, it is reasonable to assume that atmospheric elements (i.e., music and color), which have been shown to increase or decrease arousal levels, may be capable to improve consumers' memory retention in the retail contexts. In particular, the relationships between music and memory, as well as color and memory are presented in the following.

2.4.1 Music and memory

Given the potential of music to influence emotions, and emotions are found to affect memory processes, music may therefore contribute in enhancing memory. In this regard, Judde and Rickard (2010) demonstrate that arousing music can increase arousal degrees and

subsequently strengthen individuals' memories. In their study, participants were instructed to learn and remember the presented word lists, followed by exposure of either a positively or negatively arousing music after delays of 0, 20 or 45 minutes. Free recall was then tested one week later, and the results showed that recall of word list items were significantly enhanced when music was presented 20 minutes after learning the word list, regardless of music valence. As such, they suggested that arousal, rather than valence, accounts for the memory-enhancing effect of arousing music.

While arousing music has been found to enhance memory strength, relaxing music has also been shown to weaken recall. A recent study by Rickard, Wong, and Velik (2012) provide a demonstration of the effects of relaxing music on emotional memory. The findings of their first experiment provided partial support for the memory-reducing effect of relaxing music during encoding, whereas the second experiment confirmed that relaxing music countered heightened memory for emotional events. These findings therefore indicated that relaxing music can be used to attenuates recall of an emotional story by a means of lessening arousal levels. All in all, in both studies arousal is found to mediate the effect of music on memory retention and thereby this mechanism might be applied to retail settings. This leads to the following hypothesis:

H1: *In-store stimulating music background will increase arousal degrees that in turn facilitate consumer's memory regarding the elements in the shopping environments, as compared to in-store calming background music.*

2.4.2 Color and memory

Previous studies have shown that color may assist the process of encoding and storing of information. For example, Olurinola and Tayo (2015) found that color can increase retention rate of learners. In their experiment, twenty single words were printed on white sheets with three different conditions: achromatic (black ink), congruent (colors that are associated with the words), and incongruent (colors that are not associated with the words) conditions. Participants were then asked to recall as many words as possible. The memory performance of the participants was found to be better in congruent and achromatic color condition than those exposed to incongruent color. Several related studies have also reached similar results. It was demonstrated that color may increase the possibility of environmental stimuli to be

encoded, stored, and retrieved successfully (Spence, Wong, Rusan & Rastegar, 2006; Dzulkifli & Mustafar, 2013).

While most of the perspective on colors-influenced memory often emphasize on the cognitive effects of color on memory, affective reaction to color may also affect memory. Kuhbandner and Pekrun (2013) provide the evidence that emotion-induced memory enhancement is influenced by color. They presented sequences of black-colored words containing one critical word with distinct color (i.e., red, green, or blue) that was either emotionally neutral, negative, or positive to participants. Results showed that participants remember both red and green words better than blue words. In particular, red enhanced memory for negative words and green enhanced memory for positive words. Accordingly, they suggest that color can interact with emotional salience to enhance memory rates. The above discussion therefore indicates that the affective reaction to color can facilitate the memories in various ways. In the present study, it is expected that red colored environment will be more well-remembered due to its arousing potential. This leads to the following hypothesis:

H2: *A red-colored store interior will increase arousal degrees that in turn facilitate consumers' memory regarding the elements in the shopping environments, as compared to a blue-colored store interior.*

2.5 Shopping motivation

Besides environmental factors, another factor that plays a role in how consumer experiences shopping is shopping motivation. Based on consumers' shopping purposes, Wagner and Rudolph (2010) distinguish shopping motivation into *task-fulfillment* and *recreation*. While the former characterizes consumers' need to complete a specific shopping task, the latter refers to a desire to go shopping for enjoyment (Wagner & Rudolph, 2010). Accordingly, in the present study consumers are categorized as *task-oriented consumers* and *recreational consumers*.

Task-oriented consumers are likely to enter the store, search for intended products, and off to the checkout as quickly as possible. In other words, they wish to complete their shopping as efficiently as possible with minimum energy expense (Kaltcheva & Weitz, 2006). Here, goal attainment becomes their primary objective and satisfaction is derived when they get their goals done (Babin et al., 1994). In comparison, recreational consumers

are likely to look for entertainment, appreciate the surroundings, and are less time-sensitive (Van Hagen et al., 2014). They desire rich experience from shopping and tend to be oriented toward experience related goals and thus they derive satisfaction from the shopping trip itself (Kaltcheva & Weitz, 2006). Overall, while task-oriented consumers have necessities that are related to speed and functionality, recreational consumers have necessities that are related to enjoyment in the shopping environment.

Furthermore, Kaltcheva and Weitz (2006) demonstrated that the degree of congruence between consumer's motivations and arousal stimuli determines the outcome of the shopping experience. As such, different motivations or tasks will respond differently to arousal inducing environmental elements (Ang, Leong, & Lim, 1997; Massara, Liu, & Melara et al., 2010). Accordingly, it is expected that consumers with different motivational orientation needs different level of arousal for optimal performance. For recreational consumers who seek fun and stimulation during shopping, high arousing environment will facilitate these goals. Furthermore, a stimulating environment will enhance their sensory stimulation because they are more susceptible to environmental stimuli (Massara et al., 2010; Van Hagen et al., 2014), resulting in a more positive response. Hence, the following hypotheses are suggested:

H3: *In-store stimulating music, as opposed to calming music, will positively affect (a) shopping pleasure and (b) behavioral intentions for recreational consumers.*

H4: *A red-colored store, as opposed to a blue-colored store, will positively affect (a) shopping pleasure and (b) behavioral intentions for recreational consumers.*

By contrast, for task-oriented consumers who prefer low arousal stimuli, the same stimulating environments might be seen as distractions from their goal attainment, resulting in a more negative experience (Massara et al., 2010). Therefore, it is expected that a low arousing, as opposed to a high arousing, environment that seems to facilitate concentration will be evaluated as more positive for task-oriented consumers. Formally stated:

H5: *In-store calming music, as opposed to stimulating music, will positively affect (a) shopping pleasure and (b) behavioral intentions for task-oriented consumers.*

H6: *A blue-colored store, as opposed to a red-colored store, will positively affect (a) shopping pleasure and (b) behavioral intentions for task-oriented consumers.*

2.6 Interaction between music, color, and shopping motivation

Although relatively numerous studies have examined how color and music influence consumers in one study, most of them tend to treat color and music as one entity of high/low environmental stimulus—they do not specifically assess the interaction between music and color (e.g., Lin, 2009; Baker, Parasuraman, Grewal, & Voss, 2002). Therefore, in that case the results from music or color alone are impossible to interpret. However, to the best of author knowledge, Cheng et al. (2009)'s study is the only research documenting the effects of music and color simultaneously on consumers' responses. They showed that the arousal congruency of these two atmospheric cues (i.e., fast music/warm color or slow music/cool color) intensified shoppers' emotional responses. Both congruence conditions were also rated significantly more positive (Cheng et al., 2009). Accordingly, a similar interaction effect is expected in the current study.

As discussed earlier, the affective reaction to environmental stimuli may affect individuals' memories, whereby it is argued that high arousal stimuli improve recall rates (Judd & Rickard, 2010). Nevertheless, Hallam, Price, and Katsarou, (2002) revealed that high arousing music disrupts performance on the memory task. Presumably this occurs because when the task itself is complex and it requires more focus, the arousal levels of high arousing music becomes too great and hence disrupts concentration, resulting in performance deterioration (Hallam et al., 2002). This implies that to some extent arousal positively affects cognitive processing; however, when the level of arousal exceeds the optimum point, the relationship turns into a negative one. Consequently, since the combination of two atmospheric stimuli can generate stronger arousal effect (Cheng et al., 2009), this may lead to two possible outcomes: (1) Consumers will be more alert to the environment, or (2) Consumers experience it as an overly stimulating environment. While the former may evoke better memory retention, the latter may result in memory impairment.

Furthermore, it remains uncertain how two atmospheric variables interact with consumer' motivation in influencing individual's memory. Probably color, music, and motivation will strengthen/weaken each other or have no effect at all. A case in point, when combining high arousing (red/stimulating music) environment and recreational consumers, it may result in better memory retention because recreational consumers may be more open to external cues of the environment and simultaneously enjoy stimulating environment, which is likely to evoke higher memory retention. However, so far there has been no research

conducted that tested a three-way interaction effect between background music, color, and motivational orientation on consumers' responses and memories. Consequently, a research question concerning the three-way interaction is created.

RQ: *To what extent does the interaction of in-store music, store interior color, and motivational states impact consumer's response and memory in the shopping environment?*

The conceptual framework of this study is as follows:

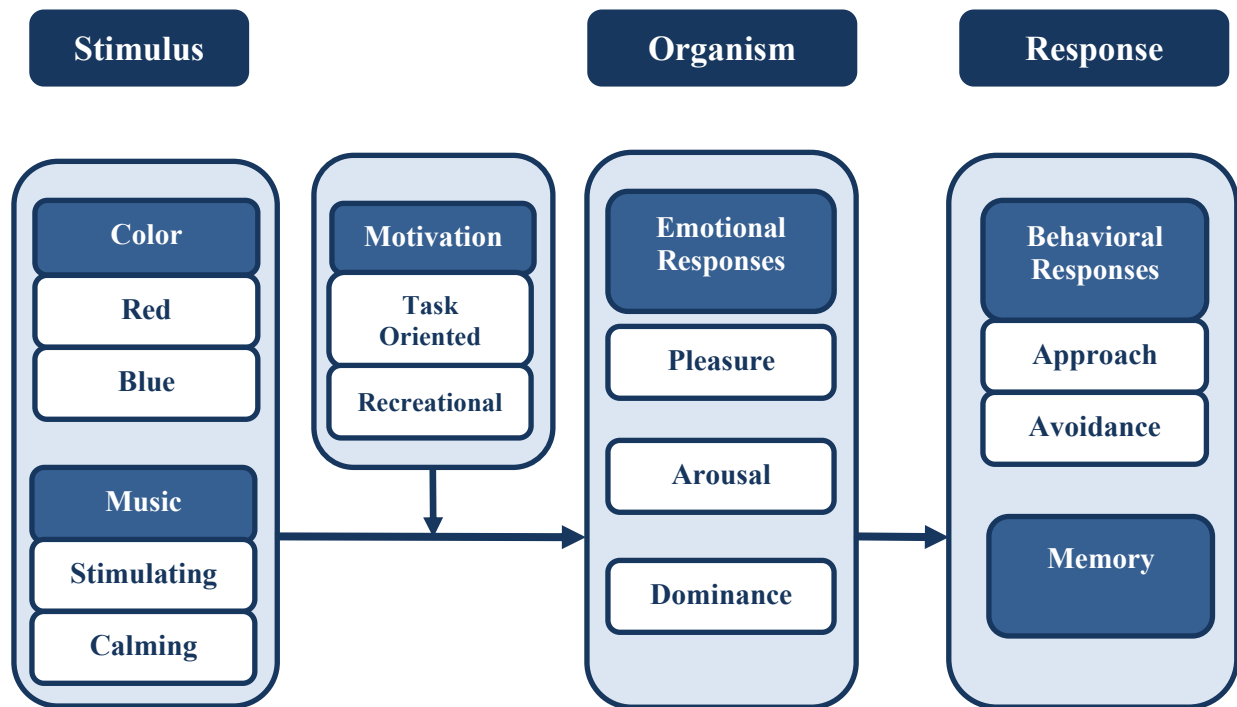


Figure 2. Research model

3. Research Methodology

3.1 Research design

In this study, the hypotheses were tested using a 2 (music: stimulating vs. calming) x 2 (color: blue vs. red) x 2 (shopping motivation: task-oriented vs. recreational consumer) between-subjects factorial design, as shown in Table 1. A laboratory experiment was accomplished by utilizing a realistic 3D visualization video simulation of a clothing store. The video protocol has been reported to have ecological validity, indicating that video can simulate real-life settings and reflect the real behavior as in the field study (Bateson & Hui, 1992).

Table 1. Factorial design of the experiment

Task-oriented			Recreational		
Conditions	Color	Music	Conditions	Color	Music
1	Red	Stimulating	5	Red	Stimulating
2	Red	Calming	6	Red	Calming
3	Blue	Stimulating	7	Blue	Stimulating
4	Blue	Calming	8	Blue	Calming

3.2 Stimuli manipulations

In order to investigate the effect of different independent variables on the dependent variables, the manipulations of consumers' motivations and in-store design were created in different ways. In the following each of specific stimuli manipulation is described.

3.2.1 Shopping motivation manipulations

To induce task-oriented versus recreational motivational orientation, two different scenarios were manipulated following previous research by Kaltcheva and Weitz (2006) (see also Van Rompay et al., 2012; Van Hagen et al., 2014). The scenario for recreational consumers is as follows:

It is weekend already. Since at the moment you have free time, you looked for something to do and therefore decided to go to city center. While you have plenty of

time and did not intend to search for any specific item in the city center, you noticed that there is a newly opened clothing store that you found interesting and you decided to take a look inside. Imagine yourself entering the store and browsing around for a couple of minutes.

As for task-oriented consumers, they were asked to imagine themselves in the following scenario:

Your male best friend is going to leave the country for work matters. Tomorrow is his last day at work and he is holding a farewell party. You would like to come and give a green shirt as a present for him because you know green is his favorite color. However, you only have today to purchase the present. Furthermore, you are quite in a hurry because the store is about to close in 20 minutes. Imagine yourself entering the clothing store with a task to specifically find a green formal shirt.

For those in the task-oriented condition, at the end of the questionnaire they were asked whether they found the the green shirt or not. In cases where the answer is yes, the respondent is then asked to identify the shirt price. This question, therefore, can help to verify if they really perform the given task or not.

3.2.2 Store design manipulations

Previous research has noted the importance of providing realistic settings and experience in an experiment (Bateson & Hui, 1992). To attain this, four clothing store video simulations consisting of the manipulations of in-store music (stimulating versus calming) and interior color (red versus blue) were created to simulate real shopping experience. At first, a fictitious clothing store was created using architecture design software, i.e. SketchUp. Afterwards, the video demonstrating a walkthrough in the store were created by continuously changing views of the store environment using animated scenes from SketchUp. In this way, participants will feel as if they are walking and browsing through the collections in the store. The videos show exactly the same flow and the constant scene with the presence of an employee and a consumer in the store to create more realistic shopping experience in all four conditions. The videos were then rendered into a realistic video animation with Podium Walker—a plug-in for SketchUp. The total duration of each version is 1 minute 38 seconds.

In regards to color manipulation, blue and red were chosen since these two colors are at the two different extreme positions on the visual spectrum and hence have different arousal qualities (Valdez & Mehrabian, 1994; Stone, 2003). Therefore, store colors were manipulated by designing the store interior as either the blue-colored (RGB code: 0, 115, 207) or the red-colored store interior (RGB code: 255, 0, 0) (see Figure 3). Level of light and saturation were held constant for both conditions.

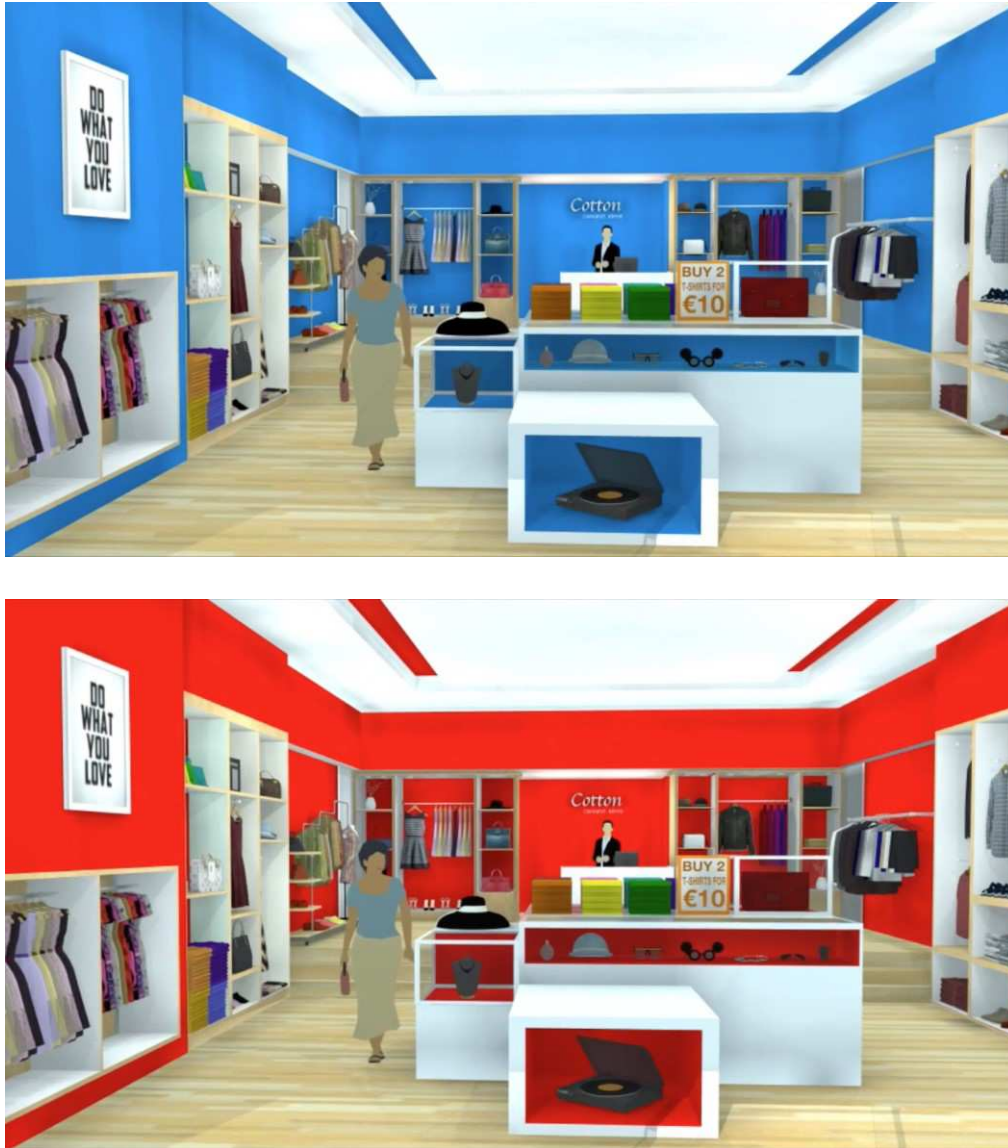


Figure 3. Color conditions virtual laboratory

Turning to music, following the research by Spenwyn, Barrett, & Griffiths (2010), two different types of dance music were employed for this study: one chill-out dance music (slow tempo) and one upbeat dance music (fast tempo). Specifically, the instrumental version of Daft Punk’s “Something About Us” and Disclosure’s “White Noise” were selected to

represent the slow paced and fast paced music respectively. Furthermore, this type of genre is a typical music that is usually played in real clothing stores, which is expected to provide a more realistic clothing store experience. Besides, it is suitable with the clothing store target groups, i.e. teenagers and young adult. As far as the tempo is concerned, basic tempo markings (Randel, 2003) are used as a guidance to classify fast and slow tempo music. According to basic tempo markings, slow and stately (at ease) tempo music falls within range of 66-76 beats per minute (BPM), whereas fast and bright (march tempo) tempo music falls within range of 120-168 BPM. To achieve this, the original music selections were modified to meet the desire BPM by increasing or decreasing the tempo with audio editing software, i.e. WavePad. Finally, video editing software (i.e., iMovie) was utilized to adjust the music volume and integrate the selected music to the video clips. These files were then exported into QuickTime video clips.

3.3 Pre-test

To confirm that there was no ambiguity and to verify that store design and scenarios of consumers' shopping motivation manipulations were perceived as intended for the main study, a pre-test was conducted.

3.3.1 Procedure Pre-test

To ensure the music and color were perceived similarly in each of video, two questionnaires were created using Qualtrics. The first questionnaire consisted of red/stimulating and blue/calming store videos and the second one consisted of red/calming and blue/stimulating store videos. There were also two consumer motivation scenarios in each of questionnaire. In total, 21 respondents were approached individually to participate, these respondents were all randomly selected students at the University of Twente.

At first, participants were presented with a video in the first condition—either red/stimulating or red/calming. Afterwards, they were asked to rate if the background music and color was perceived as a stimulating or calming and pleasant or unpleasant. Participants were then asked to indicate the appropriateness of using such color and background music in a clothing store. Subsequently, similar questions were applied for the second video with different condition—either blue/calming or blue/stimulating. Lastly, participants were asked to

indicate if two different scenarios belonging to either the *task-oriented* or *recreational* condition.

3.3.2 Measurement Pre-test

To ensure if the manipulations were successful, several items were employed in the questionnaire. First, Mehrabian and Russell's (1974) 2-item semantic differential scale (i.e., "calming–stimulating" and "unpleasant–pleasant") were used on a 7 point scales to check if participants perceived the music or color as stimulating/calming and unpleasant/pleasant. For example, "The background music played in the video is: calming – stimulating". Additionally, one statement regarding the appropriateness on the use of color or background music in a clothing store was created: "The background music played in the video is appropriate for a clothing store." For this item, participants indicated their agreement on a 7-point Likert-type scale ranged from 'Strongly agree (1)' to 'Strongly disagree (7)'.

As for the shopping motivation scenario manipulation, participants were given two different scenarios and they were asked to rate on a scale of one to seven (strongly disagree to strongly agree), the extent to which each scenario represents a recreational motivation or a task-oriented motivation. Task-oriented (*utilitarian*) motivation was measured with two items: "This scenario indicates that I primarily want to get things done" and "This scenario indicates that I have a clear task to accomplish" ($\alpha = .97$). As for recreational (*hedonic*) motivation, two items were employed: "This scenario indicates that I primarily want to have fun" and "This scenario indicates that I visit the store to look around" ($\alpha = .89$). These items were adapted from Motivational Orientation Scale of Kaltcheva and Weitz (2006).

3.3.3 Results Pre-test

An independent-samples t-test was conducted to compare mean scores in different conditions. The results confirmed that the music was perceived as intended. Specifically, it was showed that the stimulating music was significantly perceived as being more stimulating ($M = 6.09$, $SD = 0.7$) than the calming music ($M = 2.76$, $SD = 1.41$), $t(40) = 9.69$, $p < .001$. Furthermore, calming music ($M = 5.57$, $SD = 0.98$) was perceived as more pleasant than stimulating music ($M = 4.38$, $SD = 1.5$); $t(40) = -3.04$, $p < .05$. Both of stimulating music ($M = 5.04$, $SD = 1.24$) and calming music ($M = 5.52$, $SD = 0.75$) are rated as appropriate for a clothing store, $t(40) = -1.50$, $p > .05$. However, some respondents reported that the volume of

stimulating music was too loud. Hence, the volume of the music will be readjusted to for the main study.

As for the color of store interior, the results also showed that the color manipulations were successful. The red-colored store was significantly perceived as being more stimulating ($M = 5.43$, $SD = 1.54$) than the blue-colored store ($M = 3.38$, $SD = 1.32$, $t(40) = 4.63$, $p < .001$). Moreover, both color of the stores were perceived as pleasant ($M_{red} = 4.29$, $SD = 1.38$; $M_{blue} = 4.9$, $SD = 1.18$; $t(40) = -1.56$, ns) and appropriate for each group ($M_{red} = 3.29$, $SD = 1.42$; $M_{blue} = 2.76$, $SD = 1.04$; $t(40) = -1.36$, ns). Finally, an analysis of variance (ANOVA) showed that participants who read task-oriented scenario rated their motivational orientations significantly as more utilitarian ($M = 6.45$, $SD = .54$), rather than hedonic ($M = 2.38$, $SD = 1.15$, $F(1,40) = 214.84$, $p < .001$). Likewise, participants who read recreational scenario evaluated their motivational orientations significantly as more hedonic ($M = 6.35$, $SD = .45$), rather than utilitarian ($M = 2.4$, $SD = 1.07$, $F(1, 40) = 214.84$, $p < .001$). Based on these results, the scenarios were suitable and would lead to the desired effects.

3.4 Participants and procedure main study

A total of 136 individuals participated in this study, of which 86 (63.2%) were female and 50 (36.8%) were male. The mean age of the participants was 23 years ($SD = 2.84$, min. 18 years, max. 30 years). Furthermore, the majority of respondents (54.4%) had completed a bachelor's degree, 32.4% high school, and 13.2% master's degree. Of all participants, 51.5% has a Dutch nationality, 25.7% an Indonesian nationality, and 23.5% had other nationalities. Participants were recruited by asking students at the University of Twente, the visitors of the public library in Eindhoven, and people from personal network and acquaintances. Attempts have been made to reach a group as large and diverse as possible to ensure the generalizability.

Since the fictitious clothing store were targeted for young adults, only participants in the age range of 18-30 years were selected. At first, participants were approached individually and asked to participate in an experiment to determine the most effective store atmosphere by investigating people's impressions on different store settings. Participants were assigned randomly to one of eight conditions. In the introduction, participants were informed about the purpose and procedure of the experiment. Participants were then informed that they were about to view a short walkthrough video and hence paying close attention while watching the video was required. Afterwards, participants were given one of

two scenarios to adopt either a task-oriented or recreational motivational orientation by imagining themselves as if they were in the situation described in the scenarios. Subsequently, in order to reduce distraction, participants were required to use headphones while watching the video that was played on a laptop. In particular, each video coincides with a different condition (see Table 1). Participants were asked to complete the questionnaires to indicate their emotional states and their shopping-behavior intention in relation to the store environment, as well as their memory in the given environment. The demographic information was also collected for analysis. Lastly, after completion of the questionnaire, participants were thanked for their cooperation.

3.5 Measurements

Manipulation Check. Two questions measured whether the music and color were indeed perceived as stimulating or calming: “The background music played in the video is: calming – stimulating” and “The color of the store in the video is: calming – stimulating”. Both items were measured on a 7-point scale.

Emotional Responses. Mehrabian and Russell’s (1974) 10-item semantic differential scale were employed to measure emotional responses towards the environment. Pleasure was measured with 5 items: pleased–displeased, satisfied–dissatisfied, pleasant–unpleasant, unhappy–happy (Coefficient Alpha = .83). Arousal was measured with 5 items: relaxed–stimulated, calm–excited, sleepy–wide awake, unaroused–aroused, unstressed–stressed (Coefficient Alpha = .76). Dominance was measured with 3 items: out of control–in control, restricted–free, easy–difficult (Coefficient Alpha = .56). However, since the reliability of the dominance construct was appeared to be very low ($\alpha < .6$), only a single item of ‘out of control – in control’—which is considered to be the most relevant in this case—was used to represent global construct of dominance. Construct validity of the single-item dominance measure was further supported by significant correlations with the multiple item pleasure and arousal. The case example for this measurement is as follows: “Being in the store makes me feel: Relaxed – Stimulated.” All items were measured on a 7-point scale.

Behavioral Responses. A six-item based on Donovan and Rossiter’s (1982) study were used to assess the approach-avoidance behavioral responses. These items are: “I would enjoy

shopping in the store,” “I would stay in the store,” “I would want to look around and to explore the store,” “I would be willing to buy things at the store,” “I would like to return to the store sometime,” and “I would be willing to recommend the store to my friends.” Alpha reliability for behavioral responses measure was $\alpha = .91$. The variables are measured with a 7-point Likert scale, ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (7).

Memory. For developing memory measurements, several elements were deliberately placed throughout the store. Five questions were then made to test participant’s memory regarding some elements within the store environment in multiple choice questions. For instance, “How much is the discount for the dress?” “What is the name of the store?” and “On what day the store offers student discount?”. To quantify the data, the response on this question was scored. Participants got a one for each correct answer and no score for each of the wrong answer. Their memory scores were measured by the number of questions answered correctly.

4. Results main study

4.1 Manipulation check

To determine whether the music and color were indeed perceived as stimulating or calming, an analysis of variance (ANOVA) were conducted. The participants in the stimulating music condition perceived the music they listened as being more stimulating ($M = 5.86$, $SD = .78$) than those in the calming music condition ($M = 2.47$, $SD = 1.5$), $F(1,134) = 272.77$, $p < .001$. As for color manipulation, participants evaluated the red-colored store as being more stimulating ($M = 5.05$, $SD = 1.38$) than the blue-colored store ($M = 3.88$, $SD = 1.7$), $F(1,134) = 19.53$, $p < .001$. These results indicated that the manipulation checks in the main study were successful.

4.2 Hypothesis testing

Data were analyzed by performing a set of 2 (music: stimulating vs. calming) x 2 (color: blue vs. red) x 2 (shopping motivation: task-oriented vs. recreational consumer) full factorial ANOVAs for each dependent variable, i.e. pleasure, arousal, dominance, behavioral responses, and memory. Preliminary assumption testing was conducted to check for normality, outliers, and homogeneity of variance with no serious violations noted; thus, a factorial ANOVA can be used appropriately to analyze the data.

4.2.1 Pleasure

The effect of in-store music, color of the store, and shopping motivation on pleasure was examined using a factorial ANOVA. The average values and standard deviations for all groups on pleasure are given in Table 2. The ANOVA showed a marginally significant effect of consumers' motivation on pleasure ($F(1, 128) = 2.84$, $p = 0.09$), suggesting that recreational consumers experienced more pleasure ($M = 5.15$, $SD = .72$) than task-oriented consumers ($M = 4.93$, $SD = .84$). Furthermore, the main effect of in-store music on pleasure was not significant, $F(1, 128) = 1.66$, $p = .20$, but the main effect of color was significant, $F(1, 128) = 5.64$, $p = 0.02$. This result, however, was qualified by a significant interaction between color and consumer shopping motivation, $F(1, 128) = 10.82$, $p = .001$. These results indicated that the effect of color on pleasure significantly differed depending on consumer shopping motivation (see Figure 4). In line with H5a, for task-oriented consumers, the blue-colored store was experienced as more pleasant than the red-colored store ($M_{blue} = 5.30$, $SD = .67$; $M_{red} = 4.57$, $SD = .85$), $F(1,128) = 16.4$, $p < .001$. Nevertheless, although the results

point in the expected direction, the difference between the colors red and blue for recreational consumers did (contrary to H4a) not reach significant, $F(1, 128) = .42, p = ns$. Furthermore, the results did (contrary to H3a and H5a) not show an expected interaction between music and shopping motivation, $F(1, 128) = .42, p = ns$. An anticipated interaction between music and color was also not found, $F(1, 128) = .18, p = ns$.

Table 2. Mean (and standard deviation) of color, music, and shopping motivation on pleasure, arousal, dominance, and behavioral responses

		Task-oriented		Recreational	
		Red	Blue	Red	Blue
		Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Pleasure	Stimulating	4.44 (.95)	5.12 (.73)	5.23 (.77)	5.06 (.95)
	Calming	4.71 (.74)	5.48 (.57)	5.12 (.73)	5.13 (.49)
Arousal	Stimulating	4.88 (.79)	4.25 (1.01)	4.52 (.55)	4.52 (.81)
	Calming	3.46 (.91)	3.28 (.87)	3.60 (.91)	3.22 (.75)
Dominance	Stimulating	3.94 (1.48)	5.12 (1.58)	4.65 (1.71)	4.23 (1.48)
	Calming	4.94 (1.71)	4.24 (1.48)	5.35 (1.27)	5.29 (.85)
Behavioral responses	Stimulating	4.31 (1.08)	4.95 (.76)	5.05 (1.17)	4.41 (1.38)
	Calming	4.71 (1.06)	5.48 (.71)	5.12 (.73)	4.99 (.70)

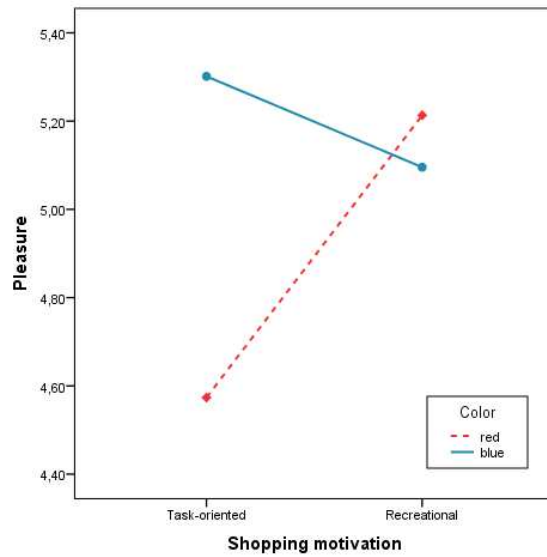


Figure 4. Interaction between color and consumer motivation on pleasure

4.2.2 Arousal

The effect of in-store music, color of the store, and shopping motivation on arousal was examined using a factorial ANOVA. Table 2 shows the average values and standard deviations for all groups. The ANOVA revealed that the difference of music ($F(1, 128) = 70.6, p < .001$) and color ($F(1, 128) = 4.37, p = .039$) on arousal were significant. These results indicate that participants experienced greater arousal when stimulating music was played, as compared to calming music ($M_{stimulating} = 4.57, SD = .79$; $M_{calming} = 3.39, SD = .85$). Also, participants being more aroused in the red-colored ($M = 4.14, SD = .98$) than the blue-colored ($M = 3.81, SD = 1.02$) store environment. All interactions did not reach significance (all F 's < 1 , except for the interaction between color, music, and shopping motivation ($F(1, 128) = 2.0, p = .15$)).

4.2.3 Dominance

The effect of in-store music, color of the store, and shopping motivation on dominance was examined using a factorial ANOVA. The average values and standard deviations for all groups on dominance are given in Table 2. The ANOVA showed that calming music had a significant positive effect on dominance than stimulating music ($M_{calming} = 5.19, 5.35, SD = 1.25$; $M_{stimulating} = 4.48, SD = 1.42$), $F(1, 128) = 14.72, p < .001$, indicating that participants experienced greater control in a store with calming music as compared with stimulating

music. Furthermore, the color of the store marginally affected dominance ($F(1, 128) = 3.08, p = .081$), but this result was qualified by a significant interaction between color and consumer motivation, $F(1, 128) = 7.82, p = .006$. Figure 5 shows that task oriented consumers experienced greater sense of dominance in the the blue-colored store ($M = 5.47, SD = 1.33$) as compared with the red-colored store ($M = 4.44, SD = 1.65$), $F(1, 128) = 7.82, p = .006$. For recreational consumers, the difference was non-significant, $F(1, 128) = .94, p = ns$. Other interaction effects were non-significant (F 's < 1).

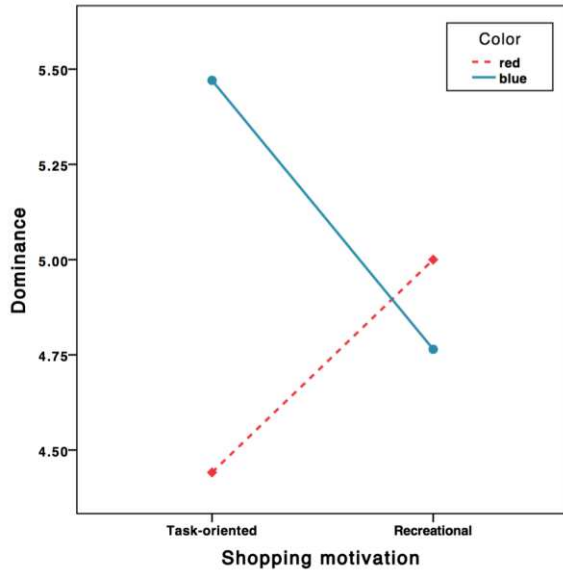


Figure 5. Interaction between color and consumer shopping motivation on dominance

4.2.4 Behavioral responses

The effect of in-store music, color of the store, and shopping motivation on behavioral responses was examined using a factorial ANOVA. Table 2 shows the average values and standard deviations for all groups. The ANOVA revealed a marginally significant effect of music on approach tendency ($F(1, 128) = 3.61, p = .06$), suggesting that participants are more incline to approach a store with calming ($M = 5.01, SD = .90$) than stimulating music ($M = 4.68, SD = 1.14$). No significant main effects of color on behavioral responses was found, $F(1, 128) = .29, p = ns$.

In addition, the expected interaction between color and shopping motivation reached significance, $F(1, 128) = 3.61, p = .006$. Figure 6 illustrates the interaction. In line with H6b, pair-wise comparisons showed that task-oriented consumers rated their approach tendency significantly higher in the blue-colored store ($M = 5.22, SD = 1.14$) than the red-colored store environment ($M = 4.51, SD = 1.14$), $F(1,128) = 4.43, p = .037$. Also as expected (H4b),

recreational consumers rated their approach tendency (marginally) higher in the red-colored store ($M = 4.96$, $SD = 1.06$) than the blue-colored store environment ($M = 4.70$, $SD = 1.22$), $F(1,128) = 4.43$, $p = .064$. However, the in-store music and shopping motivation interaction did (contrary to H3b and H5b) not reach significance, $F(1,128) = .596$, $p = ns$. Other interactions were not obtained (all F 's < 1 , except for the interaction between music and color, $F(1, 128) = 1.7$, $p = .19$).

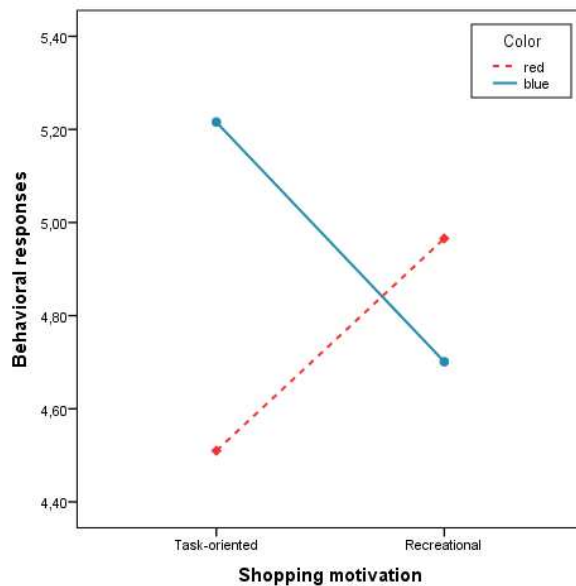


Figure 6. Interaction between color and consumer motivation on behavioral responses

4.2.5 The mediation of dominance

To further explore the underlying mechanism of how color and shopping motivation influence pleasure and behavioral responses, an analysis of covariance (ANCOVA) was used, controlling for dominance. The ANCOVA showed that the covariate, i.e. dominance, was significantly related to pleasure ($F(1, 131) = 57.67$, $p < .001$) and behavioral responses ($F(1, 131) = 43.45$, $p < .001$). Moreover, the inclusion of dominance as covariate dropped the interaction effect between color and shopping motivation on pleasure ($F(1, 131) = 5.55$, $p = .020$), as well as behavioral responses ($F(1, 131) = 3.31$, $p = .071$) (see Figure 7). (Note that the ANOVA results showed an interaction between color and shopping motivation on pleasure was $F(1, 128) = 10.82$, $p = .001$ and behavioral responses was $F(1, 128) = 3.61$, $p = .006$ in previous section). Accordingly, these results suggest partial mediation, implying that not only color and shopping motivation directly affect pleasure and behavioral responses, but dominance also accounts for some of these relationship by mediating the interaction between

color and shopping motivation on pleasure and behavioral responses. Dominance, may therefore help explain why color and motive is related to pleasure and behavioral responses in this study.

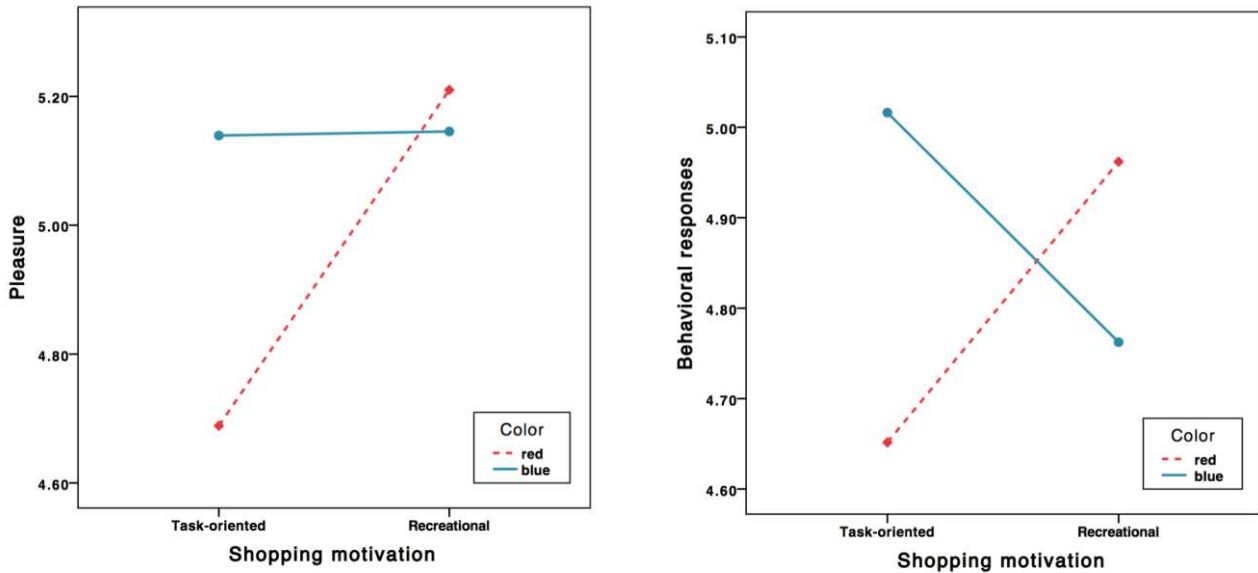


Figure 7. Interaction between color and consumer motivation on pleasure (left) and behavioral responses (right) after controlling for dominance

4.2.6 The predictor of behavioral responses

A multiple regression analysis was performed using enter method to test if pleasure, arousal, and dominance significantly predicted behavioral response (see Table 3). The results clearly revealed that pleasure is the strongest predictor of general approach/avoidance behavior and its subscales. Furthermore, dominance was found to be a significant predictor of enjoyment, desire to stay, and general approach/avoidance behavior, indicating that more highly controlled consumer will be more likely to remain and enjoy being in the store and have a positive approach tendency. Particularly, the combination of pleasure and dominance accounted for 68 percent of the variation in intentions to stay. On the other hand, arousal is not significantly related to any of the behavioral responses measures. The result, however, show a negative relationship between arousal and intentions to explore. The negative sign indicates that the higher consumers' arousal, the lower their intention to continue browsing in the store. In addition, the results of the regression indicated that the combination of three predictors explained 54 percent of the variance in general approach/avoidance behavior ($F(3, 132) = 50.52, p < .001, R^2 = .54, R^2_{Adjusted} = .52$). Overall, it was found that pleasure

significantly predicted approach tendency, as did dominance, but arousal did not significantly predict approach/avoidance behavior.

Table 3. Regression analysis results for pleasure, arousal, and dominance dimensions predicting behavioral responses

Dimension	Behavioral responses						
	Approach/avoidance	Enjoyment	Stay	Exploration	Purchase	Return	Recommendation
Pleasure	.81***	.48***	.5***	.61***	.41***	.52***	.44***
Arousal	-.06	-.1	-.08	-.16*	-.05	-.03	.16
Dominance	.16*	.26*	.23**	-.03	.17	.01	.14
R^2	.54	.48	.68	.41	.29	.28	.27
F	50.53***	41.13***	37.98***	30.01***	18.07***	17.05***	16.09***

* $p < .05$ ** $p < .01$ *** $p < .001$

4.2.7 Memory

The effect of in-store music, color of the store, and shopping motivation on participants' memories was examined using a factorial ANOVA. The average scores and standard deviations for all groups are presented in Table 4. The ANOVA revealed that the main effect of in-store music on memory was (contrary to H1) not significant, $F(1, 1280) = 2.83, p = ns$. However, a marginally significant main effect of color on memory was detected, $F(1, 128) = 3.46, p = .08$. In line with H2, the red-colored (as opposed to the blue-colored) environment positively affected memory ($M_{red} = 3.69, SD = 1.04; M_{blue} = 3.40, SD = .88$). All interaction effects were not significant (all p 's $> .1$).

Further analysis using a Pearson arousal-memory correlation coefficient was computed to assess the relationship between the level of arousal and memory scores. Although not significant, there was a positive correlation between the two variables ($r = .096, n = 136, p = .27$), suggesting that increases in arousal levels were correlated with increases in memory scores.

Table 4. Mean (and standard deviation) of color, music, and shopping motivation on memory

	Task-oriented		Recreational	
	Red	Blue	Red	Blue
	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>	<i>Mean (SD)</i>
Stimulating	3.82 (1.01)	3.65 (.93)	3.88 (.99)	3.35 (.70)
Calming	3.41 (1.3)	3.18 (.95)	3.65 (.70)	3.41 (.93)

4.2.8 Additional analysis

Although not hypothesized, it was analyzed whether gender affect consumers' responses and/or memory within the environment. It appeared that the mean scores of approach tendency were (marginally) higher for females ($M = 4.96$, $SD = 1.06$) than males ($M = 4.64$, $SD = .99$, $F(1, 128) = 3.46$, $p = .077$). This is not surprising since women, rather than men, view shopping as more recreational and as a more social activity (Kruger & Byker, 2009), thereby women are more likely to enjoy their shopping trip more than men. Additionally, an intriguing result emerged from a potentially significant interaction between music and gender, $F(1, 128) = 3.82$, $p = .053$. The interaction was illustrated in Figure 8. Pairwise comparisons showed that male participants significantly perform better under stimulating music (as opposed to calming music) condition, $F(1,128) = 6.92$, $p = .010$. For female participants, in-store music had no effect, $F(1, 128) = .57$, $p = ns$. A possible explanation may relate to the fact that regardless of music genre, men prefer louder and faster music, whereas women prefer slower and softer music (Stipp, 1990). Thus, it seems that for men, stimulating music induces positive effect and increases arousal levels that, in turn, enhances memory.

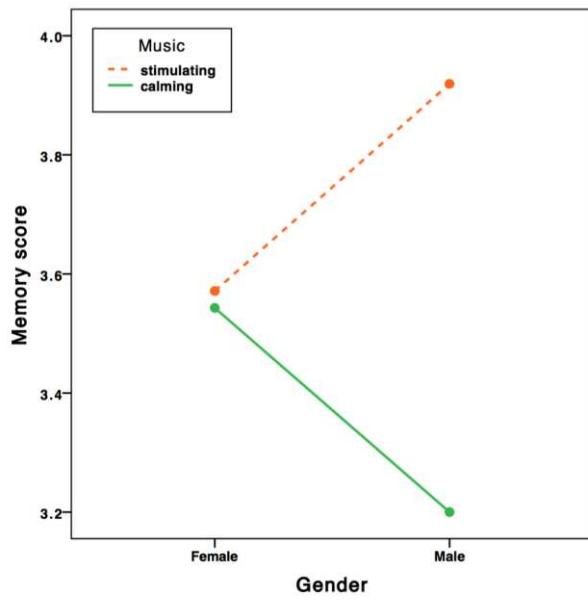


Figure 8. Interaction between gender and music on memory

5. Discussion

This research attempts to provide more insight to the influence of two different atmospheric stimuli (i.e., in-store music and store interior color) on consumers' responses and memory in a retail setting, taking into consideration consumers' motivational orientations. The findings show that atmospheric variables indeed are not only capable of influencing consumers' emotions and responses, but to some extent also increase consumers' cognitive processing. Moreover, shopping motivation moderates the effect of store color on consumers' responses. This is the first research, to author's knowledge, that explores the interplay of color, music, and shopping motivation simultaneously with analysis of their effects on consumers' responses and memory processes.

In regards to store color, it is not surprising that in this study consumers are affected strongly by the interior color since it is generally believed that consumer reactions and behaviors to store atmospherics are shaped largely by the design of interiors (Kutlu, Manav, & Lanc, 2013). Nevertheless, the result shows that shopping motivation determines the effect of color on consumers. In particular, task-oriented consumers rated greater levels of dominance, pleasure, and approach tendency in the blue-colored store (as opposed to the red-colored store), whereas recreational consumers show a slight inclination for the red-colored store. Although this finding is partially in line with the predictions, it is similar with research by Holmqvist and Lunardo (2015) who find arousal has a negative effect (i.e., low pleasure and behavioral intentions) for task-oriented consumers, but no effect for the recreational consumers.

Here, the notion that different consumer's motivation needs different level of arousal for optimal pleasant experience (Massara et al., 2010; Van Rompay et al., 2012) and the mediation role of dominance in this study may underlie the finding. As such, it is likely that task-oriented consumers experience the blue-colored store as more pleasant because it provides optimal arousal and greater sense of control over the situation that may facilitate their goal attainments, resulting in positive responses. The red-colored store, conversely, may be seen as a source of distraction in accomplishing the needed shopping task for them. As for recreational consumers who do not have a specific goal to attain, the feeling of being in-control in the store environment seems less important and thus the presence of color does not really affect them.

Regardless of color or shopping motivation, music alone has strong effects on dominance and behavioral responses. Notably, some negative effects under stimulating music

conditions were observed. Not only consumers significantly experienced less dominance under stimulating music, but they also rated a high inclination to avoid the store. This can be explained by the fact that music with its arousing potential has capacity to attract attention onto itself (Chou, 2010). Thus, since highly arousing (i.e. stimulating) music demand a large mental attention, it might become a form of distraction for consumers during shopping and consequently evokes the feeling of losing control in the store. Eventually, it may also evoke discomfort that triggers greater avoidance tendency towards the store. Indeed, prior research has established that slower tempo and lower volume make people staying longer in the environment than when the tempo or volume of the music are high (Garlin & Owen, 2006).

Furthermore, the prediction that in-store music and color of the store can be used to affect arousal is supported. These results concur with prior studies that have demonstrated stimulating music and warm color increase levels of arousal, whereas calming music and cool color reduce it (van der Zwaag et al., 2011; Küller et al., 2009). In relating these facts and consumers' memories, another result showed a positive correlation between arousal and memory, indicating that the higher the arousal level is, the higher the memory score achieved. Indeed, color appears to marginally affect consumer's memory, in which higher scores were reported for participants in the red-colored, as opposed to the blue-colored, environment. This finding therefore seems to support the assumption that environment with a red color being arousing, and that arousal is likely enhancing memory strength. As such, this result seems consistent with the arousal emotional hypothesis.

Another, alternative explanation that may be suggested for the memory facilitation observed in this study—regardless of arousal-based theory—is that exposure to color red narrows the scope of visual attention (Elliot, Maier, Moller, Friedman, & Meinhardt, 2007; Maier, Elliot, & Lichtenfeld, 2008). Consequently, it might be argued that in a red-colored environment, individuals focus on more detailed elements of the store, which induce a higher level of attention and subsequently elicit better memory. Here, it seems that the red-colored store helps consumers in memorizing certain elements or information by increasing their attentional level; hence, instead of arousal-induced memory, attentiveness may play a role in influencing memory. However, it should be noted that the effect of in-store color remains marginal, possibly only influencing very few of participants, or in fact having no effect at all. Therefore, follow up research to further assess the relevance and usability of the findings in this area is clearly required.

5.1 Limitations and directions for future research

The result of this study should be interpreted cautiously for many reasons. First, the duration of exposure to the atmospheric stimuli was relatively brief—less than 2 minutes. Responses may be different if the exposure were longer. Furthermore, the fact that participants were experiencing the store environment from the video is not representative of how they would move in a real store and thus it might hinder their full projection into the imaginary scenario. In addition, the use of a video tends to limit participants' visual range because they only can see what is presented in the video within a relatively equal duration for each scene. However, the attention people put in the real store could have been different in this case and perhaps would affect their memory processes. For these reasons, a virtual environment that allows participants to move through the simulated environment at their own pace can be an effective method to use for future research (e.g. Van Hagen et al., 2014).

Second, this study was conducted under a strictly controlled laboratory setting. The fact that there are only few people present in the store and there is no social interaction among individuals within the environment may make the environment to be perceived as tedious and less realistic. Future research therefore should consider the role of human density since many literatures have suggested that crowding is an essential environmental factor in affecting consumers' evaluations of service experiences (e.g., Eroglu, Machleit, & Barr, 2005; Grayson & McNeill, 2009; Pons, Mourali, & Giroux, 2014). By doing so, it would also provide a more comprehensive understanding of consumer-environment interactions.

Third, the use of single-retail setting of a clothing store environment and relatively small samples of highly educated participants may limit the generalizability for the findings obtained. Exploring different types of settings, sample groups, and replication in a field experiment would provide a richer understanding on the relation between atmospheric cues, motivational orientation, and consumers' responses. Another potential limitation of the study is the difficulty to justify whether the impact of atmospheric elements really increase participants recall rates or reduce it since there was no control condition in this study. Moreover, although this study highlighting the importance of shopping motivation in stimulating purchase intention, adding another situational moderator such as consumer self-regulation can also be the subject of future research. For example, does high-arousing shopping environment stimulate a purchase intention for individual who simply want to have fun (i.e., recreational consumers) on the one hand, but already have formed a high control mechanism over the impulsive decision (i.e., action oriented consumer) on the other hand?

Finally, only two types of music and two varieties of colors were employed in this study. Considering the various equally important characteristics of color and music, future research should investigate more varieties of color (e.g., hue, saturation, brightness) and background music (e.g., mode, rhythm, melodic, texture). Furthermore, it can also be argued that assessing the effect of tangible variables would be more relevant when taking motivational orientation as a moderator since these variables directly affect consumer movement in a store (Van Rompay et al., 2012). Therefore, other design elements that are more concrete than store color, such as layout and furniture variables, as well as decoration and display furniture can be considered for further work.

5.2 Practical implication

The result of this study illustrates the importance of considering situational variables when attempting to adapt specific environmental elements, such as color and music in order to create a pleasant retail environment. Here, retailers are suggested to adjust the level of excitement in their stores by selecting the most suitable elements of the store environment that meet consumers' needs to generate positive responses and enhance purchase possibility. In general, to positively influence consumers who shop to obtain some specific items, retailers should set the tone of their store environment into the calming one by using low arousing elements. On the other hand, retailers should create an exciting environment by applying high arousing elements to suit the needs of consumers who shop for entertainment.

The present study also demonstrates some ways to manage the level of arousal in store environment by means of color and music. Specifically, warm-colored environment can be used to increase consumers' arousal levels, whereas cool-colored environment is useful to lessen it. Here, colored lighting LEDs can be an option that allows retailers to conveniently modify store color. One prominent example on colored lighting application is given by Haat, a high-end fashion retailer in Tokyo, they utilize LEDs on the ceiling that can be programmed to subtly change the light to various colors one row at a time when consumers entering the store. In doing so, retailers are able to dynamically adjust the color to set the intended tone. For example, at a holiday season when consumers are commonly recreationally oriented, it is suggested to apply warm colors (e.g., red, orange, and yellow) around the store; conversely, when the store are about to close and consumers usually have task-oriented motivation, retailers may apply cooler colors (e.g., green and blue) throughout the store. In retail design, however, color also plays an important role in affecting the

perceived image and identity of a store (Kutlu, Manav, & Lanc, 2013), thereby the use of color should align with the desired brand image and identity. In cases when they are not fit, retailers are advised to adjust the level of saturation and/or brightness of the color to either increase or decrease its arousal degrees.

Indeed, creating a highly arousing environment can be easily done by increasing the sound volume and/or tempo of background music within the store. However, despite its use as a tool of marketing, music has the potential to impact negatively on consumers (Hynes & Manson, 2016). Specifically, retailers should be aware of how highly arousing music may cause discomfort or stress to consumers. In order to achieve the utmost result of in-store music function, retailers should be conscientious in using music, by giving attention to factors such as the level of volume or the appropriateness. Care should also be taken to ensure that stimulating music is fairly pleasant; thus, retailers can deliver the right combination of high arousal and high pleasure (i.e., exciting) music to avert the annoyance effect of stimulating music. Alternatively, retailers can choose to play calming music that presumably induces consumers to stay longer and increase value returns.

It is also noteworthy that just as the store environment affects consumers in a traditional retailing setting, to some extent store atmospherics can be adopted into certain features on the web sites to influence online shoppers (Eroglu, Machleit, & Davis, 2001). For instance, Wang, Minor, and Wei (2011) suggest that web aesthetics can be manipulated through interface design customization to attain most favorable outcomes. Here, in terms of colors, e-tailers can apply and modify color used in the background, text, and also the space that surrounds product images depending on the consideration of consumers' responses as well as their shopping motivations. As for music, it may be applicable to mitigate negative emotion evoked by the perceived waiting time of page downloads or induce positive emotion by means of playing background music on opening pages (i.e., intro-music). All in all, an appropriate design of background music and color in the online store should enhance consumer's online experience that subsequently improve their likelihood of exploring the web-store and purchasing the products.

Lastly, the study result suggests that red-colored environment may facilitate recall function. If color plays a role in influencing memory, then it will be useful when consumers need to make a decision using memory-based choice (Rottenstreich, Sood, & Brenner, 2007), in which consumers try to recall the items, promotion, or information at the store in the future. For example, a consumer who intends to purchase a product in the next promotional day can remember on which day they should visit the store or they also can recall which shop

to visit when they want to purchase a specific item. Thus, retailers could present some notable store elements or information (e.g., product display and promotion) surrounded by warm colors to make their store more memorable for consumers.

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Appendix

Questionnaire main study

Dear respondent,

Thank you for your participation in this study. This experiment is a part of my master thesis project, which is one of the requirements to conclude my master program in Marketing Communication at University of Twente. The aim of this experiment is to determine the most effective store atmosphere by investigating people's impressions on a given store conceptual design. This experiment takes place in a fictitious clothing store.

In this experiment you will watch a simulation video. Please watch the video thoroughly and answer all the questions that follow. You can only choose one answer per question. Your sincere opinion will be very appreciated. This experiment will take no longer than 15 minutes to complete.

All the answers you provide are anonymous and will be kept in the strictest confidentiality. Participation is completely voluntarily and you are free to end your participation at any moment and for any reason.

If you have any questions before or during the experiment, please do not hesitate to ask me.

By clicking the next button, you agree to participate in this experiment.

Kind Regards,

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To begin please thoroughly read the scenario below and imagine yourself in the following situation:

It is weekend already. Since at the moment you have free time, you looked for something to do and therefore decided to go to city center. While you have plenty of time and did not intend to search for any specific item in the city center, you noticed that there is a newly opened clothing store that you found interesting and you decided to take a look inside. Imagine yourself entering the store and browsing around for a couple of minutes.

Now imagine that you are about to step into the store and this is how you experience the store.

[Please ask the researcher to play the video for you before proceeding to the next page.]

Note: you are not allowed to change the volume of the video.

The following questions are related to your memory regarding the store elements. Please select one that best answers the question.

Note: There would be no penalty or other adverse consequences if you fail to identify the answers correctly.

1. How much is the discount for the summer dress?

- ☐ 10%
 - ☐ 20%
 - ☐ 30%
 - ☐ 40%
-

2. What is the name of the store?

- ☐ Coast
 - ☐ Cotton
 - ☐ Console
 - ☐ Cavallo
-

3. How much is the price for two t-shirts in one of the promotions in the store?

- ☐ €10
 - ☐ €15
 - ☐ €20
 - ☐ €25
-

4. On what day does the store offer student discount?

- ☐ Monday
 - ☐ Tuesday
 - ☐ Wednesday
 - ☐ Friday
-

5. What is the quote in the motivational poster on the wall?

- ☐ Believe in Yourself
- ☐ Positive Vibes
- ☐ The Best is yet to Come
- ☐ Do What You Love

The following questions are related to your perception towards the stimuli in the video simulation. Please choose to what extent the statement best corresponds to your opinion regarding each statement below.

The background music played in the video is:
Calming | ☐ ☐ ☐ ☐ ☐ ☐ ☐ | Stimulating

The color of store interior in the video is:
Calming | ☐ ☐ ☐ ☐ ☐ ☐ ☐ | Stimulating

The following questions are related to the demographic data.

Please indicate your gender:

- ☐ Female
☐ Male
-

Please indicate your age:

Please indicate your nationality:

- ☐ Dutch
☐ Other (please specify)

Please indicate your highest completed level of education:

- ☐ Primary school
☐ High school
☐ Bachelor's degree
☐ Master's degree
☐ Doctorate degree
☐ Other (please specify)

If applicable, please indicate your favorite music genre:

If applicable, please indicate your favorite color(s):

We thank you for your time spent taking this survey.
Your response has been recorded.