Impulsive purchase behavior: The role of the environment and self-regulatory processes. Masterthesis Department Marketing Communication

Inga Haubrock s0159182 25.0

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The present study investigates the effect of impulsive purchase behavior as influenced by the environment and state-ego depletion. It was supposed that high arousal environments lead to higher amounts of ego-depletion and therefore to impulsive purchase behavior. Within the first study respondents were exposed to different arousal inducing environments manipulated by the use of color and music. The second study manipulated state-ego depletion by means of a depletion task. The third study dealt with a higher level of manipulation by using the factor crowding additionally being manipulated. Impulsive spending was measured afterwards. Results indicate that high arousal environments lead to more ego-depletion. Furthermore high arousal environments were found to increase impulsive spending behavior, whereas this effect could only be detected in the third study. Study 1 and 2 revealed the factor pleasure to be a good predictor of impulsive buying. Low amounts of pleasure were found to increase the amount of money being spent. The present findings imply high arousal environments to elicit ego-depletion and impulsive spending. Furthermore displeasure was detected to increase ego-depletion due to the mood-regulatory processes taking place during negative mood states. The obtained findings and practical implications are discussed.



Introduction

Surely everyone knows a comparable scenario. You go into a supermarket in order to buy something you need for cooking. Instead of only buying products you need for your meal you come home with many more products you purchased without having intended to. The act of impulsive purchasing is very common in everyday life.

Between 27 and 62 % of consumers can be classified as impulsive purchasers (Rook, 1987). Impulsive purchasing is defined as "involving spontaneous and unreflective desires to buy, without thoughtful consideration of why and for what reason a person should have the product" (Vohs & Faber, 2007). The desire to buy is not under conscious control but arises due to a specific stimulus (Rook, 1987) which leads to action if not controlled. The environment can provide such stimuli by either enhancing decision making or aggravating it. The present paper investigates the effects of environmental stimuli on impulsive purchasing in relation to individual self-regulation mechanisms.

This thesis first describes the Reflective-Impulsive Model (RIM) and its underlying selfregulatory processes. Furthermore, environmental influences are examined and related to impulsive buying on the basis of a model developed by Mehrabian and Russell

(Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). In addition, the role of the optimal stimulation level and screening ability is clarified and then linked to impulsive purchase behavior. The first study investigates the effect of environmental arousal level on impulsive purchase behavior. The second study explores the effect of state-ego depletion on impulsive purchase behavior by manipulating egodepletion. Finally, the third study ascertains the effect of a much stronger environmental manipulation on state-ego depletion and spending behavior. To understand the intrinsic processes subordinate to impulsive purchasing, the Reflective-Impulsive Model gives a basic understanding how individuals react on stimuli.

The Reflective-Impulsive Model (RIM)

The reflective-impulsive model is a parallel process model which is used to explain the pathway from cognition to a behavioral response (Strack et al., 2006). It assumes that two distinct systems (impulsive and reflective) interact with each other and therefore lead to a behavior response. The impulsive system is a sort of pattern recognition system which is activated through a fast spread of activation by environmental stimuli and cues (Strack et al., 2006). Therefore, the impulsive system assumes fast processing and contains information about individual urges, desires and impulses (Vohs, 2006). The reflective system includes information about individual goals and plans (Vohs, 2006), operates slowly, is based on intention and is susceptible to disruption by other processes (Strack et al., 2006; Hoffmann, Strack, & Deutsch, 2008). The reflective system rests underneath a threshold until it is pushed into action by an underlying process called selfregulation (Vohs, 2006) which is clarified in a later section of this thesis.

If the individual is exposed to desirable stimuli, such as a tasty cookie, self-regulation will activate the reflective system. When the reflective system contains the goal of eating healthy the individual tries to attain this goal. When an individual has to engage in self-control such as emotional, attentional or cognitive selfcontrol, subsequent self-control processes are restricted (Muraven & Baumeister, 2000) due to the decrease in self-regulatory resources. The individual is incapable of controlling their behavior and to resist the tasty cookie. The depletion of regulatory resources is named egodepletion whereas no continuous term is used in literature. In the present paper we make use of the term ego-depletion.

In a study conducted by Vohs (2007) participants were resource depleted by ignoring particular stimuli on a video screen. As a result, individuals in the resource-depletion condition were willing to pay higher prices for products in comparison to individuals who were not depleted at all. This effect is based on the decreased activation of the reflective system which was resource depleted through attentional control. The impulsive system reacts on stimuli and cues (products) without consideration of goals, and standards set by the reflective system so that the individual is more likely to buy impulsively. A closer look should be taken on the driver of the reflective system, self-regulation.

Self-regulation

Self-regulation is the process in which an individual forms his or her goals or standards and monitors the distance from the current state to the desire state. A discrepancy appears if the current state differs from the ideal state. The individual tries to diminish this discrepancy by moving the current state to the desired state (Vohs & Faber, 2007; Carver & Scheier, 1990). If an individual has the desired state to be slim but eats cookies, a discrepancy results due to the disagreement between desired and current state. As a consequence, the individual has to diminish this discrepancy by regulating his/her behavior to buy only low-fat and healthy food.

However, the regulation of the self is not always possible in any given situation. Selfregulatory control processes are constricted as













proposed by the limited-resource model, wherein self-regulation is described as a muscle which loses its strength through exertion (Muraven & Baumeister, 2000). All selfregulatory processes are assumed to draw on the same resource which means that an individual only has limited capacity of selfregulation. Exerting control over the self results in a depletion of self-regulatory resources (Janssen et al., 2007). This state is named egodepletion. As a consequence of this circumstance the individual is less capable to function effectively so that a subsequent decision may rely on habit, routine or automatic processes (Janssen et al., 2007). The individual makes choices without information processing so that previous set goals do not have any effect on behavior. An individual with the goal state of being slim reacts in such a situation on simple cues and desires and eats cookies he/she wasn't intended to. The behavior response is guided by the impulsive system because activation of the reflective system is impaired due to limited selfregulation capacity to push the reflective system above threshold. In such a situation behavior strongly influenced is by environmental cues and heuristics which trigger a behavioral response (Dijksterhuis et al., 2005).

Ego-depletion could be elicited through various processes and stimuli such as exposure to stress in a crowded situation, noise or other stressors (Muraven & Baumeister, 2000).

Controlled processing (Janssen et al., 2007) and choice making (Vohs, 2006) are factors eliciting ego-depletion as well. The present studies mainly deal with ego-depletion elicited by highly arousal inducing environments. If an individual has the goal of saving money, coping with high arousing environments, for example a crowded supermarket with fast played music and designed by arousal inducing colors, can result in ego-depletion. In this case the individual has to suppress emotions, thoughts and other automatic responses to the high arousing situation such as leaving the supermarket without making any purchase at all, or inhibiting emotions such as anger. As a result, the self-regulatory resources diminish and the impulsive system is more activated than the reflective system so that the individual is less capable of controlling their spending behavior. The next section gives a basic understanding about the influences the environment executes.

Environmental influences

In fact the environment can facilitate decision making. Norman (2004) proposes that in a dangerous situation ringing alarms makes people anxious and focuses their attention toward escape. However, the environment is also capable of aggravating decision making. Mehrabian and Russell (1974) developed a model to investigate environmental effects on behavior. They propose that behavior responses are mediated by emotional states. It was found that two dimensions were adequate to people's represent emotional responses triggered by the environment (Russel & Pratt, 1980; Mehrabian & Russell, 1974). The degree of pleasure and arousal predicts behavior with respect to the environment (Bitner, 1992; Mehrabian & Russell, 1974). Pleasure is supposed to be the motivational factor in impulsive behavior reactions whereas arousal functions as a mobilization to engage in impulsive action (Madhavaram & Laverie, 2004). Mehrabian and Russel propose arousal and pleasure to interact with each other and to predict approach and avoidance behavior (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). Therefore we propose high amounts of pleasure and arousal leading to impulsive purchase behavior.

Mehrabian and Russell refer to the degree of environmental stimuli as information load (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). If the environmental stimulation rate increases, a threshold is reached so that information processing decreases due to the overload of information the environment offers to the individual. This overload results in poorer decision making and dysfunctional performance (Malhotra, 1982). As a consequence, individuals who are exposed to high amounts of arousal are more prone to buy things on impulse due to restricted decision making capabilities. If an individual enters a shopping mall during Christmas time high amounts of stimuli, such as music played, different odors and lots of people require attentional control. As a result, the individual is more prone to buy impulsively.

Several studies showed that environmental information load can be manipulated by the music played in the retail environment, (Demarre, 2003-2004; Milliman, 1982) the presence of a particular scent (Mattila & Wirtz, 2001) the color-design of the retail environment (Bellizzi & Hite, 1992) and the amount of other people present in the environment (Muraven & Baumeister, 2000). It was found that changes in such ambient conditions can have a huge impact on individual perception of the environment and responses to it. However, individuals differ in their responses to the environment which could be clarified by the personality trait screening ability (OSL) (Sharma et al., 2010).













Optimal stimulation level (OSL) and individual screening ability

The optimal stimulation level is an individual reference point indicating that the degree of arousal is individually satisfying (Raju, 1980). In general, the affective reaction to environmental information load follows an inverted U-shaped function as displayed in figure 1 (Steenkamp & Baumgarten, 1992).

The optimal stimulation level can be linked to the concept of screening ability developed by Mehrabian (1977). Screening ability is the capability of screening out unimportant stimuli in the environment and therefore reducing the complexity and the individual arousal response it (Mehrabian, 1977). Screeners are to individuals who are capable of this process. Non-screeners, in contrast, show more intense arousal responses to the environment due to their incapability of reducing the environmental information load (Mehrabian, 1977). It can be assumed that individuals who are less able to reduce the incoming stimuli are more easily aroused (Mehrabian, 1977) and therefore more susceptible to overstimulation.

In order to attain the optimal stimulation level the individual may raise the stimulus input by exploring the environment or to lower the stimulus input by avoidance behavior (Steenkamp & Baumgarten, 1992). If it is



Figure 1: Inverted U-shaped function of the individual optimal arousal level: Too few environmental stimuli lead to low levels of satisfaction whereas too many environmental stimuli lead to low levels of satisfaction as well.

proposed that non-screeners desire a lower environmental information load than screeners, a high arousing environment will cause nonscreeners to experience dissatisfaction. The individual wants to lower the stimulus input by e.g. leaving the environment. If an individual with a high optimal stimulation level (screener) perceives the environmental information load as being low, understimulation results so that the individual might raise the stimulus input by risk-taking behavior (Raju, 1980) such as impulsive buying. Mattila and Wirtz (2008) found in their study that high perceived arousal environments lead to higher impulsive purchase behavior due to the restricted self-regulatory processes. Their data also suggest a tendency of understimulated purchasers to buy impulsively more often than purchasers in a neutral retail environment. However, no explanation for this effect was given by Mattila and Wirtz, a possible clarification for this phenomenon might be the emotional implication of impulsive purchasing.

Rook (1987) describes impulsive purchasing as stimulating, providing novelty, spontaneity and alertness. In other words, impulsive purchasing is capable of increasing the stimulus level and might therefore act as a coping strategy. This assumption is also supported by Sharma et al. (2010) who assume that individuals experiencing a low arousal level are more likely to purchase impulsively to reach their optimal stimulation level (OSL). In their study a strong correlation between high OSL and impulsive buying behavior was detected (Sharma et al., 2010). To give a global understanding of the interrelation between the different concepts, an integration of all factors would be necessary.

Integration of self-regulation, environment and optimal stimulation level (OSL)

Mattila and Wirtz suggest that high arousal environments have inhibiting effects on selfregulatory processes (2008). This inhibitory effect could be explained by the informationload paradigm. It is proposed that through the multitude of environmental input the individual becomes distracted and is not capable of processing the incoming stimuli which leads to dysfunctional performance (Jacoby, 1984). Selfregulation is the driver of the reflective system (Vohs, 2006) so that the loss of self-regulation causes the impulsive system to exert control over behavior. The individual reacts on simple heuristics and patterns and is more willing to accommodate urges and desires. Therefore, behavior is guided by the impulsive system so that the individual is more likely to purchase impulsively.

Ego-depletion might be less often elicited in individuals scoring high on screening ability because of their higher need of information load (Raju, 1980). Further, it is proposed that understimulating environments lead to low levels of satisfaction (Wirtz et al. 2007). The individual wants to reduce the undesired emotional state by increasing the stimulus input by purchasing impulsively. This effect might be less pronounced in low-screening individuals experience because they low arousal environments as satisfying. In contrast, individuals scoring high on screening ability might experience low arousing environments as understimulating and therefore fall back on impulsive purchase behavior to raise the stimulus input more often than low-screeners.

On the basis of these assumptions the following theoretical framework is established: The environmental stimulation can be expressed by the level of information rate. Subsequent emotional reactions such as pleasure, arousal and state-ego depletion are subordinate to the level of information load. The most relevant emotional reaction which is influenced by optimal stimulation level is state-











ego depletion which in turn influences impulsive spending behavior. Impulsive purchase behavior is influenced by the trait buying impulsiveness and the amount of stateego depletion. The main theoretical background is schematically described in figure 2.

On the basis of the theoretical background the following three main hypotheses were tested

H1: High arousal environments (overstimulation) will lead to higher levels of ego-depletion than low arousal environments and therefore to higher levels of impulsive purchase behavior

H1a: High arousal environments (overstimulation) will lead to less ego-depletion and impulsive purchase behavior in screeners than in nonscreeners.

H2: Neutral arousal environments (understimulation) will lead to perceived understimulation and therefore to higher levels of impulsive purchase behavior than moderate arousal levels.

H2a: Neutral arousal environments (understimulation) will lead to fewer perceived understimulation and impulsive purchase behavior in nonscreeners than in screeners.

H3: State-ego depletion mediates the effect of environmental arousal level on impulsive purchase behavior.





Study 1

The aim of the first study is to investigate the effect of the environmental information load (high vs. moderate vs. low arousal) on selfregulatory resource decline and impulsive purchase behavior. It is proposed that overstimulating environments (fast music and arousal inducing colors) lead to higher amounts of arousal and therefore to a higher level of self-regulatory resource decline (state-ego depletion). The amount of state-ego depletion is supposed to be influenced by the individual level of screening ability (OSL) and a high amount of state-ego depletion leads to impulsive purchase behavior.

Methods

Design

We chose for a 1x3 (high arousal, moderate arousal, low arousal) design.

Sample

A total of 123 Dutch undergraduate students were randomly recruited to participate in the experiment. The mean age was 24 with a standard deviation of 6.71. 45.5 % of the sample was male whereas 54.5 % of the sample was female.

Measures

Moderator:

Screening ability:

Screening ability was measured by the short version of the Trait-arousability scale (Mehrabian, 1994). The scale consists of 16 items with 7 negatively formulated. The items answer format ranges from *very strong disagreement* (1) to *very strong agreement* (9). Sample items include "Drastic changes in weather can affect my mood" and "My moods are not affected quickly when I enter new places". Cronbach's alpha was α = .72 in the present study.

Covariate:

Buying impulsiveness:

Buying impulsiveness was measured by the Buying Impulsiveness Scale (Rook & Fisher, 1995). The scale consists of 9 items with one of the items negatively formulated. Sample items include "I often buy things spontaneously" and "I carefully plan most of my purchases". The items answer format ranges from *very strong disagreement* (1) to *very strong agreement* (5). Cronbach's alpha in the first study was $\alpha = .62$.

Manipulation:

Information load:

Perceived environmental information load was assessed by the "General Measure of Information Rate" adapted from Mehrabian and Russell (1974). The scale consists of 14 items 7 of which are negatively formulated. Participants had to indicate on a bipolar 9-point Likert scale which word described their perception of the environment the best. Cronbach's alpha was $\alpha = .64$ in the first study.













Pleasure/arousal:

To assess the amount of pleasure and arousal the pleasure-arousal scale, developed by Mehrabian and Russell (1974), was used. The scale consists of 12 items, 8 of which are negatively formulated. Participants had to indicate on a 9-point Likert scale to which amount one of two words represented their current state. High scores on the pleasure-arousal scale imply a high amount of pleasure and arousal. Cronbach's alpha for the pleasure scale was α = .84 and for the arousal scales α = .78 with both values indicating a good internal consistency.

Dependent variable:

Resource depletion:

Participants had to answer a questionnaire to assess the amount of resource depletion. The State-ego-depletion scale (Ciarocco, Twenge, Muraven, & Tice) was used with a total of 25 items. Six of the 25 items were negatively formulated. The items answer format ranges from *not true* (1) to *very true* (7). The average scores on the State Ego Depletion Scale served as measure of resource depletion. Sample items include: "Right now, it would take a lot of effort for me to concentrate on something", "I can't absorb any more information", and "I feel sharp and focused". Cronbach's alpha in the present study was $\alpha = .80$ which indicates a good internal consistency.

Manipulation of Arousal

The arousal manipulation involved varying two ambient stimuli. *Color* was manipulated by creating an overstimulating arousal environment through the use of red color which was supposed to overstimulate the consumer. A moderate stimulating environment was created by using the color blue which was associated with terms such as calm and restful (Bellizzi & Hite, 1992). An understimulating environment was created through the use of white color which was supposed to understimulate the participant (see Appendix B).

Music was manipulated using music tempo. A neutral piece of music was chosen to avoid genre preferences (Interpret: Aisha Duo, Album: Quiet Songs, Title: Amanda). The music was manipulated by changing the beats per minute (BPM). Fast music was used for the overstimulation condition to trigger emotional arousal, whereas slow music was supposed to be relaxing in the moderate stimulation condition (Demarré, 2003-2004; Hevner, 1935). No music was used in the neutral condition which was supposed to understimulate the participant.

Music and color were combined to create an overstimulating, understimulating and moderate stimulating environment respectively.

Procedure

The study was conducted by a simulation experiment. Bateson and Hui (1992) found that photographic slides used to simulate the service setting, elicits the same psychological and behavioral phenomena as real life settings. The sample responded to the questionnaire in a controlled setting to avoid external distracting stimuli and to shape the same situation for each person. Participants were randomly assigned to three groups and exposed to an overstimulating, moderate stimulating and understimulating environment respectively by showing them a short video fragment of a retail environment. Subsequently participants had to answer a short questionnaire to assess the amount of state-ego depletion. The scale was directly used after respondents saw the short video fragment because it was assumed that answering several questions would result in resource depletion as well (Baumeister et al., 2008) what would lead to a bias on our manipulation. Afterwards participants had to determine prices they would pay for various products. It was supposed that a decline in self-regulatory

resources would lead to a higher willingness to pay for a potential product (Vohs & Faber, 2007). We chose for hedonic products because it was assumed that participants would be more susceptible to buy such products impulsively due to their "pleasant" nature (Bruyneel et al., 2006). After the assignment of prices, participants had to answer a questionnaire to determine the constructs which were supposed to be of interest. Participants were thanked, salaried and debriefed.

Data Analysis

To test for the manipulation a univiariate analysis of variance (ANOVA) was used with the level of information rate as dependent variable. Emotional reactions toward the environment were tested by the use of multivariate analysis of variance (MANOVA) with pleasure and arousal as dependent variables. To test for group differences we used ANOVA/ANCOVA with screening ability as additional factor and buying impulsiveness as covariate. Depletion and environmental stimulation (color/music) were used as independent variable as well. State-ego-depletion and price assignments were used as dependent variables. We categorized the scores respondents gave on the traitarousability scale. The procedure we chose was a median split to categorize respondents as low screeners and screeners. Finally mediation analysis was conducted for the environmental manipulation as an independent factor, price assignments as the dependent factor and state-egodepletion as mediator. Outlier analysis resulted in deleting two outliers. Data were analyzed by using the statistical program SPSS version 16.0 for Windows.

Results

Level of information rate

The manipulation check revealed no significant results concerning the amount of information rate among the three groups (F(2,118) = 0.54, p > 0.10). The lack of significant group difference is not in line with our







hypotheses that high arousal environments will lead to higher amount of level of information rate.

Pleasure and Arousal

No significant group differences were found on the amount of arousal experienced (F(2,80) = 0.84, p > 0.10). It was supposed that high stimulating environments will lead to higher perceived arousal. The obtained result is not in line with this supposition. Significant differences on pleasure were detected (F(2,80) = 2.48, p < 0.10).

Respondents in the understimulation condition experienced the lowest level of pleasure (M = 28.42, SD =5.10) whereas the highest level of pleasure was observed in the overstimulation condition (M = 31.87, SD = 6.58) with the moderate stimulation condition in the middle (M =29.86, SD = 6.55). Results on perceived pleasure are in line with our supposition that low arousal environments lead to lower levels of satisfaction. Means and standard deviations are displayed in table 1.

State-ego depletion

Two factor ANOVA with state-ego depletion as dependent and environmental stimulation (color/music) and screening ability as independent variable yielded significant results on the factor environmental stimulation (F(2,115) = 3.32, p < 0.05). No effect of screening ability on state-ego depletion was found as well as any significant interaction on the factor screening ability and environmental stimulation. By post hoc comparison a significant difference in the amount of state ego depletion was found for participants experiencing more depletion in the overstimulation condition (M = 86.37, SD = 2.58) and the moderate stimulation condition (M = 86.75, SD = 2.61) in contrast to the understimulation condition (M = 78.10, SD = 2.61) (Table 1). No significant differences were found between the blue-slow music condition and the red-fast music condition.

On the basis of these results we can partially accept hypothesis one *(high arousal environments will lead to*





Table 1: Means and Standard deviations of the three conditions on state-ego-depletion and price assignments.

	Mean (SD) State-ego-depletion	Mean (SD) price assignments	Mean (SD) pleasure
Overstimulation	86.37 (2.58)	36.57 (1.49)	31.87 (6.58)
Moderate stimulation	86.75 (2.61)	34.06 (1.49)	29.86 (6.55)
Understimulation	78.10 (2.61)	39.52 (1.49)	28.42 (5.10)
N = 123			

higher levels of self-regulatory resource decline than low arousal environments) and have to reject hypothesis one a) (High arousal environments will lead to less ego-depletion and impulsive purchase behavior in screeners than in nonscreeners.).

Price assignments

To test for the second part of hypothesis one (high arousal environments will lead to higher levels of selfregulatory resource decline than low arousal environments and *therefore to higher levels of impulsive purchase behavior*) we ran ANCOVA on the price assignments with environmental stimulation (color/music) and screening ability as independent variables and buying impulsiveness as covariate. The analysis revealed significance results on the factor environmental stimulation with F(2,114) = 3.25, p < 0.05 which indicates differences in price assignments on the three conditions (Table 1).

No effect of buying impulsiveness on price assignments and screening ability on prices assignments was detected; as well as no interaction effect of screening ability and environmental stimulation. Post hoc analysis revealed a significant difference between the moderate stimulation condition (M = 34.06, SD = 1.49) and the understimulation condition (M = 39.52, SD = 1.49) (p < 0.05); with the latter spending more money for products the moderate stimulation condition. No significant differences were found between the moderate stimulation condition and the overstimulation condition (M = 36.57, SD = 1.49) (p > 0.1).

On the basis of these results we have to reject the second part of hypothesis 1. In the present study the

understimulation condition leads to higher impulsive purchase behavior which is in line with the second hypothesis (Neutral arousal environments will lead to perceived understimulation and therefore to higher levels of impulsive purchase behavior) even though no significant difference was found on information load or arousal between the groups. Furthermore we did not find significant differences among screeners and nonscreeners on price assignment which causes us to reject hypotheses one and two a) (High arousal environments will lead to less ego-depletion and impulsive purchase behavior in screeners than in nonscreeners (H1a). Neutral arousal environments will lead to fewer perceived understimulation and impulsive purchase behavior in nonscreeners than in screeners (H2a).).

To clarify the role of pleasure in the interpretation of the present result we ran Regression analysis with pleasure as a predictor and price assignments as independent variable. Results indicate a significant relation between pleasure and the assignments of prices (β = -.18, t(111) = -1.87, p < 0.10). Therefore we were not able to infer that understimulation causes impulsive buying behavior but have to prove the effect of pleasure in this context.

Mediation analysis

We ran mediation-analysis to test for state-egodepletion as a mediator. The regression coefficient with level of information rate as a predictor and price assignment as a dependent variable yielded no significant result (β = 0.03, t(120) = .07, p > 0.10). The second analysis with state-ego-depletion as dependent variable and level of information rate as independent variable did not reach significance (β = -0.01, t(120) = -.05, p > 0.10). Regression with state-ego-depletion as independent variable and price assignment as dependent variable did not reach significance (β = -0.02, t(120) = -.17 p > 0.10) neither did a regression analysis with level of information rate (β = .04, t(120) = .37, p > 0.10) and state-ego-depletion (β = -.02, t(120) = -.16, p > 0.10) as independent variable and price assignment as dependent variable. Therefore we have no confirmation for the third hypothesis (State-ego depletion mediates the effect of environmental arousal level on impulsive purchase behavior).

Discussion

Aim of the first study was to assess the effect of environmental stimulation on impulsive purchase behavior. State-ego depletion was assumed to mediate this process. Results obtained indicate that participants who were exposed to the color and music conditions experienced more state-ego depletion than participants in the white and no music condition. This result is in line with the assumption that high arousal environments lead to a higher amount of state-ego depletion (Mattila & Wirtz, Furthermore, participants 2008). spent significantly more money for products in the understimulation condition than in the stimulation condition. moderate This phenomenon could be explained by the fact that respondents were understimulated by the environment and were trying to raise the stimulus input by impulsive purchase behavior as a coping strategy. This result is in line with

hypothesis 2a.

Results obtained by regression analysis indicate that pleasure significantly predicts spending behavior. High amounts of pleasure were found to decrease the amount of money individuals spent for products. Respondents in the understimulation condition experienced the lowest amount of pleasure and spent the highest amount of money for products.

State-ego depletion seems to have no effect on spending behavior in the present study. One possible explanation for this outcome might be the failure of our manipulation. The manipulation check shows no significant differences on level of information rate and arousal which could imply that our manipulation was not strong enough to elicit the predicted emotional responses. If this is the case there would be an explanation for the fact that the overstimulation condition and the moderate stimulation condition are spending unexpectedly low amounts of money for the products. To reassess the effect of selfregulation in impulsive spending the second study tries to explain the role of state-ego depletion in impulsive spending intention by manipulation of state-ego depletion.













Study 2

The second study investigates a possible mediation effect of state-ego depletion on impulsive purchase behavior. To prove the effect we manipulated state-ego depletion with a depletion-task to elicit state ego-depletion. The study was constructed as an online survey.

Methods

Design

We chose for 3 (high arousal vs. moderate arousal vs. low arousal) x2 (depletion vs. no depletion) design.

Sample

A total of 131 Dutch undergraduate students were randomly recruited to the experiment. The sample consisted of 61 (46.6%) men and 69 (52.7%) women. Mean age of the participants was 25.3 years with a standard deviation of 7.08 years.

Measures

To test for our moderator variable screening ability we used the "Trait arousability scale" developed by Mehrabian (1994). The scale showed a good internal consistency with an alpha value of α = .77.

The covariate buying impulsiveness was assessed with the "Buying Impulsiveness Scale" developed by Rook and Fisher (1995). Cronbach's alpha was $\alpha = .87$.

To test for our manipulation we made use of the "General Measure of Information Rate" (Mehrabian & Russell, 1974). Cronbach's alpha in the second study was $\alpha = .81$.

The emotional responses toward the environment were assessed by the pleasure and arousal scale developed by Mehrabian and Russell (1974). Cronbach's alpha for the pleasure scale was α = .90. The alpha coefficient for the arousal scale was α = .89.

Ego-depletion was measured by the use of the State-ego depletion scale (Ciarocco et al.). Cronbach's alpha indicated a good internal consistency with a value of α = .95.

Manipulation and Procedure

The environmental stimulation level was manipulated as it was in the first study (see Appendix B). Additionally, state ego-depletion was manipulated by asking the respondents to transcribe a short text without making use of an 'e' or the space button. This depletion technique was adapted from Muraven et al. (2006). It is proposed that transcription consumes a high amount of attentional resources (Graham, 2000). If the transcription process is constricted (by the prohibition to use the space button and the 'e') participants were ego-depleted as a result. Participants were randomly assigned to three groups and exposed to an overstimulation, a moderate stimulationand an understimulation setting by means of a video fragment of a retail environment. Subsequently participants had to answer a short questionnaire to assess the amount of ego-depletion initiated by the exposure to the environment. Afterwards participants had to determine prices they would pay for various emotionally loaded products such as chocolate and wine. We chose for hedonic products due to their pleasant nature, as already used in the first study. It was supposed that a decline in self-regulatory resources would lead to more willingness to pay for a potential product (Vohs & Faber, 2007). After the assignment of prices, participants had to answer a questionnaire to determine the constructs which were supposed to be of interest. The questionnaire was equal to the questionnaire used in the first study. Participants were thanked, salaried and debriefed.

Data Analysis

To test for the manipulation a univiariate analysis of variance (ANOVA) was used with the level of information rate as dependent variable. Emotional reactions toward the environment were tested by the use of multivariate analysis of variance (MANOVA) with pleasure and arousal as dependent variables. To test for group differences we used ANOVA/ANCOVA with screening ability as additional factor and buying impulsiveness as covariate. Depletion and environmental stimulation (color/music) were used as independent variable as well. State-ego-depletion and price assignments were used as dependent variables. Regression analysis was used to identify possible predictor variables. Outlier analysis resulted in deleting one outlier. Data was analyzed by using the statistical program SPSS version 16.0 for Windows.

Results

Level of information rate

To test for the manipulation we checked whether there were significant differences on the level of information rate. Multivariate variance analysis (MANOVA) revealed significant differences on the factor depletion (F(1,123) = 3.94, p = 0.50). Respondents who were in the depletion condition experienced significantly more information load than participants in the no depletion condition. The environmental stimulation (color /music) seems to have no influence on the information level (F(2,123) = 0.78, p > 0.10). In addition no interaction between depletion and environmental stimulation was detected (F(2,123) = 0.23, p > 0.10). These results are not in line with our proposition that high arousal environments lead to higher perceived information rate.

Pleasure and arousal

Analysis on the arousal level did not reach significance on factor depletion (F(1,123) = 1.64, p > 0.10). Additionally no interaction effect and no effect of environmental stimuli were found.

Analysis on pleasure yielded significant results for the factor environmental stimulation (color/music) (F(2,123) = 2.67, p < 0.10). Respondents in the understimulation condition experienced significantly more pleasure (M = 21.74, SD = 7.96) than participants in the moderate stimulation condition (M = 18.59, SD = 6.07) whereas no significant difference on pleasure was found for the overstimulation condition (M = 21.12, SD = 7.96). No interaction effect between depletion and environmental stimulation (color/music) on pleasure and no effect of depletion was detected. The results are contrasting to our assumption that low arousal environments lead to lower levels of pleasure. Means and standard deviations are shown in table 2.

State ego depletion

To test for our depletion manipulation we ran ANOVA with environmental stimulation, depletion and screening ability as factors. Results revealed no significant differences on state-ego depletion. Depletion appears to have no effect on state-ego depletion as well as the environmental stimulation (color/music). No significant interaction between the depletion and environmental stimulation was found. Furthermore no effect of screening ability on state-ego depletion was detected as well as any interaction between screening ability and environmental stimulation. We obtained a significant interaction between depletion and screening ability (F(1,108) = 3.19, p < 0.10), whereas we did not find the three factors to interact with each other.

These results stand in contrast to our proposition that higher amounts of arousal lead to more ego-depletion. Furthermore we have to reject hypothesis one a) (*High arousal environments will lead to less ego-depletion and impulsive purchase behavior in screeners than in nonscreeners*).







Table 2: Means and Standard deviations of the six conditions on the price assignments and pleasure.

	Mean (SD) price assignments	Mean (SD) pleasure
OS	41.53 (11.89)	21.12 (7.02)
MS	40.84 (9.40)	18.59 (6.07)
US	35.17 (8.82)	21.74 (7.96)
OS-D	37.81 (10.20)	22.37 (5.23)
MS-D	40.59 (8.87)	20.15 (6.97)
US-D	36.53 (8.53)	23.61 (5.69)

N = 131

Note: OS = Overstimulation, MS = Moderate stimulation, US = Understimulation

OS-D = Overstimulation with depletion, MS-D = Moderate stimulation with depletion

US-D = Understimulation with depletion

Price assignment

ANCOVA on price assignments with the factor depletion, environmental stimulation, screening ability and buying impulsiveness as covariate yielded significant results on the factor buying impulsiveness (F(1,112) = 3.48, p < 0.10). Furthermore no other effects could be detected. These results are in contrast to our proposition that screening ability influences impulsive spending behavior (H1a & H2a).

Two factor ANOVA on the price assignments with depletion and environmental stimulation (color/music) as independent variable revealed significant results. Respondents in the moderate stimulating condition spent more money on products than participants in the understimulating condition (F(2,125) = 2.82, p < 0.10). Means and standard deviations are displayed in table 2. Depletion seemed to have no effect on impulsive spending (F(1,125) = 0.26, p > 0.10). Furthermore no interaction effect between environmental stimulation (color/music) and depletion was detected. This result is partially in line with our proposition that high arousal environments lead to impulsive spending behavior whereas the absence of a depletion-effect stands in contrast to our suggestion that ego-depletion leads to impulsive spending behavior. To test for the effect of pleasure on purchase behavior we ran a regression analysis. Regression coefficient reached significance (β = -.15, t(130) = -1.72, p < 0.10)

Discussion

Aim of the second study was to prove the mediation effect of state ego depletion on the price assignments. No mediation effect of stateego depletion was found for environmental stimulation on price assignments. Furthermore no influence of environmental stimulation (color & music) on the level of information load was detected. In the second study the manipulation of the environment seems to be unsuccessful even though there is an effect on impulsive purchase behavior. Individuals were exposed to the video fragment only in the beginning of the study. It is possible that the emotional response to the environment decreased during the study so that it was not able to be detected by the price assignment task.

In the depletion condition respondents experienced a significantly lower level of information rate. This outcome could be explained by the fact that depletion diminishes information processing as proposed by Malhotra (1982). Respondents whose cognitive capabilities were depleted might be less capable of processing incoming information.

Significant differences between the groups were found on the pleasure dimension. Individuals who were in the understimulation condition experienced significantly more pleasure than participants in the higher stimulation conditions. Participants in this condition spent less money on products than those in the other conditions. Respondents in the moderate stimulation condition experienced the least amount of pleasure and spent most money on products. This result is also affirmed by the first study where high amounts of displeasure results in impulsive spending behavior.

In sum no conclusion can be drawn on the effect of high arousal environments on impulsive purchase behavior and state-ego depletion. Our manipulation appears to be unsuccessful in the present study. Pleasure seems to have an impact on impulsive purchase behavior whereas no relation was found between low levels of pleasure and state-ego depletion.

Study 3

The aim of the third study is to prove the role of self-regulation once again. We chose to manipulate the environment with an additional factor to ensure the success of the manipulation. proposed that overstimulating lt was environments would leads to higher amounts of state-ego depletion and therefore results in impulsive spending behavior. We assumed state-ego depletion to mediate the relation between environmental stimulation and impulsive spending behavior.

Methods

Sample

The sample consisted of 76 German undergraduate students. A total of 35 (46.1%) men and 28 (36.8%) women responded to the questionnaire whereas 13 participants did not respond to the demographic questions. Mean age was 23.5 years with a standard deviation of 2.49 years.

Measures

Manipulation check

Information load:

Once again we made use of the level of information rate scale where perceived environmental information load was assessed with. The scale was adapted from Mehrabian and Russell (1974). The scale revealed a very good internal consistency with Cronbach's alpha α =.89.













Ego depletion:

To assess the amount of ego-depletion as dependent variable we made use of the mental fatigue dimension of the Multidimensional Fatigue Inventory (Gentile et al., 2003). The dimension consits of 6 items with two items negatively formulated. Sample items included "When I am doing something, I can keep my thoughts on it." and "I can concentrate well". The scale yielded a good internal consistency with Cronbach's alpha α = .89.

Manipulation and Procedure

We manipulated the environmental stimulation by the use of a combination of color and music, as in the other studies. Additionally we used the factor crowding. The video fragment was manipulated by changing the amount of people presented in the retail environment (see Appendix B). The overstimulation environment contained a high quantity of individuals presented in the environment. Muraven and Baumeister (2000) propose that crowding decreases self-regulatory processes and therefore results in ego-depletion. Furthermore crowding is supposed to induce tension and confusion and leads to negative evaluations of the shopping experience (Eroglu & Harrell, 1986). By means of a combination of crowding, color and music the environmental stimulation was supposed to be strong enough to elicit the proposed emotional reactions. Respondents had to read a short scenario which was supposed to facilitate participants to imagine being in the given situation. The used scenario was as follows: It is Christmas time and you have to buy some presents for your family and friends. You won 250 Euro in the lottery which you want to spend in the displayed mall on presents. Keep in mind that you don't have to spend all the money and you also can spend more money if you are willing to.

Participants were randomly assigned to three groups and exposed to an overstimulation- a moderate stimulation- and an understimulation setting by means of a video fragment of a retail environment. Subsequently participants had to answer a short questionnaire to assess the amount of information rate and state-ego-depletion initiated by the exposure to the environment. Afterwards participants had to determine prices for 10 different products. The products we chose were middle high-priced products such as a mobile phone, perfume and a headphone. We chose these products for the reason given by Vohs and Farber (2007). "(1) They allowed for sufficient variance in the plausible range of prices in order to maximize sensitivity to differences in willingness to pay and (2) our college student participants would not have crystallized (factual) knowledge of exact prices for these types of products" (Vohs & Faber, 2007). Furthermore these kinds of products were hedonic as well which was supposed to result in a higher susceptibility to buy the products on impulse. During the price assignment task, respondents were continually exposed to the retail environment. This was assumed to increase the effect of our manipulation because emotional responses toward the mall might fade in time.

Data analysis

To test for the effect of the manipulation, we used a univariate analysis of variance (ANOVA) with the level of information rate as dependent variable. To test for group differences we used univariate analysis of variance (ANOVA) with state-ego-depletion and price assignments as dependent variables. Further, mediation analysis was conducted for the level of information rate as an independent factor, price assignments as the dependent factor and state-ego-depletion as mediator. Data were analyzed by using the statistical program SPSS version 16.0 for Windows. Finally we tested our theoretical model with a model generating approach using LISREL (Student Edition 8.80) as suggested by Jöreskog & Sörbom (1993).LISREL

	Mean (SD) State-ego-depletion	Mean (SD) price assignments
Overstimulation	21.03 (8.41)	366.00 (129.98)
Moderate stimulation	15.13 (5.75)	510.10 (231.07)
Understimulation	15.73 (6.40)	369.82 (106.77)
N = 76		

Table 3: Means and Standard deviations of the three conditions on state-ego-depletion and price assignments.

was supposed to be the most appropriate method to test both direct and indirect paths between variables. The structural equation model was tested by means of a path analysis to specify the relationships between variables.

Results

Manipulation check

The manipulation check revealed significant differences among the groups on the level of information rate (F(2,69) = 25.47, p < 0.001). Post hoc comparison yielded significant group differences among the overstimulation and moderate stimulation condition (p < 0.001). Participants in the overstimulation condition experienced a significant higher level of information rate (M = 64.12, SD = 2.33) than participants in the moderate stimulation condition (M = 43.64, SD = 2.68). Furthermore respondents in the overstimulation condition experienced a significant higher amount of information rate than participants in the understimulation condition (M = 41.67, SD = 2.74) (p < 0.001). No significant differences were detected between the moderate and the understimulation condition (p > 0.10). These results are in line with our proposition that high arousal environments lead to higher perceived environmental information load. On this basis, we can conclude our manipulation to be successful in the present study.

State ego-depletion

Univariate analysis of variance (ANOVA) with condition as independent and state-ego depletion as dependent variable reached significance (F(2,72) = 5.65, p < 0.05). Post hoc Bonferroni test yielded significant differences between the overstimulation condition (M = 21.03, SD = 8.41) and the moderate stimulation condition (M = 15.13, SD = 5.75) (p < 0.05) as well as between the overstimulation condition and the understimulation condition (M = 15.73, SD = 6.40) (p < 0.05). No significant differences were detected between the understimulation and moderate stimulation condition (p = 1.00). These results are in line with the first part of hypothesis 1 (High arousal environments (overstimulation) will lead to higher levels of ego-depletion than low arousal environments and therefore to higher levels of impulsive purchase behaviour). Means and standard deviations are displayed in table 3.

Price assignments

We ran univariate analysis of variance to detect group differences on the price assignments. Significant differences were found (F(2,72) = 6.07, p < 0.05) for the overstimulation condition (M = 366.00, SD = 129.98) spending significantly more money in contrast to moderate (M = 510.10, SD = 231.07) and understimulation condition (M = 369.82, SD = 106.77) with p < 0.05 in both cases. No significant differences were found between the moderate stimulation condition and the understimulation













condition (p = 1.00). The present results confirm the second part of our first hypothesis (see above). Means and standard deviations are shown in table 3.

Mediation analysis

We ran mediation-analysis to test for a mediation effect of state-ego-depletion on the effect of environmental information rate on price assignment. The regression coefficient with level of information rate as a predictor and price assignment as a dependent variable yielded a significant result (β = 0.56, t(71) = 5.64, p < 0.001). The second analysis with state-ego-depletion as dependent variable and level of information rate as independent variable reached significance (β = 0.60, t(72) = 6.21, p < 0.001). Regression with state-ego-depletion as independent variable and price assignment as dependent variable reached significance (β = 0.34, t(72) = 2.98 p < 0.005). Multiple regression yielded significant results on the level of information rate (β = .58, t(71) = 4.63, p < 0.001) whereas ego depletion did not reach significance (β = -.03, t(71) = -.22, p > 0.10). Therefore we have no confirmation for the third hypothesis (State-ego depletion mediates the effect of environmental arousal level on impulsive purchase behavior).

Testing the theoretical framework

Lastly, we performed a structural equation model test to prove our theoretical model. LISREL (Jöreskog & Sörbom, 2001)is supposed to be the most appropriate method to test both direct and indirect paths between variables. The proposed model was found to predict the data quite well with a chi-square value of 0.00 (df = 0) and a p-value of 1.00. Root Mean Square Error of Approximation indicated a quite good model fit with a value of 0.00 on the basis of the rule of thumb (Browne & Cudeck, 1993). T-values indicate an insignificant path from state-ego depletion to the dependent variable prices which means that the effect of environmental information load on prices is not mediated by state-ego depletion.

Discussion

Purpose of the third study was to prove the role of self-regulatory processes in high arousal environments. We chose to manipulate the environment in a stronger way by adding another factor to the environment. Crowding seems to increase the effect of our manipulation. Previous studies revealed that the exposure to the two atmospheric stimuli music and color did not seem to be strong enough to elicit the proposed emotional responses (study 1 & 2). A combination of several high arousing stimuli was able to lead to group differences. The factor crowding seems to have an impact on underlying emotional processes. Several studies found remarkable effects of the factor crowding. Altman (1975) states, that crowding elicits feelings as anxiety and stress. Others found physiological reactions such as increased heart rate, blood pressure, sweating and sickness (Bechtel, 1997). Crowding seems to increase ego-depletion in a higher amount than other ambient factors. Additionally the continual exposure toward the retail environment during the price assignment task seemed to increase the effect of our manipulation as well. Emotional aftereffects of the exposure to the environment tend to fade in time so that the environment has to be continually displayed to make the situation as realistic as possible. The choice of the products

in the last study led to remarkable results as well. We were able to detect highly significant differences among the groups on the price assignments with individuals in the overstimulation condition spending significantly more money for products than respondents in the other conditions. Even though, no significant difference was detected between the moderate and the understimulation condition. This result is in line with the second part of the first hypothesis (High arousal environments (overstimulation) will lead to higher levels of self-regulatory resource decline than low arousal environments and therefore to higher levels of impulsive purchase behavior.)

Furthermore we proposed that high amounts of arousal would lead to ego-depletion which in turn would result in impulsive purchase behavior (H1). Our results confirmed this assumption and are also in line with results obtained in the study by Mattilla and Wirtz (2008). Surprisingly we did not find egodepletion to mediate the effect of the environment on impulsive purchase behavior even though state-ego depletion was found to be predicted by the level of information rate and in turn predicts impulsive spending behavior quite well.

General Discussion

A huge amount of research has been done on the topic impulsive purchase behavior whereas less research has been done on the internal antecedents of impulsive spending. Mehrabian and Russell (1974) propose pleasure and arousal to be crucial emotional factors in impulsive spending whereas Vohs and Faber (2007) assume ego-depletion to be the underlying cause of spending impulsively. The present three studies were used to give a global view on emotional responses subordinate to impulsive purchase behavior.

We manipulated the atmosphere of the retail environment by means of music and color (Study 1 & 2). Pleasure was revealed to be a crucial antecedent of impulsive purchase behavior. Individuals experiencing displeasure spend the highest amount of money for the products. Muraven and Baumeister (2000) propose that mood and emotional regulation is likely to result in resource depletion too. Individuals experiencing bad mood try to override this negative emotional state through self control. The resulting decrease in selfregulatory resource might have prompted individuals to buy impulsively. On the basis of these effects we cannot conclude that understimulation causes individuals to purchase impulsively. Rather the absence of pleasure













seems to be the underlying factor that pushes individuals toward impulsive spending. A study conducted by Fry (1975) demonstrated the aftereffects of mood regulation. Children who had to think about a sad event were more prone to play with a forbidden toy than children who had to think about a pleasant or neutral event (Fry, 1975). The experience of displeasure might have caused individuals to regulate their emotions which in turn resulted in egodepletion and impulsive spending behavior. Surprisingly we did not find a relation between displeasure and ego-depletion in both studies (1&2). Another explanation for the fact that pleasure/displeasure predicts impulsive spending might be positive emotional aftereffects of impulsive purchases. Literature proposes that impulsive buying elicits positive affect which could be the reason for respondents buying more impulsively when they experience less pleasure. The act of buying elicits some positive feelings. Furthermore the nature of the chosen products in study 1 & 2 (hedonic products) elicits positive feelings as well.

We were not able to identify the source of pleasure. Respondents in the first study experience the understimulating environment as highly displeasing whereas individuals in the second study experienced most pleasure in the understimulation condition. However the condition individuals were exposed to predicts the amount of pleasure, there has to be another factor which explains these contrasting results. On the basis of our results we cannot fully explain internal processes causing impulsive purchase behavior produced by pleasure/displeasure.

The third study focused on state-ego depletion elicited by environmental stimulation. Results indicate that high arousal environments lead to ego-depletion and to higher impulsive purchase behavior as well. On the basis of this result we conclude state-ego depletion to play an important role in impulsive purchasing. Surprisingly we did not find ego-depletion to mediate the effect of the environment on impulsive purchase behavior even though stateego depletion was found to be predicted by the level of information rate and in turn predicts impulsive spending behavior quite well. The third study focuses on ego-depletion and the level of information rate only but beside these, there seems to be another factor to influence impulsive spending. The first and second studies might provide an answer. Both studies detected pleasure as a crucial factor influencing impulsive spending. Pleasure could also provide an explanation for the absence of group differences among the moderate and understimulation condition on both dependent measures (ego-depletion and price assignments). As proposed by Wirtz et al. (2007) understimulating environments lead to dissatisfaction. Individuals in the understimulation condition might have had regulated their negative emotional state and fall back in impulsive purchase behavior. This assumption is also affirmed by the high level of ego-depletion they experience.

In addition, the effect of crowding density in the environment was found to increase the amount of ego-depletion. Crowding requires high amounts of self-control in so far that it diminishes personal privacy, personal space and territorial behavior. Privacy is defined as an interpersonal boundary control process regulating interactions with others. If the desired privacy differs from the achieved privacy the individual regulates contacts (Altman, 1975). Furthermore, crowding has also influence on the individual personal space. "Personal space refers to an area with an invisible boundary surrounding the person's body into which intruders may not come" (Altman, p. 53, 1975). If the personal space diminishes, the individual will try to regain space. Territoriality is defined as "a self/other boundary-regulation mechanism involving personalization or marking of a geographic are or object and the communication of "ownership" by its users or occupants" (Altman, p. 125, 1975). Furthermore a territory can be distinguished in primary, secondary and public territory. In this case, a retail environment could

be classified as a public territory where almost everyone has free access to. A restriction in all three factors (privacy, personal space and territory) causes the individual to regulate behavior. Therefore it is not suprising we found stonger effects of our manipulation by including the factor crowding due to its multiple influences.

Shortcomings of the present studies are on firsthand the simulation character of the research design. However research proposing simulation studies to be as reliable as field studies (Bellizzi & Hite, 1992), triggering emotional responses might be much more difficult. Besides this, the sample size is quite small so that findings were only limited to generalize. Future research should reinvestigate the present results by means of a field study. A very obtrusive shortcoming in study 1 & 2 is the short-term exposure to the manipulated retail environment. The third study dealt with this shortcoming and revealed significant results on the manipulation check. Furthermore, the product choice in study 1 & 2 might have led to very small group differences. In general individuals have basic knowledge about supermarket products so that they were easily able to estimate product costs. Additionally the chosen products only generate a small variance which could have made it insensitive for small group differences and improper for our purpose. Anyway, this does not imply that impulsive













purchase only occurs in a setting where no basic product knowledge is available. In this case, only the used measure seems to be inadequate to detect group differences.

Methodically further research should account for the product choice. Emotionally loaded products with a wide variance and no basic knowledge about product costs would be the best choice. These products are sensitive to group differences and create the desired susceptibility toward the product. Furthermore individuals should be long-term exposed to the environmental manipulation so that emotional responses were not able to fade in time. Further we advice to use a combination of multiple environmental manipulations to elicit emotional reactions which were strong enough to be detected.

Future research should reinvestigate the influence of displeasure on state-ego depletion. Research yielded contrasting results concerning the role of pleasure in impulsive spending behavior. Beatty and Ferrell (1998) propose that high levels of pleasure increase the urge to buy impulsively whereas Muraven and Baumeister (2000) suggest that low amounts of pleasure result in state-ego depletion and therefore in impulsive purchase behavior.

Practical implications

The obtained results support the assumption that high arousal environments lead to egodepletion. Individuals who are ego-depleted are more prone to buy impulsively. The obtained findings have noteworthy implications for retail marketers as well. By means of several ambient factors it is possible to increase buying rates. The use of arousal inducing colors such as red and orange (Bellizzi & Hite, 1992) lead to higher amounts of ego-depletion. Additionally the utilization of music is able to manipulate customers as well. A study conducted by Milliman (1982) found that music tempo influences customers' running-tempo in the retail environment. Customers adapt their running tempo toward the music tempo being played.

Retail managers could use the insights obtained in the present studies. The third study found the strongest effects on ego-depletion by the use of fast music, red color and high customer density whereas the use of blue color, slow music and moderate customer density seems to have lesser impact on ego-depletion. Therefore the implication of highly arousal inducing colors and music in practice would result in higher buying rates. Two atmospheric factors, color and music could be easily manipulated whereas retail managers were not able to influence crowding density in the retail store. Therefore they have to adjust factors easily to be influenced to the factor crowding. By means of light, color can be switched dependent on the crowding situation. Blue color causes customers to relax and to spend more money in the store (Bellizzi & Hite, 1992), whereas red color induces arousal and leads to more state-ego depletion. In highly crowded situations we suggest making use of red color and fast music to elicit ego-depletion which results in impulsive spending and higher buying rates. Especially in situations as described in the scenario (Study 3), the combination of high crowding during Christmas shopping, the exposure to fast music and red light causes customers to lose self-regulatory capacities. However, continuous depleted customers in a retail setting are not desirable. In less crowded situations we suggest making use of blue light to relax customers. The sound of slow music makes them to spend more time in the retail environment however this effect was not tested in the present study. Therefore we suggest increasing experienced prior emotional states by the use of ambient factors.

Results obtained in study 1 & 2 imply that low amounts of pleasure lead to impulsive purchase behavior. This would suggest that supermarkets and shopping malls should be designed as unpleasant as possible to be most profitable. However, this condition would not be desirable for society as a whole.

Conclusion

The present three studies investigate the effects of environmental stimulation on stateego depletion and impulsive purchase behavior. We found pleasure to predict impulsive spending in a negative way, which means that pleasure avoids high amounts of ego-depletion and displeasure leads to ego-depletion. Furthermore high arousal inducing environments were found to elicit high levels of state-ego depletion and higher price assignments.

Still, the present findings should not be overstated. We conclude state-ego depletion and pleasure determine impulsive spending but we cannot conclude these two factors being the final explanation for impulsive spending behavior. There are still a handful of other factors influencing emotional responses as well as impulsive spending which were neglected in the present studies. Beside these, regulatory focus (promotion vs. prevention) determines customer's motivational orientation during the buying process (Florack et al., 2005). Furthermore, subliminal priming and persuasion were found to have an impact on spending as well (Strahan et al., 2005). Mattila and Wirtz (2008) found familiarity with the store to affect













buying impulsiveness in a positive way. Factors such as time available, money available, shopping enjoyment and in store browsing were found to predict impulsive shopping behavior (Beatty & Ferrell, 1998). To point out some factors influencing ego-depletion, motivation to attain goals was found to influence the amount of ego-depletion (Baumeister & Vohs, 2007) as well as implementation intentions were found to improve people's ability to self-regulate their behavior (Webb & Sheeran, 2003). Further research has to develop a broader picture of environmental and emotional factors, predicting impulsive purchase behavior.

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Appendix A

State Ego Depletion Scale (Ciarocco, Twenge, Muraven, & Tice)

1	2	3	4	5	6	7
helemaal niet	nauwelijks	een beetje	neutraal	best wel	behoorlijk	heel erg

- _____ 1. Ik voel me mentaal uitgeput.
- _____2. Op dit ogenblik zou het me veel inspanning kosten me ergens op te concentreren.
- _____ 3. Ik heb iets prettigs nodig om me beter te voelen.
- _____4. Ik voel me gemotiveerd.
- _____5. Als ik nu een moeilijke opdracht zou krijgen, zou ik makkelijk opgeven.
- _____6. Ik voel me leeg.
- _____7. Ik heb veel energie.
- _____ 8. Ik voel me uitgeput.
- 9. Als ik nu ergens door verleid zou worden, zou weerstand bieden erg moeilijk zijn.
- _____ 10. Ik zou met elke moeilijke taak die ik zou krijgen willen stoppen.
- _____ 11. Ik voel me rustig en rationeel.
- _____ 12. Ik kan geen informatie meer opnemen.
- _____ 13. Ik ben in een luie bui.
- ______ 14. Op dit moment zou ik het moeilijk vinden om vooruit te plannen.
- ______15. Ik voel me scherp en geconcentreerd.
- _____ 16. Ik wil opgeven.
- ______ 17. Dit zou een goed moment voor mij zijn om een belangrijke beslissing te nemen.
 - _____ 18. Ik heb het gevoel dat mijn wilskracht verdwenen is.
- _____ 19. Ik heb mijn gedachten nu niet helemaal op een rijtje.

Pleasure Arousal Scale (Mehrabian and Russell, 1974)

- Ongelukkig Gelukkig
- Blij Geirriteerd
- Tevreden Ontevreden
- Voldaan Melancholisch
- Hoopvol Wanhopig
- Verveeld Ontspannen













Geprikkeld – Lijzig Kalm – Opgewonden Opgefokt – Lusteloos Gestimuleerd – Ontspannen Slaperig – Wakker Alert – Sloom

Buying impulsiveness Scale (Rook & Fisher, 1995)

- 1. I often buy things spontaneously.
- 2. "Just do it" describes the way I buy things.
- 3. I often buy things without thinking
- 4. "I see it, I buy it" describes me.
- 5. "Buy now, think about it later" describes me.
- 6. Sometimes I feel like buying things on the spur of the moment.
- 7. I buy things according to how I feel at the moment
- 8. I carefully plan most of my purchases.
- 9. Sometimes I am a bit reckless about what I buy.

A general measure of information rate (Mehrabian & Russell, 1974)

- 1. Varied redundant
- 2. Simple complex
- 3. Novel familiar
- 4. Small-scale large-scale
- 5. Similar contrasting
- 6. Dense sparse
- 7. Intermittent continuous
- 8. Usual surprising
- 9. Heterogeneous homogeneous
- 10. Uncrowded crowded

- 11. Asymmetrical symmetrical
- 12. Immediate distant
- 13. Common rare
- 14. Patterned random

Mental fatigue scale (Gentile, Delaroziere, Favre, Sambuc, & San Marco, 2003)

- 1. When I am doing something, I can keep my thoughts on it.
- 2. I dread having to do things.
- 3. I can concentrate well.
- 4. It takes a lot of effort to concentrate on things.
- 5. I don't feel like doing anything.
- 6. My thoughts easily wander.



Appendix B

Environmental manipulation study 1 & 2

Overstimulation condition:



Moderate stimulation condition:



Understimulation condition:



Environmental manipulation study 3:

Overstimulation condition:





Moderate stimulation condition:



Understimulation condition:

