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SELF-CONTROL DEPLETION: MECHANISMS AND ITS EFFECTS ON CONSUMER BEHAVIOR

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INTRODUCTION

> "The man who acts according to the rules of perfect prudence, of strict justice, of proper benevolence, may be said to be perfectly virtuous. But the most perfect knowledge of those rules will not alone enable him to act in this manner; his own passions are very apt to mislead him – sometimes to drive him, and sometimes to seduce him, to violate all the rules which he himself, in all his sober and cool hours, approves of."
>
> Adam Smith, *Theory of Moral Sentiments*

People will only be perfectly virtuous if they do not allow their passions to mislead them. According to Smith (1892/1759), it takes more than perfect knowledge of all kinds of rules to adhere to them. What was he referring to? Individual freedom, according to Smith (1892/1759), is rooted in self-reliance, the ability of an individual to pursue his self-interest while commanding himself based on the principles of natural law. Without doubt, he was referring to what is currently better known as *self-control*.

The capacity to exert self-control is an important feature of human nature. Self-control refers to the self's capability to alter its own responses. In general, people are able to regulate their thoughts, control their emotions, alter their performance, or inhibit their impulses (e.g., Vohs & Baumeister, 2004b), and thus free themselves from control by the direct stimulus environment. Given the adaptive benefits of being able to control inner states and behavioral responses, self-control is of significant importance for achieving success in life (cf. Baumeister & Heatherton, 1996).

Self-control theories have focused on various aspects of the processes involved in exerting self-control. For instance, scholars have pointed out that people

balance ‘hot’ and ‘cool’ cognitions (Metcalfe & Mischel, 1999), short-term and long-term considerations (Wertenbroch, 1998), low-level and high-level construals (Fujita, Trope, Liberman, & Levin-Sagi, in press), visceral responses and rational self-interest (Loewenstein, 1996), or desire and willpower (Hoch & Loewenstein, 1991) in exerting self-control. Others have stressed the distinction between automatic and controlled psychological processes in exerting self-control (Bargh & Chartrand, 1999), the role of perceptions of self-efficacy (Bandura, 1991), and cybernetic feedback principles (Carver & Scheier, 1981), and the energetic nature of self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998).

This last theory, the theory of self-control depletion, has received a lot of attention lately. It states that all acts of self-control draw on a common limited resource that is akin to energy or strength. Hence, exertion of self-control is necessarily followed by a period of diminished capacity to exert subsequent self-control. Eventually, with sufficient rest, the resource should build up again (e.g., Muraven & Baumeister, 2000). Studies on self-control depletion typically use a two-task paradigm. Participants are asked to exert self-control and then perform a subsequent, seemingly unrelated task that also requires self-control. In general, it is found that the first self-control task reduces performance on the second self-control task (see Vohs & Baumeister, 2004a, for a review). Researchers have demonstrated self-control depletion in various circumstances. Behaviors as diverse as thought suppression (Muraven, Tice, & Baumeister, 1998), persistence at strenuous tasks (Baumeister et al., 1998), emotion control (Vohs & Heatherton, 2000), response inhibition (Wallace & Baumeister, 2002), intellectual performance (Schmeichel, Vohs, & Baumeister, 2003), self-presentation (Vohs, Baumeister, & Ciarocco, 2005),

and attention regulation (Vohs & Faber, in press) have been shown to rely on the scarce self-control resource.

We focus on the theory of self-control depletion throughout this dissertation. We will follow two related routes of research. A first contribution of this dissertation is to explore some important consequences of self-control depletion for consumer decision making behavior. A second contribution is to provide more insight in the process involved in exerting self-control and the factors that lead to self-control depletion.

Self-control depletion and consumer behavior

The prevailing paradigm to describe consumer behavior in marketing has long been the rational choice model. Consumers were assumed to be rational decision makers who implemented carefully evaluated decision alternatives (e.g., Bettman, 1979). However, this stance has proven to be incomplete accurate sometimes. There are episodes during which consumers act against their better judgment, engaging in behavior that is often regretted after the fact, and that would have been rejected with sufficient consideration. It appears that consumers are driven both by long-term rational concerns and short-term emotional factors (Loewenstein & Lerner, 2003). Hence, the notion of self-control, defined as efforts to avoid behaving in a short-sighted emotion-driven fashion, should be incorporated into the traditional decision-analytic accounts of human behavior (e.g., Hoch & Loewenstein, 1991; Loewenstein, 1996, 2000).

Baumeister (2002) outlined the applicability of self-control processes, and more specifically, of the theory of self-control depletion, to consumer behavior.

Causes of self-control failure might be important for understanding several aspects of consumer behavior. Effective self-control has been argued to depend on the acquisition of unambiguous standards, a successful monitoring process, and the capacity to alter one's behavior (e.g., Baumeister & Heatherton, 1996). First, consumers who do not know what they want (i.e., who have ambiguous *standards*) will be relatively susceptible to external influences such as sales persons and advertisements. Second, consumers who are not successful in keeping track of relevant behaviors such as the amount of money they spend (i.e., who are unsuccessful in *monitoring* their behavior), will be relatively susceptible to overspending. Finally, consumers who do have unambiguous standards and are successful in monitoring their behavior may still fail at self-control whenever they lack the *capacity* to make themselves perform the necessary actions. Exerting self-control may influence this capacity through the depletion of self-control resources. Consumers in a state of depletion should be less likely to perform the necessary actions and, for instance, be more likely to spend money or to consume vice products (Baumeister, 2002).

Empirically, depletion has been linked to consumer choices that are not conducive to long-term self-interest, such as impulsive spending (Vohs & Faber, in press). Resisting temptation has also been found to rely on the scarce self-control resource (Vohs & Heatherton, 2000), implying that consumers in a state of depletion will be more likely to yield to temptation. Vohs et al. (2004) observed that one of the most frequent activities during a shopping trip – that is, active choice-making - depletes self-control resources.

The first contribution of the present dissertation consists of adding to this literature. In Manuscript I, we replicate that choosing relies on the scarce self-control

resource, and show that depletion enhances consumers' susceptibility to purchasing products on the basis of affective product features, such as taste. In Manuscript II, we provide real-life evidence for a link between depletion and consumer behavior. More specifically, we observe that reduced exposure to sunshine is related to increased lottery expenditures. We show that a shortage of sunshine induces consumers who suffer from weather-induced bad moods to engage in active mood regulation attempts that are depleting in nature, resulting in a decreased resistance of lottery play.

Processes involved in exerting self-control

Although the self-control as energy analogy seems powerful and appealing, recent literature has pointed out the importance of broadening our perspective on self-control and of investigating the exact nature of the scarce self-control resource (e.g., Vohs & Baumeister, 2004a). A start in tackling this question has been made by linking self-control resources to other self-related phenomena.

Muraven, Baumeister, and Tice (1999) found that people showed improved self-control performance after a two-week self-control training period as compared to a control group. Martijn, Tenbült, Merckelbach, Dreezens, and de Vries (2002) showed that self-control performance can be guided by people *thinking* that the scarce self-control resource exists, suggesting that self-control might not be a matter of energy alone, but also of implicit theories and expectancies about self-control. Muraven and Slessareva (2003) advanced a similar view by suggesting that people act as if self-control is a limited resource. They showed that the traditional depletion effect is moderated by motivation. Vohs and Schmeichel (2003) observed that people experience time as moving more slowly during and after they have exerted self-

control, and found that this distorted experience statistically mediated the traditional depletion effect. Depleted people seem to be transfixed in the present, rendering them more susceptible to immediate stimuli, impulses, desires, and thus, a loss of self-control. Vohs and Schmeichel (2003) labeled this experience 'the extended-now state'.

Although the aforementioned studies provide insight in several important moderators of the depletion effect, the exact nature of the scarce self-control resource remains hard to pin down to this day. Manuscript III intends to add to our understanding of the processes involved in self-control by demonstrating that exerting self-control leads one to narrowly direct one's attention towards concrete task characteristics. This possibly results in enhanced performance on the self-control task at hand but reduced performance on other tasks.

MANUSCRIPT I

REPEATED CHOOSING INCREASES SUSCEPTIBILITY TO AFFECTIVE PRODUCT FEATURES.

Abstract

The present research demonstrates that repeated active choice-making increases consumers' susceptibility to salient affective product features. We show that affective features influence product choice more after a series of active product choices than after a series of compliances with purchase instructions. The combined results of three experiments suggest that repeated choice depletes self-control resource strength, in that repeated choosing renders consumers vulnerable to the temptation of emotionally-laden product features.

Imagine that you have promised your significant other that you would do today's shopping. Inside the store, you have a hard time choosing the best color for a new coffee mug. Should it be blue or should it be yellow? You also have difficulties deciding between one of two familiar-looking brands of laundry detergent because your shopping list does not specify which brand to buy. To complicate matters even more, you find it taxing to determine how many apples to purchase, because your shopping list does not say how many you need. You struggle through the rest of the list choosing and selecting items as well as you can. Then you see the freezer full of ice cream. Ice cream is the last item on your shopping list. There is a less expensive, less attractive brand of ice cream but also a more expensive and more delicious brand. You remember that you are on a limited budget but in the end you cannot resist the temptation. You buy the more expensive, more delicious ice cream. We propose that you may not have succumbed to the delicious-looking (and more expensive) ice cream if you had not previously made choices among coffee mug colors, laundry detergents, or calculated how many apples to buy. Specifically, we submit that the ability to stick to a fixed budget is impaired by previous episodes of choice-making. In this paper we present three studies to support this claim.

Several decades ago, researchers began to recognize that consumer purchase decisions are driven by more than the tangible product or service being offered for sale. Indeed, the tangible product is but a small part of the total product. In addition to tangibles, the product includes pleasantries, images, packaging, advertising, and other product features, all of which are thought to receive considerable attention in consumer choice-making (Kotler, 1973). Now researchers know that consumer purchase decisions are influenced by considerations of both affective and cognitive

product features. [1] Affective product features furnish fun, pleasure, fantasy and excitement. In contrast, cognitive product features are primarily instrumental, functional and goal-oriented (Dhar & Wertenbroch, 2000). When consumers give more weight to affective product features at the expense of cognitive product features, they may be prone to making suboptimal purchase decisions that will bring regret later (cf. impulsive spending; Rook, 1987; Rook & Fischer, 1995; Rook & Hoch, 1985). We argue that susceptibility to affective product features can be brought about by a lack of self-control strength. In this paper, we argue that it requires self-control strength to give sufficient weight to cognitive product features and not to succumb to the enticement of affectively-laden product features. Moreover, the current approach views engagement in a repeated choice-making process as one route by which self-control strength is depleted. Accordingly, an overvaluation of affective product features is thought to come about because of depleted self-control strength, a state that may well be a consequence of the shopping process itself.

Previously studied determinants of susceptibility to affective product features

It has been argued that consumers may overvalue affective product features at the expense of cognitive product features, depending on the environmental stimulation (for reviews see Bitner, 1992; Lam, 2001; Turley & Milliman, 2000) or the degree of novelty and complexity in the environment (Donovan & Rossiter, 1982; Mehrabian & Russell, 1974). Examples of in-store atmospheric variables that impact the environmental load and thus consumer behavior are music, odor, colour, and

[1] Affective and cognitive considerations have been referred to as desire and willpower (Hoch & Loewenstein, 1991), as vice and virtue considerations (Wertenbroch, 1998), as parts of the hot emotional and the cool cognitive system (Metcalfe & Mischel, 1999), or as hedonic and utilitarian considerations (Dhar & Wertenbroch, 2000). For the sake of clarity, we will use the terms 'affective' and 'cognitive' throughout the remainder of the paper, following Shiv and Fedorikhin (1999).

lighting (Turley & Milliman, 2000). Research has shown that variations of atmospheric variables have an influence on the amount of money people spend, the number of items they purchase (Turley & Milliman, 2000), time spent in the store, and increased unplanned spending (Donovan, Rossiter, Marcoolyn, & Nesdale, 1994). Hence, there is evidence that in-store atmospherics – through the novelty or complexity of the stimulation in the store - can create shopping experiences that are both affect-enhancing and cognitively demanding. As a result, shopping experiences can reduce consumers' available cognitive resources and enhance consumers' susceptibility to affective product features.

Research on the effect of environmental load has focused only on the concurrent taxing of cognitive resources on consumers' susceptibility to affective product features. Building on the self-control literature however, we aimed to demonstrate that susceptibility to affective product features can also be a consequence of previous taxation of scarce self-resources. Specifically, we focus on engagement in a series of product choices as a determinant of overvaluation of affective product features in a purchase situation. We investigate consumer choice-making in the context of a realistic shopping situation. We expect that consumers engaging in repeated choice-making will be susceptible to affective product features.

Our rationale for this reasoning is twofold. First, it can be inferred from theorizations as well as empirical findings that it requires self-control strength to give sufficient weight to cognitive product features. Hence, giving more weight to affective product features and less weight to cognitive product features suggests a lack of available self-control strength (Hoch & Loewenstein, 1991; Metcalfe & Mischel, 1999; Shiv & Fedorikhin, 1999). Second, research on repeated choice-making has demonstrated that it brings about a loss of self-control due to a depletion of self-

regulatory resources (Vohs et al., 2004). Hence, the present paper considers repeated choice-making (e.g., through the process of shopping) as a key factor determining subsequent susceptibility to affective product features. Both lines of reasoning will be elaborated on in the next paragraphs.

Lack of self-control resources and susceptibility to affective product features

There are both theoretical reasons and empirical evidence to suggest that preferences for affective product features (relative to cognitive product features) imply low levels of self-control. Theoretically, it can be inferred that consumers will prefer attractive products over functional products when they lack sufficient self-control resources (Hoch & Loewenstein, 1991; Metcalfe & Mischel, 1999). Empirically, it was found that consumers with sufficient resources were better able to resist affective product features, whereas this was more difficult for consumers who lacked resources (Shiv & Fedorikhin, 1999).

Hoch and Loewenstein's (1991) theoretical framework of consumer purchases as a struggle between affective and cognitive considerations points to lowered self-control as one primary reason. According to this analysis, when affective considerations exceed cognitive considerations, consumer self-control breaks down.

Metcalfe and Mischel (1999) have argued that affective and cognitive representations can be conceptualized as two separate but interacting systems. Typically, responses that are determined by affective considerations are either approach or avoidance patterns. In contrast, responses that are established by cognitive considerations consist of descriptions, statements, assertions, and commentaries (i.e., reflections). According to Metcalfe and Mischel (1999), self-

control ability is determined by the capacity to limit the dominance of affective considerations in the service of cognitive goal pursuit. This is possible through engagement in cooling operations such as distraction, symbolic transformations of the affective stimulus, avoiding drift to affective considerations, and enriching cognitive considerations. However, the extent of cognitive elaboration varies depending on several factors.

Trade-offs between affective and cognitive considerations have received empirical attention (Babin & Darden, 1995; Hinson, Jameson, & Whitney, 2003; Read & van Leeuwen, 1998). For instance, it has been shown that consumer choice between affective and cognitive product features depended on whether consumers had sufficient cognitive resources (Shiv & Fedorikhin, 1999). Consumers who were under high cognitive load were significantly more influenced by affective product features than consumers who were under low cognitive load. In other words, consumers with sufficient resources were better able to resist affective product features, whereas this was more difficult for consumers who lacked resources. Framed according to the self-regulatory resource model, this suggests that consumers will buy the affective product when they are depleted and therefore lack sufficient self-control resources. In contrast, when consumers are not depleted and have sufficient self-control resources, they will be able to refrain from buying the affective product.

In the present research, we show that susceptibility to affective products can be a consequence of previous taxation on scarce self-resources. Specifically, we focus on repeated choice-making as a determinant of preference of affective products over cognitive products.

The capacity to exert self-control is an important feature of human nature. Self-control refers to the self's capacity to alter its own responses (e.g., to regulate one's thoughts, control one's emotions, alter one's performance or inhibit one's impulses; Vohs & Baumeister, 2004b). It has been argued that all acts of self-control draw on a common limited resource that is akin to energy or strength. Hence, exertion of self-control is necessarily followed by a period of diminished capacity to exert subsequent self-control. Eventually, with sufficient rest, the resource should build up again (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998; Vohs & Heatherton, 2000; Vohs, Baumeister, & Ciarocco, 2005).

Studies on self-control depletion typically use a two-task paradigm. Participants are asked to exert self-control and then perform a subsequent, seemingly unrelated task that also requires self-control. In over 40 published experiments (see Vohs & Baumeister, 2004a, for a review), it has been found that the first self-control task reduces performance on the second self-control task. Researchers have attempted to demonstrate self-control depletion in diverse circumstances. For instance, controlling one's emotions or suppressing forbidden thoughts induced people soon afterwards to show impaired physical stamina or to give up quickly on unsolvable anagrams (Muraven et al., 1998). Likewise, resisting tempting chocolates or suppressing one's emotions caused people soon afterwards to quit faster on unsolvable puzzles or to show impaired performance on solvable anagrams (Baumeister et al., 1998). Resisting good-tasting snacks or controlling one's emotional expressions made dieters eat more ice cream in the next task (Vohs & Heatherton, 2000).

There exists evidence that choosing requires self-control and therefore depletes regulatory resources. Baumeister et al. (1998) found that making a meaningful personal choice (i.e., deciding whether or not to make a counter-attitudinal speech) caused people to quit faster on unsolvable puzzles than people who did not have to make this choice beforehand. A more extensive test was conducted by Vohs et al. (2004), who asked some participants to make a series of choices among household products or to choose about features of a product class (i.e., choice participants), whereas other participants evaluated the same products and product features but did not make any choices (i.e., these were no-choice participants). Subsequently, choice participants were found to drink less of a bad-tasting beverage (Study 1 and Study 2), persist less on a cold water pressure task (i.e., keeping one's hand in water of 1°C; Study 3), and perform worse on a math task (Study 4) than no-choice participants. In Study 5 (Vohs et al., 2004) people were approached at a shopping mall and asked to complete a choice questionnaire. Subsequently, all respondents were asked to solve 100 addition problems. As predicted from the choice-depletion hypothesis, people who had made a lot of difficult choices during their shopping trip performed poorly on the addition problems. Vohs et al. (2004) concluded that across a wide variety of circumstances, active choice-making depletes self-control resources. These findings are in line with earlier accounts that stressed active guidance by the self as a requirement for all kinds of complex forms of information processing, including active choice-making (Schmeichel, Vohs, & Baumeister, 2003).

The current studies

Susceptibility to affective product features might be affected by the shopping process itself. This reasoning assumes two steps. First, resistance to exaggerated influence of affective product features requires self-control. Therefore, self-control depletion is likely to make consumers more susceptible to affective product features. Second, Baumeister (2002) suggested that shopping may tax consumers' resources, in part because it involves a series of active choices. If this is true, at the conclusion of a shopping trip consumers should be rather susceptible to affective product features at the cost of cognitive product features. In the present research, we tested the hypothesis that making a series of product choices would heighten consumers' susceptibility to affective product features.

In three studies, we assessed susceptibility to affective product features after engaging in depleting versus non-depleting choice tasks. In Study 1, participants were either asked to make a series of six binary product choices (i.e., depleting choice task), or were instructed to select the same product as the participant before them had done (i.e., non-depleting choice task). Afterwards, participants were given the opportunity to choose between an attractive but expensive product and a cheaper but less attractive product of similar functionality. If depletion through active choice-making increases the weight of affective product features at the expense of the weight of cognitive product features, depleted participants would be expected to select the more attractive (but expensive) product more often than non-depleted participants, a prediction that received support in Study 1. In Studies 2 and 3, participants either were given the option of choosing as many single pieces of candy as they wanted from each of six different flavors of candy (i.e., depleting choice task), or were

instructed to select the same number of items of those six types of candy as the participant before them had done (i.e., non-depleting choice task). In Study 2, the dependent measure of consumption was purchase amount of a very attractive but overpriced type of candy, whereas in Study 3 the consumption measure was purchase amount of a very attractive but overpriced type of candy versus a less attractive but a cheaper type of candy. Again, if depletion as a result of active choice-making increases the weight of affective product features at the expense of the weight of cognitive product features, depleted participants would be expected to buy more items of the attractive but overpriced candy than non-depleted participants. We found support for this claim in Studies 2 and 3.

Study 1

In previous research, it has been shown that making a series of choices leads to self-control depletion (Vohs et al., 2004). We built on these studies to test the hypothesis that self-control depletion through active choice-making increases subsequent susceptibility to affective product features. In the *choice condition*, participants were asked to make six binary product choices. For five of these six product pairs, the two products were equally attractive and equivalently priced. Accordingly, choosing between those products was expected to be difficult and hence, depleting. In the *no-choice condition*, participants' choices were yoked to the choice condition participant before them, such that participants were instructed to select the same products as the choice condition participant before them had done. Hence, no-choice participants did not have to ponder over options and consequently their task was considered to be non-depleting. Subsequently, all participants in both conditions

made one binary product choice as the measure of importance of cognitive versus affective product features. Within this product pair, one product was more attractive but more expensive than the other product. Given similar functionality, attractiveness was considered to be a relatively affective product feature, whereas price was considered to be a relatively cognitive product feature. It was hypothesized that choice participants (i.e., participants in the choice condition) would be relatively more influenced by the affective (i.e., attractiveness) rather than the cognitive (i.e., price) feature than no-choice participants (i.e., participants in the no-choice condition).

Method

Participants. Participants were 101 undergraduate students. Data from 12 participants were discarded because they did not comply with the instructions by not buying the products in the assigned order. Of the remaining 89 participants, 62 were women. Ages ranged from 18 to 31 years (M = 21.42 years, SD = 2.20 years). Participants were rewarded with money and with a gift for their cooperation. The money and the gift had a combined value of € 7.50.

Materials. A store was simulated in the laboratory. Eleven product categories were displayed on a table. Seven of these product categories were on the shopping list that participants received upon entering the shop. The remaining four product categories served as fillers.[2] Each product category consisted of two products. Results of a pretest conducted in the same population (n = 42) showed that both products in each pair were equally attractive for the five product categories of interest. Those products all received the same price label, € 1, which was close to their retail price. As a result, choosing between the two products within each of these five

[2] The seven product categories on participants' shopping lists were light bulbs, coasters, candles, drinking straws, Christmas cards, chocolates and staples. The four filler product categories were drinking glasses, cactuses, alarm clocks and pens.

product categories was expected to be difficult and hence, depleting. A second independent pretest also in the same population (n = 42) showed that the prices that participants believed the two products in each of these five pairs would have in the store did not differ.

The two pretests also showed that for two product categories of interest, the two options differed in attractiveness and expected price. Those two remaining product categories served as our target product categories. We selected two product categories as a first step towards generalizability. In both categories, we created a conflict between the affective and the cognitive aspects. The affective aspect was attractiveness. The cognitive aspect was price. One product category was staples, which were either multi-colored or ordinary gray staples. Because colored staples were regarded as more attractive than regular gray staples, we priced the colored staples at € 1.20 and the gray staples at € 0.90. A second product category was chocolates. Santa Claus-shaped chocolates were regarded as more attractive than elf-shaped chocolates. The Santa Claus-shaped chocolates were priced at € 1 and the elf-shaped chocolates at € 0.90. In both cases, prices were selected such that the price difference between the products in each target product category was larger than the price difference participants would probably expect (i.e., a price difference based on the results of the pretest). Order of chocolate versus staple category was counterbalanced. Half of the participants saw the chocolate-shape product category on their shopping list first and the staples last, whereas the order was reversed for the other half of participants. For convenience, we refer to the attractive but expensive

product as the affective product and to the cheap but less attractive product as the cognitive product.[3]

Procedure. The present experiment was the first in a series of unrelated studies. Participants were scheduled to come to the laboratory individually. Upon arrival, they were asked to watch a five-minute computer presentation with landscape pictures and peaceful music. The aim of this presentation was to reduce differences that may have existed in pre-experimental levels of self-control depletion. A pretest (n = 77) indeed showed that this presentation reduces feelings of stress and increases reports of calm.

After the presentation, participants were invited to visit a simulated store. They received a shopping basket and were told to pick seven products from a shopping list. Participants received € 7.50 and were told that, at the end of the experiment, they would have to actually buy one of the products they had picked. This product would be randomly determined by means of a lottery. This procedure is incentive compatible (e.g., Wertenbroch, 1998). It was made clear that if a more expensive product was purchased at the end of the experiment, consequently less money would be left of the € 7.50 to take home. Hence, this incentive compatible procedure does not necessarily bias participants towards choosing affective products.

At this point, participants were randomly assigned to one of two conditions: a choice or a no-choice condition. Participants in both conditions received a shopping list. In the *choice condition*, the shopping list consisted of seven product category names. For each of these seven product categories, participants had to decide which of the two options to select. In the *no-choice condition*, the shopping list contained the names of six products instead of product categories. Only for the last product

[3] There were no visible brand names on the products. Therefore, participants could not choose products based on familiarity with a particular brand.

category, which represented the dependent measure, did participants have to make a decision between two options. To increase comparability between the two conditions, no-choice participants were yoked to the choice participants with respect to the product choices. Hence, in terms of an account of actual selections, the no-choice and choice conditions had identical selections for all products until choice number six. The major difference was that the no-choice condition involved no active choice-making regarding the first six products on the shopping list. In both conditions, the time required to pick up every single product and to put it in the shopping basket was registered.

Subsequently, by means of a lottery game, it was determined which product participants had to buy with part of their € 7.50. At the end of the experiment, participants were debriefed and thanked.

To ensure that mood did not differ as a function of having or not having to make choices, a pretest (n = 36) was conducted. The results showed that the choice manipulation did not induce significant differences in positive ($F(1, 34) = 0.18$, $p = .67$) or negative affect ($F(1, 34) = 0.05$, $p = .83$) as measured by the Positive Affect Negative Affect Scale (Watson, Clark, & Tellegen, 1988).

Results and discussion

We predicted that participants in the choice condition would show more susceptibility to affective product features than participants in the no-choice condition and thus purchase the affective product more often than the cognitive product. To test this hypothesis, we conducted a logistic regression analysis with choice (no choice versus free choice) as the predictor variable, shopping time as a covariate, and product choice as the dependent variable. This analysis indicated that choice participants

chose the affective product significantly more often (53.5%) than no-choice participants (37.0%), *Wald* χ^2 (Df = 1) = 6.50, $p < .05$.

Shopping time was inserted as a covariate because preliminary analyses revealed significant differences in shopping times between the choice and the no-choice condition, F (1, 83) = 20.84, $p < .0001$. Average shopping times were significantly lower for no-choice participants (M = 50.98 s, SD = 18.66 s) than for choice participants (M = 71.56 s, SD = 22.82 s). Preliminary analyses showed no effects of gender or product replicate on the dependent measure of product choice. Therefore, these variables were omitted from the analyses.

Study 1 tested the idea that consumer choice changes attraction to affective and cognitive aspects of products. We found that after a series of active product choices, affective product features were chosen more often as compared to products purchased after a similar task but which did not involve choosing.

Even with these encouraging results, two alternative explanations are possible. First, choice participants needed more time to complete the shopping task than no-choice participants. The choice condition may have led to a more real-life shopping experience than the no-choice condition, and hence may have increased the personal relevance of the last product choice. Because of increasing relevance, the attractiveness might have received more attention, and hence affected choice more in the choice condition than in the no-choice condition. However, time spent shopping was statistically controlled for, which mitigates this possible explanation. A second alternative explanation involves the idea that the percentage of affective choices in the experimental condition is a random choice process, given that the percentage of affective choices was 53.5%, which is statistically equivalent to 50%. Studies 2 and 3

were designed to tackle these concerns and replicate the depletion effect of product choice.

Study 2

Study 2 was a conceptual replication of Study 1 that additionally corrected the time confound of Study 1 by altering the demands of the shopping task to require equal amounts of time shopping.

As in Study 1, we used making product choices as a manipulation of self-control depletion. In the *choice condition*, participants were asked to choose as many single pieces of candy as they wanted from each of six different flavors of candy. In the *no-choice condition*, participants were instructed to select the same number of items of those six types of candy as the participant in the choice condition before them had done. Subsequently, participants in both conditions were given the opportunity to buy as much candy as they wanted of a highly appealing type of candy. The price of the candy was set as much higher than its retail price, and thus the price (which was a cognitive feature) was a negative feature. However, because the candy was very appealing, its expected taste (i.e., an affective feature) was a rather positive feature. In line with our hypothesis and the findings of Study 1, we expected that choice participants would be more affected by the affective product feature relative to the cognitive product feature, and hence they would purchase more of the attractive candy than no-choice participants.

Method

Participants. Participants were 47 undergraduate students. Data from three participants were discarded because they did not comply with the instructions by not buying the products in the assigned order. Of the remaining 44 participants, there were 14 men and 30 women. Their age ranged from 19 to 25 years (M = 21.45 years, SD = 1.42 years). All students participated in order to receive partial course credit. They were also rewarded with money and with a gift. The money and the gift had a combined value of € 2.

Materials. A store was simulated in the laboratory. Seven bowls filled with approximately 200 grams of candy were displayed on two tables. All seven types of candy in the bowls were on the shopping list that participants received. Results of a pretest conducted in the same population (n = 32) showed that the attractiveness of six types of candy was equivalent and high. In close accordance with actual prices, three types of candy received a price label of € 0.60 per 100 grams and the other three types of candy received a price label of € 0.80 per 100 grams. The pretest also showed that one type of candy (i.e., wrapped mini-chocolates) was more attractive than the other types of candy. This type of candy served as our target candy and therefore was last on participants' shopping list. We priced this attractive type of candy at € 1 per 100 grams, which is more expensive than the retail price, which was € 0.77 per 100 grams. The quantity of mini-chocolates (i.e., most expensive candy) purchased was our measure of susceptibility to affective product features, relative to cognitive features.

Procedure. The procedure of Study 2 was identical to the one of Study 1, with a few exceptions. In the simulated store, participants were told to put the different types of candy from a shopping list in seven little paper bags. As all participants manually scooped the different pieces of candy in the seven bags, shopping time was

expected to be equal in both conditions. In both conditions, the time required to put every type of candy in the little paper bag and to put the bag in the shopping basket was recorded. Participants received € 2 and were told that they would have to buy one of the amounts of candy they selected at the end of the experiment. The bag of candy to be purchased would be randomly determined by the experimenter by means of a lottery and thus participants were reminded that no single bag of candy could cost more than € 2.

At this point, participants were again randomly assigned to one of two yoked conditions: a choice or a no-choice condition. In the *choice condition*, the shopping list consisted of seven candy names. Participants were asked to choose as many single pieces of candy as they wanted from each of seven different flavors of candy. In the *no-choice condition*, the shopping list contained the names and the desired number of the first six candy items and the name of the highly appealing type of candy (e.g., "mini-Twix: Take four of them"). Participants were given the opportunity to buy as much candy as they wanted only for the highly appealing type of candy. While participants in both conditions were shopping, the experimenter was eating the very attractive target type of candy to make this target type of candy even more attractive.

Results and discussion

Again we predicted that participants in the choice condition would show a higher susceptibility to affective product features than participants in the no-choice condition and thus purchase more of the highly appealing type of candy than no-choice participants. We conducted a one-way ANOVA using choice (no choice versus free choice) as predictors of amount of the mini-chocolate candy. The results

indicated that choice participants purchased significantly more of the candy (M = 47.18 grams, SD = 35.27 grams) than did no-choice participants (M = 29.51 grams, SD = 17.33 grams), F (1, 42) = 4.45, $p < .05$.[4]

Preliminary analyses did not reveal any gender effects. Therefore, this variable was omitted from the analyses. This time, preliminary analyses also failed to reveal significant differences in shopping times between the choice and the no-choice condition, F (1, 42) = 0.22, p = .64. Hence, we were successful in equating shopping times in both conditions and thus this variable was also omitted from the analyses.

The results of Study 2 support the view that choosing reduces consumers' resistance to affective product features. As in Study 1, we found that susceptibility to affective product features was higher after a series of active product choices than after a similar task that did not require choice-making. Note that in Study 2, the choice manipulation was not confounded with time; therefore, the alternative explanation that shopping time differences accounted for the effect is mitigated. The aim of Study 3, then, was to directly address the other alternative explanation that choice participants made their selections randomly.

Study 3

As in Studies 1 and 2, we used making product choices as a manipulation of self-control depletion. Participants either chose as many single pieces of candy as they wanted from each of six different flavors of candy (i.e., the *choice condition*) or selected the same number of items of those six types of candy as the participants in the choice condition to whom they were yoked (i.e., the *no-choice condition*).

[4] As the variance was significantly different in both conditions, we also conducted a non-parametric analysis. A Mann-Whitney U test yielded similar results, $Z = 2.05$, $p < .05$.

Subsequently, participants in both conditions were given the opportunity to buy as much candy as they wanted of a highly appealing but overpriced type of candy and a less appealing but cheaper type of candy. Again, the series of preceding choices in the choice condition should deplete participants and should increase the relative importance of the affective product feature (i.e., taste) and decrease the relative importance of the cognitive product feature (i.e., price) relative to the no-choice condition. Because the affective product feature is weaker for the less attractive type of candy, we expected that in comparison with no-choice participants, choice participants would buy more of the very attractive candy (i.e., greater influence of affective product features) but not of the less attractive candy. The random explanation, in contrast, predicts that choice of the two types of candy should become less distinguishable (i.e., closer to a 50/50 distribution) in the choice condition than in the no-choice condition.

Method

Participants. Participants were 42 undergraduate students (30 men and 12 women). Their age ranged from 19 to 24 years (M = 20.98 years, SD = 1.44 years). All students participated in order to receive partial course credit. They were also rewarded with money and with a gift. The money and the gift had a combined value of € 2.

Materials. A store was simulated in the laboratory. Four pairs of bowls filled with approximately 200 grams of candy were displayed on two tables. All eight types of candy in the bowls were on the shopping list that participants received upon entering the shop. Results of a pretest (n = 32) showed that seven types of candy were equally attractive. In close accordance with actual prices, the first pair of bowls

of candy received a price label of € 0.60 per 100 grams, the second pair of bowls of candy received a price label of € 0.70 per 100 grams, and the third pair of bowls of candy received a price label of € 0.80 per 100 grams. The last pair of candy bowls once again contained the highly appealing mini-chocolates and one of the relatively less attractive types of candy (i.e., M&M's without peanuts). These types of candy came last and second-last on participants' shopping list, respectively. In the pretest (n=32), 75 % preferred the mini-chocolates to the M&M's ($Z = 2.83$, $p < .01$). The less attractive type of candy received a price label of € 0.80 per 100 grams and the very attractive type of candy received a price label of € 1 per 100 grams. The quantity of mini-chocolates purchased (which was the most expensive candy) relative to the quantity of M&M's purchased (which was the less expensive candy) was the dependent measure of susceptibility to affective product features.

Procedure. The procedure of Study 3 was identical to the one of Study 2, with a few exceptions. In the simulated store participants were instructed to put the candy of the two bowls that were placed together in the same little paper bag. This was done to rule out the random choice hypothesis. Indeed, in order to rule out this alternative hypothesis, all participants had to make a double product choice at the conclusion of their shopping trip. If depleted participants would choose randomly, we would expect them to select an equal amount of both types of candy. In contrast, if depleted participants would choose on the basis of affective features, we would expect them to select more of the very attractive type of candy (mini-chocolates) than of the less attractive type of candy (M&M's). Again, participants received € 2 and were told that, at the end of the experiment, they would have to actually buy one of the paper bags with this money.

At this point, participants were again randomly assigned to one of two yoked conditions. In the *choice condition*, the shopping list consisted of eight candy names. Participants were free to choose as many single pieces of candy as they wanted from each of eight different flavors of candy. In the *no-choice condition*, the shopping list contained the names and the desired number of six candy types and the names of the two target types of candy (i.e., the very and the moderately attractive type of candy). No-choice participants were given the opportunity to buy as much candy as they wanted only for the last two types of candy.

Results and discussion

We again hypothesized that participants in the choice condition would show a higher susceptibility to affective product features as compared to participants in the no-choice condition and thus purchase more of the highly appealing type of candy than no-choice participants. In the present study, we also wanted to provide a direct test of the possibility that participants who had few regulatory resources made their selections randomly, rather than on the basis of affective product features as we claim. We conducted a repeated measures ANOVA with the purchased amount of candy (i.e., the very attractive and the moderately attractive types of candy) as repeated measures and with choice (no choice versus free choice) and gender as independent variables. Gender was included because we observed a marginally significant choice by type of candy by gender three-way interaction, F (1, 38) = 3.36, p = .07, indicating that the observed effects tended to be stronger for women than for men.

The repeated measures ANOVA showed the expected choice x type of candy interaction, F (1, 38) = 8.99, p < .01. The shape of the interaction indicated that choice participants purchased a higher quantity of the very attractive type of candy

(M = 51.01 grams, SD = 51.44 grams) than of the moderately attractive type of candy (M = 22.47 grams, SD = 15.99 grams), F (1, 19) = 8.89, $p < .01$, but that no-choice participants did not purchase different quantities of the very attractive candy (M = 30.55 grams, SD = 25.35 grams) as compared to the moderately attractive candy (M = 32.78 grams, SD = 23.45 grams), F (1, 19) = 0.36, p = .55 (see Figure 1). From another perspective, we found that participants in the choice condition purchased a higher quantity of very attractive candy than did participants in the no-choice condition F (1, 38) = 4.65, $p < .05$, (thereby replicating Study 2) and that participants in the choice condition tended to purchase a lower quantity of less attractive candy as compared to no-choice participants, F (1, 38) = 3.19, $p < .10$.[5] The latter finding is consistent with our framework, in that choice participants apparently not only overweigh the affective product feature of relative attractiveness of very attractive candy, but also overweigh the affective product feature of relative unattractiveness of less attractive candy.

Preliminary analyses did not reveal significant differences in total shopping time between the choice and the no-choice condition, F (1, 40) = 0.00, p = .95. Hence, this variable was omitted from the analyses.

[5] Again, the variances differed significantly but non-parametric test led to the same conclusions for all tests.

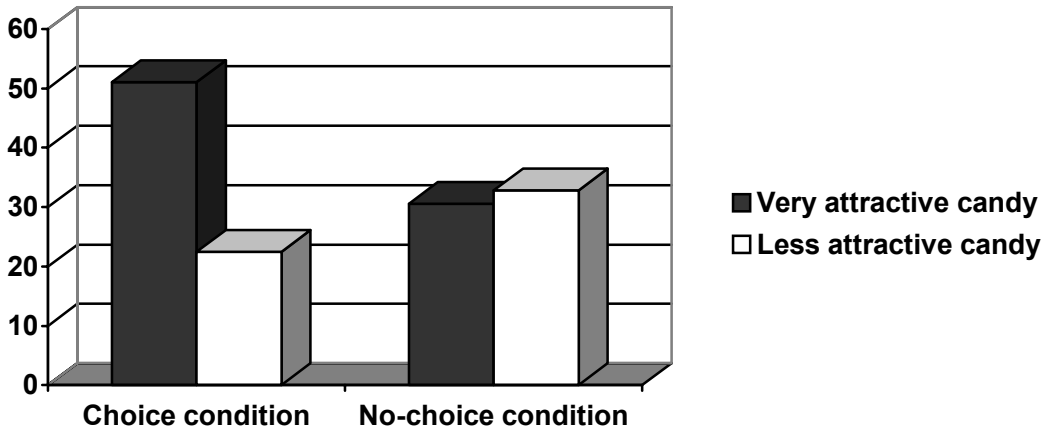

Figure 1.1. Purchased amounts (in grams) of very attractive and less attractive candy in the choice condition and in the no-choice condition.

The results of Study 3 confirmed the view that choosing reduces consumers' resistance to affective product features. Like in Study 1 and Study 2, we found that there was a greater impact of affective product features after a series of active product choices than engaging in a no-choice task that was similar in all other respects. In Study 3, we also found that people purchased more of the very attractive type of candy relative to the less attractive type of candy after a series of active choices. Because the difference between the attractive and the relatively less attractive type of candy increased rather than decreased in the choice condition, an alternative explanation in terms of random choice is not viable.

General discussion

Summary of findings and limitations

The major aim of the present investigation was to show that one of the most frequent activities during a shopping trip — that is, choosing — enhances consumers'

susceptibility to purchasing products on the basis of affective product features. The three studies reported in this paper provided support for this view. In Study 1, we found that when people have made a series of active product choices they are more likely to buy an attractive but expensive product as compared to when they merely have complied with purchase instructions. Study 2 replicated the basic effect with another product type (candy). We found that when people have made a series of choices they buy more items of a very attractive type of candy than when they have followed a pre-established shopping plan. Study 2 also eradicated the concern that time differences between the conditions influenced the results of Study 1. In Study 2, the effect was replicated without purchase time differences between the two conditions. In Study 3, we also found that people's preference for a more attractive but more expensive type of candy over a less attractive but cheaper type of candy increases after a series of active choices. This study also ruled out the alternative explanation in terms of increasing random choice in a depleted state because in the choice condition, the difference between the two types of candy increased rather than decreased.

An often-stated criticism accompanying depletion studies is the omission of manipulation checks on the inferred mediator (i.e., depletion). In our studies, we also decided not to include manipulation checks. Reasons were twofold. First, the nature of our theorized mediating variable "self-control resource strength" still needs to be clarified conceptually. Hence, finding a suitable manipulation check for this very abstract "resource" is quite cumbersome. Presumably, the resource nourishes both mental and physical abilities, as it has been demonstrated that performances in both the mental and the physical domain rely on it (e.g., Baumeister et al., 1998; Muraven et al., 1998). Hence, the most suitable manipulation check appears to be to ask

participants how they feel both physically and mentally while making their product choices (e.g., how much careful consideration do you put into your choices, how much do you deliberate before making each choice, how much do you think about your options prior to making your choices, how active do you feel making your choices, how tired do you feel right now, etc.).

A second reason as to why we decided not to include manipulation checks is that these may draw attention to the purpose of the study and may contaminate responses to the dependent measure (Sigall & Mills, 1998). For instance, people seem to harbor the belief that hard work entitles them to take rest (Kivetz & Simonson, 2002; Martijn et al., 2002). As a result, explicit questions about fatigue that immediately follow a taxing choice phase may trigger that belief and produce belief-consistent behavior. Furthermore, Sigall and Mills (1998) argued that manipulation checks are unnecessary when the most plausible rival causes for the occurrence of certain effects are experimentally eliminated, which is what we attempted to do in this series of studies. In addition, even if they are measured after the behavior (e.g., Wallace & Baumeister 2002), manipulation checks may provide rationalization rather than process measures.

Alternative explanations

The present findings are in correspondence with predictions stemming from the idea that both decision making and resisting the temptation of affective product features depend on a common, but limited, resource. Even with these results, several alternative accounts should be discussed. As noted, the findings of Study 1 were susceptible to two alternative explanations. One explanation relied on a time confound, whereas the other explanation relied on a random choice process. Both

alternatives were however ruled out in the subsequent studies, and these subsequent studies provided more confidence in the reliability and robustness of our conclusions.

Several other interpretative possibilities could be considered. A conceptually different account of how prior choice-making might have an influence on subsequent product preferences involves the idea that choice participants may have rewarded themselves for their hard work by choosing the more affective option by the time they had to select the final product. Related research by Khan and Dhar (2005) suggests that, in certain circumstances (i.e., after making utilitarian choices), prior choice-making can induce consumers to choose self-indulgent options later on. Although this explanation may be applicable to the findings of Studies 1 and 2, it is less applicable to the results of Study 3. For instance, in Study 1, choices were made between two options of equal attractiveness and cost but for which product features differed. Given that choice participants made repeated difficult choices, they may have decided to reward themselves for their hard work by selecting the affective product at the end. However, the findings of Study 3 seem to be at odds with the idea that choice participants felt like they had earned the right to indulge. Choice participants bought more of the very attractive, but slightly *less* of the moderately attractive type of candy than no-choice participants. Overall, choice participants did not buy more candy. Indulgence would seem to imply buying more of no matter what type of candy.

A potential problem with our series of studies might be that we did not have a control condition that did not perform the tasks done in the yoked control condition. This raises the possibility that there is something about being in the yoked control condition that influences choice, rather than that there is something about repeated choice-making that influences choice, as we suggest. With the current data, we

cannot firmly rule out that the effect we report is not an effect of yoking. However, we believe that participants in the yoked control condition did not do anything more than follow specific instructions, which is a very common task in a lab. So, we believe that having choice rather than lacking choice is producing our results. Other studies that used less stringent control conditions (e.g., rating rather than choosing) have also produced depletion effects in the choice condition (e.g., Vohs et al., 2004), which reinforces our analysis.

Theoretical and managerial implications

Previously, research has demonstrated that consumer susceptibility to affective product features can be strengthened by in-store atmospherics. We build upon the idea that consumer's attraction to affective product features is a crucial step to understanding consumer behavior, and go beyond to provide evidence for the notion that susceptibility to affective product features can also be enhanced by the act of shopping (insofar as it involves active choice-making) itself.

The present research has implications for the literature on impulsive spending. In the past, some definitions have depicted impulsive spending behavior as resulting from certain product characteristics (Stern, 1962). However, more recent definitions have portrayed it as stemming from affective experiences within the shopper (Rook, 1987; Rook & Fisher, 1995; Rook & Hoch, 1985). According to Hoch and Loewenstein (1991), consumers experience an ever-shifting conflict between desire and willpower. Impulsive spending occurs whenever the desire to buy, to own, or to consume exceeds willpower. In other words, it occurs whenever consumers' capacity to exert self-control breaks down. Vohs and Faber (in press) found that participants who lacked self-control resources because they had to control their attention or

suppress certain thoughts displayed subsequently more impulsive buying tendencies (Study 1), were subsequently willing to pay higher prices for a variety of products (Study 2), and spent subsequently more money on books (Study 3) than participants with sufficient self-control resources. The authors concluded that impulsive purchasing is a function of self-regulatory resources. Our research lends credence to these theoretical accounts of impulsive spending and extends the findings of Vohs and Faber (in press) by providing empirical evidence for the role of regulatory resources in determining the relative influence of affect and cognitions on choice. Moreover, to our knowledge, we are the first to both manipulate self-control depletion and assess the effects of this manipulation in the same consumer behavior context.

The current findings also have several practical consumer and managerial implications. For retailers, the results suggest that offering a large set of choices has an impact on the product attributes that consumers will take into account later in their shopping choices. Building on this idea, our results also suggest that the impact of affective product features may be expected to increase during the shopping event. Our results also imply that retailers would benefit from the use of expensive and attractive end-of-aisle-displays or delicious-looking but somewhat overpriced candy at cash registers. Typically, cheaper candy items are placed at cash registers to make an impulse decision easy. Our results suggest that even more expensive items would also be purchased if made readily available at the end of the shopping trip.

For consumers, an important implication of the present findings is that resisting the temptation of affective product features would be easier achieved by reducing the number of decisions they make in the store. One possibility is to rely on the same brands or highly familiar products. This way, self-control resources are not depleted. Another solution to reduce in-store decision making would be to use a

detailed shopping list containing the desired amounts for well-specified product brands while shopping. Apparently however, only a little more than half (55%) of supermarket shoppers are inclined to use shopping lists (Block & Morwitz, 1999), and it is unlikely that these lists contain brand, volume, and flavor information. In addition, a recent study by Oppewal and Koelemeijer (2005) has shown that adding items to existing assortments leads to an increase in assortment evaluation, suggesting that consumers like to have a lot of in-store options.

Future research

Our results raise three main questions for future research. One issue concerns the consequences of depletion for consumer decisions regarding major durable goods. Another issue is whether the depletion effect would also be observed for other types of affective product cues besides the ones used here. These questions deal with the generalizability of the depletion effect to other products and other product cues, respectively. Finally, it might be relevant in a consumer behavior context to learn more about the nature of the depletion process. Is depletion of the scarce self-control resource a gradual process or does depletion kick in suddenly if a certain threshold of choice-effort has been exceeded?

First, the issue as to whether depletion will also have an effect on consumer decisions with respect to durables such as a plasma TV set, a car, or even a house, remains open to future research. It has already been observed that affective considerations can loom larger than cognitive considerations when consumers have to make important decisions such as which apartment to acquire (Dhar & Wertenbroch, 2000). When making forfeiture decisions, consumers were found to prefer an apartment with a breathtaking view of the sunset and the city skyline (i.e., a positive

affective product feature) and a 45 minutes distance to work (i.e., negative cognitive product feature) over an apartment with a view of a parking lot (i.e., a negative affective product feature) and a 10 minutes distance to work (i.e., a positive cognitive product feature). Future research is needed to clarify whether depletion would also induce consumers to make similar affect-laden decisions when buying durable goods. We certainly believe that it could.

This brings us to a second area for future research. Even though we established a link only between repeated choice-making and subsequent susceptibility to affective product features such as attractiveness, the underlying model strongly suggests that the effects of depletion may be generalizable to other affective product features, such as, for instance, prestigious brand names. In fact, any affective product feature should receive more weight than any cognitive product feature in the mind of a depleted consumer who lacks sufficient resources to resist the temptation of affective product features. We call for future research that investigates the effects of self-control depletion on a broad range of product features.

Finally, it would be very interesting to gain insight in the timing of the depletion process. During a shopping trip, does every product choice become progressively more influenced by affective product features, or is some minimum number of repeated product choices required in order for consumers to become susceptible to affective features at once? We speculate that depletion does not always occur according to some invariable pattern, but that the nature of the process will be linked to the nature of the product choices. We know from other research that one choice might be enough to induce depletion immediately, given that this choice is of considerable importance to the choice-maker (Baumeister et al., 1998). If choices do not matter a lot, depletion might come into play more gradually.

MANUSCRIPT II

WHY CONSUMERS BUY LOTTERY TICKETS WHEN THE SUN GOES DOWN ON THEM. THE DEPLETING NATURE OF WEATHER-INDUCED BAD MOODS.

Abstract

We propose that weather conditions can influence consumers' engagement in lottery play. A longitudinal study on the extent of lottery play in Belgium shows that lottery expenditures are indeed higher after reduced exposure to sunshine, even after controlling for people's momentum, time-varying characteristics of the game, and deterministic seasonal components. The results of a first laboratory study are consistent with these findings, and establish a link between lottery play and negative mood. Subsequent experiments provide evidence that depletion due to active mood regulation attempts, rather than mood repair, is the underlying process for the link between bad weather and lottery play.

Although scholars disagree on when exactly the ancient tradition of lottery play started, there is general agreement that human beings have engaged in lottery play for a very long time. Archeologists even found evidence of lottery-style games dating back to the Egyptian Pharaohs. Lottery-raised funds have also been used to finance the construction of the Great Wall in China (100 BC), to replenish the French treasury in the mid 1500s, and to help finance the US Revolutionary War (http://www.naspl.org/history.html). Not only is lottery play a phenomenon of all times, it also occurs around the globe. State-operated lotteries are found in about half of the world's countries, and their annual worldwide ticket revenues amounted to $115 billion in 1997 (Garrett, 2001). This should come as no surprise, given that consumers are often confronted with the very tempting opportunity to engage in lottery play. Who can say not to have at least considered buying a lottery ticket once, when passing by a news-stand and being confronted with an enticing lottery ad, informing consumers about the tremendous size of this week's jackpot?

Several studies have tried to cross-sectionally explain differences in the extent of gambling across individuals (e.g., Suzuki, Hirota, Takasawa, & Shigemasu, 2003; Yechiam, Stout, Busemeyer, Rock, & Finn, 2005), social strata (e.g., Spiro, 1974; Stranahan & Borg, 1998), or countries (e.g., Garrett, 2001). Another stream of research has focused on explaining over-time variations in gambling activity within the same population (e.g., Farrell, Hartley, Lanot, & Walker, 2000; Farrell, Morgenroth, & Walker, 1999; Forrest, Gulley, & Simmons 2000a, 2000b; Gulley & Scott, 1993; Van Puyenbroeck, 2004), linking the extent of lottery play to such factors as customer momentum and time-varying characteristics of the game (we review these characteristics in the introduction section to Study 1). In this paper, we investigate whether the amount of sunshine may be another relevant factor. More

specifically, we investigate whether and why the amount of sunshine one is exposed to may affect one's willingness to engage in lottery play.

According to Parker and Tavassoli (2000), several behaviors reflect an adaptation to variations in the duration and intensity of sunlight. For example, even though one would expect investors to behave rationally, research has repeatedly shown that stock-market returns are related to climatic indicators as the amount of sunshine (Hirshleifer & Shumway, 2003; Saunders, 1993). Mittal, Kamakura, and Govind (2004) showed that customer satisfaction with automobiles and dealership service depend on climatic variables, and Parker and Tavassoli (2000) established that consumers adapt to environments with little sunshine through a higher usage of stimulating substances as alcohol, coffee, and tobacco. Similarly, Parker and Tavassoli (2000) argued that less intense sunshine should make consumers less inhibited and increase impulsive buying behavior. Because of the tempting nature of the game, we posit that lottery play could fulfill a similar function as these impulsive buying behaviors (Pezza Leith & Baumeister, 1996; Steenkamp & Baumgartner, 1992; Yechiam et al., 2005). Indeed, as is the case with impulsive spending, lottery play will occur whenever the temptation to buy, to own, or to consume exceeds willpower (Hoch & Loewenstein, 1991). We therefore suggest that a reduced exposure to sunshine may result in increased lottery play (as graphically depicted in the upper part of Figure 1). Evidence for this assertion is provided through a longitudinal study in which we analyze over eight years of semiweekly Belgian lottery-expenditure data. Even after controlling for many other relevant drivers, such as people's momentum and time-varying reward characteristics of the game, we find significant support for a link between reduced sunshine in the days preceding the lottery draw and lottery expenditures.

In subsequent laboratory studies, we investigate *why* this link between a reduction in sunlight and an increased engagement in lottery play takes place. We propose that a reduced exposure to sunshine leads to negative mood, which in turn leads to an increased engagement in lottery play (see middle panel of Figure 1). The first part of this chain (i.e., the link between sunshine and mood) is well-established in the literature (Cunningham, 1979; Eagles, 1994; Goldstein, 1972; Howerth & Hoffman, 1984; Persinger, 1975; Sanders & Brizzolara, 1982). The neurotransmitters dopamine and serotonin have been identified as mediators between natural sunlight and mood (Molin, Mellerup, Bolwig, Scheike, & Dam, 1996; Mittal et al., 2004; Parker & Tavassoli, 2000; van Praag, 1982). The subsequent link between negative mood and lottery play, in contrast, has, apart from some pioneering work (e.g., Pezza Leith & Baumeister, 1996), not yet been well-established in the literature. Therefore, in our second study, we first provide correlational evidence for this second link.

In addition, we test in a sequence of studies (2, 3, and 4) two competing hypotheses as to why this link between bad mood and lottery play occurs. A first hypothesis states that negative moods trigger the goal of mood repair (Tice, Bratslavsky, & Baumeister, 2001), which may be realized through engagement in lottery play (Pezza Leith & Baumeister, 1996). In fact, an in the literature commonly stated reason for succumbing to temptations is to repair a bad mood (Herman & Polivy, 2004). Apparently, bad moods provide consumers with the permission to not exert self-control, a phenomenon labeled 'acquiescence' in self-control literature (Baumeister, Heatherton, & Tice, 1994). Acquiescence has been argued to often be evidenced in impulsive spending behavior (Baumeister, 2002). The reasoning that mood repair may be realized through engagement in lottery play rests on the assumption that engagement in lottery play removes negative affect. It outlines a

causal chain in which negative mood leads to an increasing engagement in lottery play through the activation of a mood repair goal (see hypothesis 1 in the lower part of Figure 1). In this model, lottery play serves as a means to repair one's bad mood. Hence, lottery play is instrumental to mood repair. For the remainder of the paper, we refer to this causal chain as the *mood repair* explanation for lottery play.

The second hypothesis builds on the theory of self-control depletion. According to the self-regulatory resource model (Baumeister et al., 1998; Muraven, Tice, & Baumeister, 1998), all acts of self-control draw on a common limited resource that is akin to energy or strength. Hence, exertion of self-control is followed by a period of diminished capacity to exert subsequent self-control (i.e., self-control depletion). Recently, Baumeister (2002) has outlined the applicability of self-control processes to consumer behavior. Depletion has been linked to consumer behavior that is not conducive to long-term self-interest, such as impulsive spending (Vohs & Faber, in press) and susceptibility to affective product features (Bruyneel, Dewitte, Vohs, & Warlop, in press). Basically, as resisting temptation has been found to rely on the scarce self-control resource (Vohs & Heatherton, 2000), consumers in a state of depletion will be more likely to yield to temptation. One instance of yielding to temptation might be to buy lottery tickets. Hence, processes that undermine self-control should lead to more lottery play. One factor that has been argued to weaken self-control is active mood regulation (Baumeister & Heatherton, 1996; Vohs & Heatherton, 2000). People have been shown to engage in active attempts to regulate their mood whenever they experience negative emotions (Tice, Bratslavsky, & Baumeister, 2001). Yet, active attempts to regulate emotions deplete the same common, limited resource that is needed to resist temptations such as an opportunity to buy lottery tickets (Vohs & Heatherton, 2000). Thus, this line of reasoning outlines

a causal chain in which negative mood leads to active mood regulation attempts that are depleting in nature. In other words, people who experience a negative mood will actively attempt to regulate their mood and in this process consume scarce self-control resources. The resulting state of depletion, in turn, leads to an increasing engagement in lottery play. Indeed, depleted people will have fewer self-control resources left and will suffer from a reduced resistance to the temptation to engage in lottery play (see hypothesis 2 in the lower part of Figure 1). In what follows, we refer to this competing causal chain as the *depletion* explanation for lottery play. To the best of our knowledge, the claim that bad moods result in yielding to temptation through depletion following active mood regulation attempts has not been put forward in the literature so far. In contrast to the often-cited mood repair hypothesis (Baumeister, Heatherton & Tice, 1994; Baumeister, 2002; Herman & Polivy, 2004), which states that bad moods result in an *unwillingness* to forego temptations, the competing depletion hypothesis states that bad moods result in an increased *inability* to forego temptations.

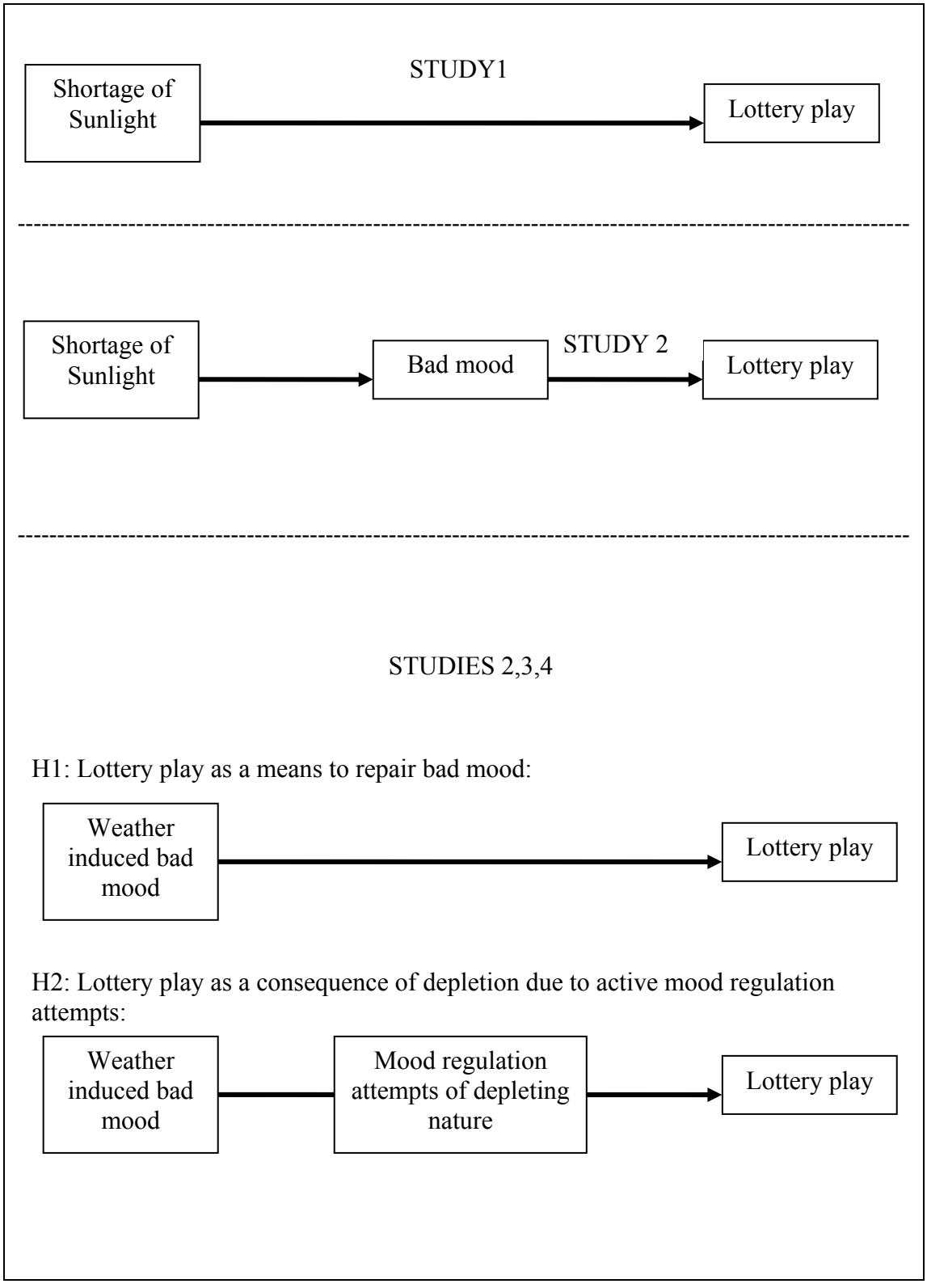

Figure 2.1. Link between sunshine, mood, and lottery play.

If mood repair is the underlying process for the link between bad mood and lottery play, we should find that lottery play is related to the extent to which people feel bad *at the moment* they are given the opportunity to buy lottery tickets. In contrast, if depletion due to active mood regulation attempts underlies the link between bad mood and lottery play, bad mood should increase the engagement in active mood regulation, which reduces subsequent resistance to temptations such as lottery play. It is important to point out that according to this process, we should find that lottery play is related to the extent to which people felt bad *some time before* they are given the opportunity to buy lottery tickets. The latter model implies a lag of several minutes that allows people to engage in active mood regulation attempts (e.g., Baumeister et al., 1998). This model makes no predictions as to people's mood at the moment they are given the opportunity to buy lottery tickets, however. Indeed, although attempts to actively regulate bad moods are likely to lead to decreased self-control resources, these attempts may or may not be successful, that is, they do not necessarily lead to improvements in bad moods (Vohs & Baumeister, 2000).

The remainder of the paper is organized as follows. Using an extensive time series of actual lottery expenditures, we first establish the link between bad weather and an increased engagement in lottery play. In three laboratory studies, we show that bad mood is a driver for this phenomenon. We test the mood repair and the depletion accounts of the link between bad mood and lottery play against each other and find evidence for the latter and not for the former. This combination of longitudinal, secondary-data, analysis with various controlled experiments should contribute to the external and internal validity of our substantive conclusions.

Study 1

Several studies on gambling behavior have appeared in recent literature. A lot of these studies have focused on *anomalies* in lottery play such as the favorite-longshot bias in horse racing (e.g., Vaughan Williams & Paton, 1997) and the gamblers' fallacy in lotteries (e.g., Terrell, 1994). The favorite-longshot bias in horse race betting refers to 'underbetting' short-odds (favorite) horses and 'overbetting' long-odds horses relative to their objective probabilities of winning. The gambler's fallacy refers to the bettor's belief that the probability of an event is lowered when the event has occurred recently, although the probability is known to be independent across trials. Other studies have focused on *cross-sectional* differences in gambling behavior (Suzuki et al., 2003; Spiro, 1974; Yechiam et al., 2005). One particularly robust finding in this respect is the observation that poorer people spend a higher percentage of their income on lottery tickets than more wealthy people (e.g., Stranahan & Borg, 1998).

At an aggregate level, Garrett (2001) provided an empirical analysis on lottery games across 82 different countries. He found significant differences in sales per capita and in sales as a percentage of GDP per capita across continents and countries. Differences in the income elasticity of demand for lottery tickets across continents and countries were observed as well. These findings provide some indirect evidence that climate might influence lottery play. However, more conclusive evidence for the link between weather conditions and lottery play would be provided by means of a longitudinal study including climate as an explanatory variable.

Several *longitudinal* studies on the underlying drivers of lottery play have already been conducted. Using UK data, Farrell, Morgenroth, and Walker (1999) found that the extent of lottery play was strongly influenced by momentum in consumers'

gambling behavior, as the extent of lottery play in the previous period had a significant positive effect on lottery play in the period of interest. It was also found that rollovers heightened the potential addictiveness of numbers games. Rollovers occur when no player selects the full set of winning numbers in the current draw. The jackpot prize money of the current draw is then added to the jackpot pool for the following draw. In another UK study, the impact of both rollovers and super-draws was explained in terms of the changes they induce in the expected value of lottery tickets (Forrest, Gulley, & Simmons, 2000b). Super-draws occur when the game organizers exercise their option to add to the jackpot fund. In a related UK study, Forrest, Gulley, and Simmons (2000a) replicated the finding that sizes of rollovers and super-draws had an important positive impact on the expected value of lottery tickets. In addition, they found evidence that Wednesday lottery draws were significantly less popular than Saturday lottery draws. The latter result was consistent with the findings of Gulley and Scott (1993), who, in a US setting, found a strong tendency for midweek draws to be less attractive. In another UK study, Farrell et al. (2000) affirmed that rollovers produce increases in the expected value of holding a lottery ticket. Virtually all results were replicated in the Belgian lottery market by Van Puyenbroeck (2004), who also found that the day of the week on which the draw took place (i.e., Wednesday or Saturday), rollovers, and super-draws affected lottery play through changes in the expected value of the lottery tickets.

Taken together, these studies find evidence of systematic patterns explaining variability in lottery play over time. In the present study, we assess whether weather conditions, and more specifically the number of hours of sunshine in the days preceding the lottery draw (i.e., in the period one can buy the tickets), have *additional* explanatory power, even after controlling for these aforementioned factors.

The setting used for our study was the Belgian "lotto game", which is comparable to the games considered in the previous studies. Similar in format to many US state lotteries, the Belgian lotto game is a 6 / 42 numbers game. The nominal price is fixed and unchanging: € 0.50 must be paid for each combination of six numbers entered in the game. As the Belgian lotto game is very popular (i.e., sales typically amount to about 0.475% of GDP; Garrett, 2001), a substantial jackpot pool is generated for each draw. Approximately 50% of this pool is awarded to ticket holders that match several numbers of the balls drawn. The jackpot is shared by those (if any) matching 6 correct numbers and smaller prizes are awarded to players with partially correct entries. The other 50% is shared by the operator, the distributors, and good causes. If no player selects the full set of winning numbers, a rollover is declared and the jackpot prize money is added to the jackpot pool for the following draw. Draws take place semiweekly, on Saturdays and Wednesdays. Rollovers are carried forward from one Wednesday to the next and from one Saturday to the next. Occasionally, the game organizers exercise their option to add to the jackpot fund. This results in a so-called super-draw.

In the study, we assessed whether the weather conditions in the three days preceding a lottery draw affects total lottery expenditures. As the lottery draw takes place in the evening to enable the public to still buy tickets the day of the draw, this amounts to the number of hours of sunshine on Thursday, Friday and Saturday for Saturday draws, and on Monday, Tuesday and Wednesday for Wednesday evening draws. The sunshine data were accumulated across three days to have a comparable number of days preceding both draws, and to make the level of data aggregation comparable to that of the dependent variable. As such, abstraction was made of the number of hours of sunshine on Sunday.

Data on lottery sales and game characteristics were made available by the National Lottery of Belgium, whereas daily sunshine data were obtained from the Belgian meteorological institute Belgocontrol. Our period of analysis was from October 1993 until August 2002, resulting in 925 semiweekly lottery draws. There was considerable variability in the number of hours of sunshine, ranging from 0.00 to 15.40 (M = 4.49, SD = 4.19). To account for diminishing returns to scale, both the dependent variable (lottery expenditures) and the key explanatory variable (combined number of hours of sunshine in the days preceding the lottery draw) were log-transformed. As a few observations experienced zero sunshine hours, we followed common practice and added a small number to each observation before taking the log-transform.[6] A graph of both series is presented in Figure 2. For expository purpose, we present the final year of the data in Figure 2 (comparable patterns were obtained in the other years). The expenditure series clearly shows the influence of occasional super-draws. The jigsaw pattern in the expenditures series also shows that the Saturday draws (odd position in the series) are more popular than Wednesday draws (even position).

[6] The size of this number was varied from 0.1 to 1.0 (reported in table 1), but this did not affect our substantive conclusion on the significance of any of the effects.

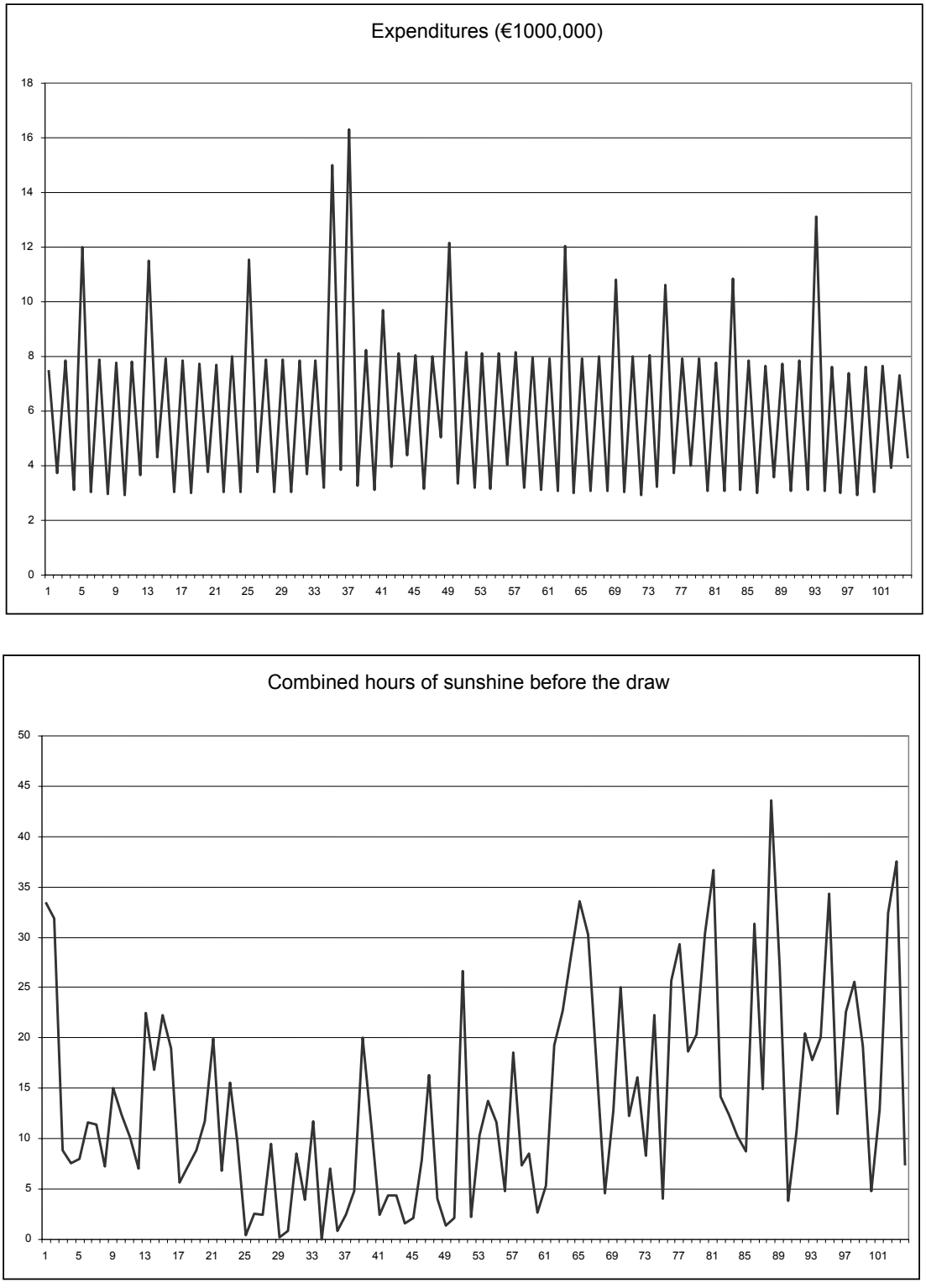

Figure 2.2. Hours of sunshine and lottery expenditures (August 23, 2001 – August 21, 2002).

In line with previous research, we added the following control variables to the model: a dummy variable to indicate whether it was a Saturday draw, two autoregressive terms to account for momentum in people's gambling behavior, an indicator variable to denote whether or not there was a rollover, and the size of the super-draw. The first autoregressive term allows for momentum across draws on two different days (e.g., whether the gambling behavior on Saturday is influenced by the gambling behavior the preceding Wednesday), whereas the second autoregressive term captures the time dependence across common days. A rollover took place in 13% of the cases, and in 3.6% of the cases, the game organizers exercised their option to announce a super-draw, the amount of which varied in size between € 600,000 and € 5,000,000.

Table 2.1

Underlying drivers of lottery expenditures.

	Dependent Variable Semiweekly Lottery Revenue (Rev_t)	
	Parameter Estimates	Standard Errors
Intercept	10.363**	0.524
Saturday Dummy	0.852**	0.047
Rev_{t-1}	0.117**	0.031
Rev_{t-2}	0.183**	0.028
Super-draw (million €)	0.119**	0.008
Rollover (0/1)	0.239**	0.016
$Sunshine_t$	-0.010*	0.005
n = 925 $R^2_{adj} = 0.932$		

* $p < .05$, ** $p < .01$

Parameter estimates and white heteroscedasticity-consistent standard errors are presented in Table 1. In line with previous findings (see e.g., Farrell et al., 2000; Farrell, Morgenroth, & Walker, 1999; Forrest, Gulley, & Simmons, 2000a, 2000b; Gulley & Scott, 1993; Van Puyenbroeck, 2004), we observed that the day of the week on which the draw took place, momentum in people's gambling behavior, and the presence of rollovers as well as the size of the super-draw (if any) all had a highly significant effect on lottery expenditures. In combination, these findings offer considerable face validity to our model. Most importantly, however, we found that, even though the combined control variables already resulted in an R^2_{adj} of 0.93, the

sunshine-variable still had a significant negative effect ($\beta = -0.01$, $p < 0.05$) on lottery revenue.

This effect stayed significant, *even when we controlled for other seasonal influences* through the inclusion of two harmonic (sine, cosine) deterministic components (see Hanssens, Parsons, & Schultz, 2003, p. 46, for a review on other marketing applications of this procedure). Hence, even after controlling for other seasonal factors that might explain more lottery play in certain times of the year (e.g. the timing of the holiday season, or differential business/consumer expectations in certain times of the year), the incremental impact of the number of hours of sunshine in the days preceding the lottery draw stayed significant, which confirmed our prior expectation[7].

In the subsequent laboratory studies, we assess some potential underlying mechanisms for this effect. Specifically, two competing explanations for this result are investigated. Both rely on weather-induced negative mood as a potential driver of the link between sunlight exposure and lottery play. One hypothesis states that lottery play could be instrumental for repairing one's bad mood, whereas the other hypothesis states that lottery play might be a mere consequence of depletion due to active mood regulation attempts.

[7] One could argue that consumers are more inclined to stay indoors in bad-weather conditions, and to go out in case of good-weather conditions, which might in turn affect their lottery-buying behavior. However, in the period under study, buying lottery tickets by phone or through the internet was not possible. As such, the implied reduced-ability argument would actually work in the opposite direction, making our significant negative result a more conservative estimate.

Study 2

Study 2 is a laboratory study that is correlational in nature. As already argued, a reduced exposure to sunshine has consistently been found to lead to negative mood (Cunningham, 1979; Eagles, 1994; Goldstein, 1972; Howerth & Hoffman, 1984; Persinger, 1975; Sanders & Brizzolara, 1982). Although the link between sunshine and mood is well-documented in the literature, the link between mood and lottery play is not. Hence, the first aim of Study 2 is to demonstrate that lottery play is indeed related to negative mood. Its second aim is to find preliminary support for one of the proposed underlying processes for the link between negative mood and lottery play.

We assessed participants' mood states upon entering the laboratory. Subsequently, participants engaged in a creativity task during which they were given the opportunity to regulate their moods. Afterwards, participants' mood states were assessed once more. Finally, participants were given the opportunity to buy lottery tickets. We expect to find a positive correlation between negative mood and lottery expenditures. In addition, if mood repair explains the link between negative mood and lottery play, negative mood as measured immediately before participants are given the opportunity to buy lottery tickets should be more predictive of lottery expenditures than negative mood as measured some minutes before that opportunity. In contrast, if depletion explains the link, negative mood as measured some minutes before participants are given the opportunity to buy lottery tickets should be more predictive than negative mood as measured immediately before the opportunity to buy lottery tickets. Indeed, according to the depletion explanation, it takes some minutes before mood regulation attempts will lead to a state of depletion (Baumeister et al., 1998), and hence before people will become susceptible to lottery play.

Method

Participants. Participants were 46 undergraduate students (20 men and 26 women). Ages ranged from 18 to 33 years (M = 21.78 years, SD = 2.50 years). Participants received € 6 for their cooperation.

Materials and Procedure. A miniature lottery bowl containing 42 lottery balls (i.e., the number of lottery balls used in the Belgian lottery) was placed in the laboratory. Participants came to the laboratory in groups of seven to nine persons. Each participant was assigned a seat in a partially enclosed cubicle and worked individually for the main part of the study. Upon arrival, participants received their participation fee and filled out an informed consent form.

As a first task, the Positive Affect Negative Affect Scale (Watson, Clark, & Tellegen, 1988) was administered (i.e., PANAS1). The PANAS consists of 10 positive and 10 negative mood items assessing participants' current mood state[8]. For each item, answers were given on a five-point Likert scale ranging from *Right now, I feel this way very slightly or not at all* (1) to *Right now, I feel this way extremely* (5).

After the PANAS was administered, participants left their individual cubicles and were asked to collectively engage in a creativity task that lasted for approximately 25 minutes. As creativity tasks have been shown to induce people to regulate their mood upward (Cohen & Andrade, 2004), participants were assumed to engage in active upward mood regulation during the creativity task. On turn, they had to pronounce a word of which the first letter had to match the last letter of the previous word.

[8] As negative mood items are more relevant to the present research setting, we opted throughout the paper not to report the results for the positive mood items for reasons of clarity.

After the creativity task, participants again took place in the partially enclosed cubicles. Once more, the PANAS was administered (i.e., PANAS2). We administered the PANAS twice to find out at which moment mood was more predictive of lottery play.

In the next phase of the study, participants were given the opportunity to engage in a 6 / 42 numbers game. This format was chosen because it corresponded to the real-life format, thereby increasing consistency with the aforementioned longitudinal study on secondary data and providing participants with a sense of familiarity towards the game. Participants were free to determine if and how many lottery tickets they bought. Each ticket cost € .50, and had to be bought with their participation fee. Participants knew that the draw would take place when all experimental sessions were over and all participants in the study had received the opportunity to buy lottery tickets (i.e., a few days after they themselves had received the chance to play at the utmost), and that they would be informed about the results of the draw through e-mail immediately after it had taken place. They also knew the approximate number of participants to take part in the study, and were told that the size of the jackpot would depend on the stakes. Thus, in correspondence with a real-life lottery, participants did not know how big the payout would be. Our dependent measure was each participant's amount of lottery expenditures.

Results and Discussion

We conducted a regression analysis with both indicators of mood as predictor variables and lottery expenditures (overall M = € 0.54, SD = € 0.55) as the dependent variable. As gender and age effects did not affect our conclusions, these factors are further ignored. Negative mood as measured at the beginning of the session (i.e.,

PANAS1; α_{NA1} = .85; *M* = 1.40, *SD* = 0.41) turned out to be significantly positively correlated with lottery expenditures (β = .07, *t* = 2.05, *p* < .05). In other words, the worse participants felt when they entered the lab, the higher their lottery expenditures 25 minutes later. This finding supports the hypothesis that lottery play is related to negative mood. In addition, as lottery expenditures were related to the extent to which people felt bad some time *before* they were given the opportunity to buy tickets, this finding is consistent with the depletion explanation. Negative mood as measured immediately before participants were given the opportunity to buy lottery tickets (i.e., PANAS2; α_{NA2} = .79; *M* = 1.31, *SD* = 0.37), in contrast, did not significantly predict lottery expenditures (β = -.03, *t* = -0.87, NS). This finding is inconsistent with the mood repair explanation.

The depletion explanation would be supported further if mood *changes* would predict lottery expenditures. We therefore conducted a regression analysis with the following two explanatory variables: (i) the negative mood as measured immediately before participants had the opportunity to buy lottery tickets (i.e., PANAS2), and (ii) the difference between negative mood as measured at the beginning of the session and as measured immediately before participants had the opportunity to buy lottery tickets (i.e., PANAS1-PANAS2). Lottery expenditures was the dependent variable. The negative mood difference score was positive (i.e., negative mood at time 2 was significantly smaller than negative mood at time 1, *t* (45) = 2.50, *p* < .05), indicating that mood had indeed, as predicted by Cohen and Andrade (2004), recovered during the creative word game. The change in negative mood turned out to be significantly positively correlated with lottery expenditures (β = .06, *t* = 2.09, *p* < .05), while PANAS2 was not (*t* = 0.80, NS). Hence, the bigger the reduction in negative mood, the

higher lottery expenditures were. This finding provides further support for the depletion explanation.

In conclusion, the outcome of our analyses showed that negative mood predicts lottery expenditures. In addition, this study provides preliminary support for the assertion that depletion due to active mood regulation attempts rather than mood repair is the underlying process for the link between bad mood and lottery play. In two follow-up studies, we try to find further evidence for the depletion explanation of lottery play. In a third study, we manipulate mood and depletion orthogonally. In a fourth study, we induce bad moods and manipulate whether subsequent mood regulation attempts are depleting or not. In both studies, we assess the impact of our manipulations on lottery play. To provide additional evidence for a causal link between reduced exposure to sunshine and an increased engagement in lottery play driven by negative mood, we manipulate mood through exposure to sunshine. This is implemented through a script-reading procedure in which participants are confronted with different amounts of exposure to sunshine.

Study 3

The aim of Study 3 is to experimentally manipulate weather-related mood and to find further evidence for the hypothesis that the link between bad mood and lottery play rests on the depleting nature of active mood regulation attempts rather than on the mood repairing nature of lottery play. We induce either a bad or a good mood state in participants, and ask them to subsequently engage in a task that was either depleting or not. Afterwards, all participants are given the opportunity to buy lottery tickets. If mood repair explains the link between bad mood and lottery expenditures, the latter should be

higher for participants in a bad mood than for those in a good mood, regardless of their level of self-control depletion. In contrast, if depletion explains the link between bad mood and lottery expenditures, lottery expenditures should be higher for depleted than for non-depleted participants, regardless of their mood state.

Method

Participants. Participants were 71 undergraduate students (32 men and 39 women). Data from 3 participants were discarded because they did not comply with the instructions. Ages ranged from 17 to 28 years (M = 21.04 years, SD = 2.29 years). Participants received € 6 for their cooperation.

Materials and Procedure. The procedure of Study 3 was identical to the one of Study 2, apart from the following. To increase the sensitivity of the PANAS used in Study 2, we administered a visual analogue version (Franik & Pathak, 2003). For each item, participants were asked to indicate on a 100 mm line to what extent they felt the particular emotion.

After filling out an initial PANAS (i.e., PANAS1), participants were assigned to one of the four conditions resulting from crossing the mood manipulation (negative versus positive) with depletion (high versus low). The mood manipulation was induced by asking participants to read a one-page description of a character that was walking around in a solitary landscape (see Wenzlaff, Wegner, & Roper, 1998 for the original use of script reading as mood induction procedure). Participants were asked to imagine that they themselves were this character. For half of the participants, the character walked around in sunny weather conditions. Therefore, these participants were hypothesized to develop a positive mood. For the other half of the participants, the

character walked around in cloudy weather conditions. Hence, these participants were hypothesized to develop a negative mood (e.g., van Praag, 1982).

Next, participants were asked to fill out the PANAS once more (i.e., PANAS2). This was done to validate that the mood manipulation influenced participants' mood states as expected. Afterwards, the depletion manipulation was induced by means of a variation of a Stroop color-naming task. Participants were asked to indicate the ink color of 50 words. The words of which the color had to be indicated were always color names (e.g., blue). In the non-depleting conditions, words and ink colors were matched (e.g., RED in red ink). In the depleting conditions however, words and ink colors were mismatched (e.g., RED in yellow ink). In addition, participants in the depleting condition faced an exception to this rule. In case a word in blue ink appeared on the screen, they were instructed to indicate the word rather than the ink color. These deviating trials occurred in 25% of the trials. Because of the need to override impulses and dominant responses, this task was hypothesized to be depleting. A similar task proved to be a successful depletion manipulation in earlier research (Wallace & Baumeister, 2002).

Subsequently, participants filled out the PANAS one last time (i.e., PANAS3). This was needed to validate that mood states did not change during the Stroop color-naming task. In fact, in both depleting and non-depleting conditions, participants in bad mood states should be unable to engage in attempts to actively regulate their moods, since Stroop color-naming tasks consume the attentional processes that are required in active mood regulation (Baumeister et al., 1998).

Finally, participants were given the opportunity to engage in a 6 / 42 numbers game. As in Study 2, our dependent measure was lottery expenditures.

Results and Discussion

Preliminary analyses revealed that our weather-induced mood manipulation was successful. After the mood induction (α_{NA2} = .93), negative mood was significantly larger in the bad mood condition (*M* = 18.84, *SD* = 17.25) than in the good mood condition (*M* = 11.42, *SD* = 10.56), *t* (69) = 2.16, *p* < .05. Before the mood induction, the mood conditions did not differ in negative mood (α_{NA1} = .89, bad mood condition: *M* = 14.94, *SD* = 14.83; good mood condition: *M* = 12.73, *SD* = 11.15), *t* (69) = 0.70, NS.

Additional analyses also revealed that mood states did not change during the Stroop color-naming task. In the depleting condition, negative mood as measured before the Stroop color-naming task (i.e., NA2; *M* = 16.61, *SD* = 15.90) was not significantly different from negative mood as measured after the Stroop color-naming task (i.e., NA3; *M* = 14.86, *SD* = 12.67), *t* (34) = 0.89, NS. Similarly, in the non-depleting condition, negative mood as measured before the Stroop color-naming task (i.e., NA2; *M* = 14.00, *SD* = 13.78) was not significantly different from negative mood as measured after the Stroop color-naming task (i.e., NA3; *M* = 12.47, *SD* = 10.12), *t* (34) = 1.19, NS.

To test our hypothesis that depletion predicts engagement in lottery play, we conducted a two by two ANOVA using mood (manipulated bad mood versus good mood) and depletion (depletion versus no depletion) as the independent variables. We found a significant main effect of depletion, indicating that lottery expenditures were higher for depleted (*M* = € 0.57, *SD* = € 0.63) than for non-depleted participants (*M* = € 0.32, *SD* = € 0.32), *F(*1, 67) = 5.01, *p* < .05, irrespective of their mood state. Neither the main effect of mood, *F(*1, 67) = 0.64, NS, nor the mood by depletion interaction effect, *F(*1, 67) = 2.27, NS, were significant.

Overall, the results of Study 3 provide considerable support for the depletion explanation, and fail to provide support for the mood repair explanation of lottery play. These findings are consistent with the findings of Study 2. So far, we find evidence that depletion plays a role. However, we have not yet presented evidence that depletion due to attempts to *actively* regulate one's bad mood is a precursor of lottery play. Hence, we conduct a fourth study that is complimentary to Study 3 and in which we manipulate whether or not mood regulation attempts are active or passive in nature.

Study 4

The aim of the fourth study is to experimentally manipulate depletion due to engagement in active mood regulation attempts, and to find further evidence that depletion due to this engagement in active mood regulation attempts underlies the link between bad mood and lottery play. We induce a bad mood state in all participants. Subsequently, we ask participants to engage in a mood regulation task that was either depleting in nature or not. More specifically, one half of the participants is asked to attempt to actively regulate their bad moods through engagement in a thought-listing task (i.e., mood regulation of a depleting nature), whereas the other half's mood is repaired through a mood induction procedure (i.e., mood regulation of a non-depleting nature). Afterwards, all participants are given the opportunity to buy lottery tickets. We expect that lottery expenditures will be higher for participants who engage in mood regulation attempts of a depleting nature than for participants who engage in mood regulation attempts of a non-depleting nature.

Method

Participants. Participants were 27 undergraduate students (5 men and 22 women). Ages ranged from 18 to 28 years (M = 21.74 years, SD = 2.35 years). Participants received € 6 for their cooperation.

Materials and Procedure. The procedure of Study 4 was identical to the one of Study 3, apart from the following. After filling out the visual analogue format of the PANAS (i.e., PANAS1), receiving the weather-induction of a bad mood (i.e., reading a one-page description of a character walking around in cloudy weather conditions), and filling out the visual analogue format of the PANAS for a second time to validate that the mood manipulation influenced their mood states as expected (i.e., PANAS2), participants were assigned to one of two experimental conditions.

In both conditions, participants were asked to engage in a task that enabled them to change their bad mood state. Participants in the depleting condition were asked to engage in a thought-listing task. They were guaranteed confidentiality and urged to write down their stream of consciousness. This task gave participants the opportunity to engage in active mood regulation attempts, something people spontaneously do whenever they feel bad (Tice, Bratslavsky, & Baumeister, 2001). However, as active attempts to regulate mood result in depletion (Vohs & Baumeister, 2000), this task was hypothesized to be depleting. Participants in the non-depleting condition were subjected to a mood induction procedure. They were asked to hand-copy a text to yoke them to participants in the other condition (see, for example, Zuckerman, Porac, Lathin, Smith, & Deci, 1978 for the use of a yoked experimental design) with respect to the physical effort they had to exert. The text resulted from a thought-listing task in an independent pilot study in which we induced a bad mood state in the same way as we did in Study 3, and in which we subsequently asked participants to attempt to actively regulate their

bad mood. This text was used as a mood induction procedure (e.g., Tice, Bratslavsky, & Baumeister, 2001). As participants in this condition did not have an opportunity to attempt to regulate their mood actively, the mere hand-copying of this pre-generated text was hypothesized to be considerably less depleting.

In the next phase of the study, participants filled out the PANAS one last time (i.e., PANAS3). This was done to assess how participants' mood states were influenced by their active or passive mood regulation attempts. Finally, participants were given the opportunity to engage in a 6 / 42 numbers game. As before, our dependent variable was lottery expenditures.

Results and Discussion

Preliminary analyses revealed that our mood manipulation was successful: the bad mood induction increased negative mood. Negative mood as measured after the bad mood induction (i.e., PANAS2; $\alpha_{NA2} = .91$; $M = 19.00$, $SD = 13.78$) was significantly higher than negative mood as measured before the bad mood induction (i.e., PANAS1; $\alpha_{NA1} = .85$; $M = 14.60$, $SD = 12.09$), $t\ (25) = 2.09$, $p < .05$).

Preliminary analyses also revealed that mood regulation in the non-depleting condition was successful: the good mood induction decreased negative mood. Negative mood as measured before the mood regulation task (i.e., PANAS2; $M = 21.73$, $SD = 14.60$) was significantly higher than negative mood as measured after the mood regulation task (i.e., PANAS3; $\alpha_{NA3} = .85$; $M = 13.66$, $SD = 12.58$), $t\ (13) = 3.23$, $p < .01$. In contrast, preliminary analyses revealed that mood regulation in the depleting condition was unsuccessful: thought-listing did not decrease negative mood. Negative mood as measured before the mood regulation task (i.e., PANAS2; $M = 16.05$, $SD = 12.75$) was not significantly different from negative mood as measured after the mood

regulation task (i.e., PANAS3; M = 17.63, SD = 9.90), t (12) = -0.46, NS. This finding is in line with previous literature stating that attempts to actively regulate bad moods are likely to lead to decreased self-control resources, but will generally not lead to improvements in bad moods (Vohs & Baumeister, 2000). Negative mood as measured before the mood regulation task (i.e., PANAS2) was not significantly different in the depleting (M = 16.05, SD = 12.75) and the non-depleting condition (M = 21.73, SD = 14.60), t (25) = -1.07, NS. Despite the different impact of the mood regulation task on negative mood in both conditions, negative mood as measured after the mood regulation task (i.e., PANAS3) was also far from significantly different in the depleting (M = 17.63, SD = 9.90) and the non-depleting condition (M = 13.66, SD = 12.58), t (25) = 0.91, NS. This lack of differences in negative affect rules out negative mood as an explanation for the effect of mood regulation type on lottery expenditures reported next. As an additional check, we included both measures as covariates in subsequent analyses.

We conducted a one-way ANOVA using mood regulation type (depleting versus not depleting) as an independent variable. The dependent variable was lottery expenditures. We found a significant effect of mood regulation type, indicating that lottery expenditures were significantly higher for participants who engaged in attempts to actively regulate their bad moods (i.e., mood regulation attempts of a depleting nature; M = € 0.81, SD = € 0.75) than for participants whose mood was regulated by means of the mood induction procedure (i.e., mood regulation attempts of a non-depleting nature; M = € 0.25, SD = € 0.33), $F(1, 25) = 6.44$, $p < .05$. Negative mood as measured before the mood regulation task (i.e., PANAS2) was not significantly correlated with lottery expenditures (r = -.06, NS). The effect of mood regulation type on lottery expenditures remained unchanged ($F(1, 24) = 6.12$, $p < .05$), when negative

mood as measured before the mood regulation was included as a covariate (i.e., PANAS2, $F(1, 24) = 0.04$, NS). Negative mood as measured after the mood regulation task (i.e., PANAS3) was also not significantly correlated with lottery expenditures ($r = .16$, NS). The effect of mood regulation type on lottery expenditures remained again unchanged ($F(1, 24) = 5.65$, $p < .05$), when negative mood as measured after the mood regulation was included as a covariate (i.e., PANAS3, $F(1, 24) = 0.20$, NS). Hence, Study 4 provided further evidence that depletion due to active mood regulation attempts is the underlying process for the link between weather-induced negative mood and an increasing engagement in lottery play.

General Discussion

The aim of the present investigation was to show that bad weather or weather-induced bad mood lead to an increased engagement in lottery play. In addition, we wanted to find out if depletion due to active mood regulation attempts or mood repair is the underlying process. The results of our research indicate that a shortage of sunshine induces people to engage in active mood regulation attempts of a depleting nature, resulting in insufficient resources to resist lottery play. In a longitudinal study on over eight years of semiweekly lottery expenditure data, we find that a reduced exposure to sunshine in the days preceding the lottery draw resulted in higher lottery revenues. This result is obtained even after controlling for various other factors that have been identified in the literature, including the well-documented momentum in lottery play, time-varying reward characteristics of the game such as the presence of a rollover and/or super-draw, and seasonal influences.

The results of a follow-up laboratory study are consistent with the findings of the real-life study on secondary data, and establish that lottery play is related to negative mood, but only when there is a time interval that gives people the opportunity to actively regulate their mood. This data pattern is consistent with an explanation of the link between sunshine and lottery play in terms of depletion due to depleting mood regulation attempts but not in terms of mood repair (see hypothesis 2 in the lower part of Figure 1). Two subsequent experiments provide further evidence that depletion due to active mood regulation attempts rather than mood repair is the process underlying the link between bad mood due to weather and lottery play. Hence, the combined use of a modelling and experimental approach enabled us to establish causal relations between the variables of interest, while enhancing the external validity of our results.

Our studies support that depletion due to active mood regulation attempts, rather than mood repair, is the underlying process for the link between bad mood and yielding to temptation. As a consequence, previous literature suggesting that consumers in bad mood states are motivated to repair their bad mood states, and hence *unwilling* to resist temptations (Baumeister, 2002; Baumeister, Heatherton, & Tice, 1994; Herman & Polivy, 2004), should be re-examined in the light of the depletion hypothesis proposing that consumers in bad mood states may be *unable* to resist temptations.

In past literature, lottery play has sometimes been presented as risk-taking behavior, which has also been linked to mood (e.g., Isen & Geva, 1987; Parker & Tavassoli, 2000; Pezza Leith & Baumeister, 1996). More specifically, it has been stated that consumers in negative mood states are willing to take risks in order to obtain an outcome that would make them feel happy, whereas consumers in positive mood states are reluctant to take risks in order to avoid an outcome that would make them feel sad. In our studies, we did not regard lottery play as risk-taking behavior, but rather as

yielding to a temptation (think back to our character in the introduction that passes by a news-stand and is tempted by the promising lottery ad). Although we acknowledge that risk could indeed be an issue in certain betting situations (e.g., if certain outcomes have further negative implications), this was less of an issue both in the real-life setting of the Belgian lotto game and in our laboratory studies, where the intrinsic risk is small. Not only do players typically buy lottery tickets for a small amount of money, once they have spent this money, they have nothing left to loose, only a lot to win. It is important to note that defining lottery play as risk-taking behavior corresponds closely to the mood repair hypothesis because the risk-taking itself is believed to alleviate the bad mood. Our failure to find support for the mood repair hypothesis casts doubt on the viability of the definition of lottery play as risk-taking behavior.

Our results raise five main questions for future research. One question is whether there are more lottery players, or whether the same players simply invest more in case of reduced sunlight. A second issue concerns the underlying reason as to why lottery expenditures are higher for depleted consumers. Third, one could wonder about the type of mood regulation that will lead to depletion and hence, to lottery play. Another issue is the generalizability of the depletion effect to other consumer behaviors besides lottery play. Finally, other antecedents of self-control depletion besides a shortage of sunlight might be relevant in a consumer behavior context.

First, one might wonder whether our aggregate finding of increased lottery play in case of reduced sunshine is due primarily to new players entering the game, or to existing players spending more. Data limitations prevented us from making this distinction in Study 1, while statistical power considerations made us opt to not split the various cells in our experiments further in, respectively, players and non-players. Still, we encourage further research into this issue.

Second, the issue as to why depletion leads to an increased engagement in lottery play remains open to future research. We know that potential players are attracted by the size of the jackpot prize but repelled by their low chances of winning this jackpot prize (e.g., Farrell, Morgenroth, & Walker, 1999; Forrest, Gulley, & Simmons, 2000a,b). It might be that depleted consumers are more inclined to play because they perceive the jackpot prize as more attractive or because they become less repelled by the small chance of winning the jackpot prize. Depleted consumers might also be less bothered by the price (Vohs & Faber, in press).

Third, the results of Study 4 provided some preliminary evidence that people can use different mood regulation techniques that possibly differ in terms of their extent of self-control resource consumption, and hence in their consequences on consumer behavior. It would be insightful for consumers to be aware of the depletion efficiency of the different mood regulation techniques that they use. Future research is needed to clarify which mood regulation techniques are most appropriate in different circumstances for different people.

Fourth, even though we only established a link between a reduced exposure to sunshine and lottery play, the underlying model strongly suggests that the effects of sunshine may be generalizable to problem gambling and addictive behaviors in general. The underlying model even suggests that the effects may also be applicable to a wide range of "more regular" consumer behaviors as well. In fact, recent research already provided some evidence that depleted consumers display impulsive spending behavior more often (Vohs & Faber, in press). We call for future research that investigates the link between sunshine or other antecedents of self-control depletion and a broad range of consumer behaviors, such as promotional sensitivity and variety seeking.

This brings us to a fifth area of future research, which could be to broaden our knowledge on other sorts of antecedents of self-control depletion. The antecedents of depletion we focused on in the present research were reduced exposure to sunshine, and the resulting negative mood states. However, one could also consider the influence of other climatic conditions, such as extreme cold or heat, or the extent of rainfall (see Agnew & Palutikof, 1999; Keller et al., 2005). In addition to (collective) mood regulation due to climatic conditions, also response inhibition has been identified as a potential resource depleting factor (Wallace & Baumeister, 2002). Response inhibition may occur when consumers postpone purchases, for example, because of expected changes in one's economic conditions (Deleersnyder, Dekimpe, Sarvary, & Parker, 2004). Postponement of desired purchases is likely to be depleting for some consumers, and hence could lead to an overall reduction in their ability to resist temptations of various kinds.

MANUSCRIPT III

EXERTING SELF-CONTROL INDUCES A NARROW MINDSET.

Abstract

Self-control theories have focused on various aspects of the processes involved in exerting self-control. In the present paper, we intend to add to this literature by demonstrating that exerting self-control leads one to narrow one's attention and cognition, inducing a narrow mindset. We demonstrate this in three studies. Participants who exerted self-control applied a narrower view (Study 1), applied a narrower categorization (Study 2), and used more concrete language (Study 3) than participants who did not exert self-control. Results are discussed in light of the possibility that a narrow mindset enhances performance on the self-control task at hand at the cost of poorer performance on other tasks.

The capacity to exert self-control is an important feature of human nature. Self-control refers to the self's capacity to alter its own responses. In general, people are able to regulate their thoughts, control their emotions, alter their performance or inhibit their impulses (e.g., Vohs & Baumeister, 2004b). Self-control theories have focused on various aspects of the processes involved in exerting self-control. Amongst other conceptualizations, researchers have stressed the importance of balancing 'hot' and 'cool' cognitions (Metcalfe & Mischel, 1999), short-term and long-term considerations (Wertenbroch, 1998), low-level and high-level construals (Fujita, Trope, Liberman, & Levin-Sagi, in press), or visceral responses and rational self-interest (Loewenstein, 1996) in the processes involved in self-control. Yet others have focused on the energetic nature of self-control (Baumeister, Bratslavsky, Muraven, & Tice, 1998), the distinction between automatic versus controlled psychological processes (Bargh & Chartrand, 1999), and the role of perceptions of self-efficacy (Bandura, 1991) in exerting self-control. In the present paper, we intend to add to this literature by focusing on yet another aspect of the processes involved in self-control. More specifically, we argue that exerting self-control leads one to narrow one's attention and cognition, inducing a narrow mindset.

Challenging Tasks and Narrowing of Attention and Cognition

Earlier, it has been argued that narrowing one's attention and cognition is associated with more successful performance on challenging tasks, particularly in the initial stages of learning (e.g., Mischel, Cantor, & Feldman, 1996; Norman & Shallice, 1986; Scheier & Carver, 1988; Vallacher & Wegner, 1987; Vallacher, Wegner, & Somoza, 1989). Experientially, a number of different sorts of tasks such as those

involving planning, decision-making, and components of troubleshooting, those being ill-learned or containing novel sequences of actions, those being judged to be technically difficult, those requiring the overcoming of a strong habitual or emotional response, and those requiring resisting temptation, necessitate deliberate attentional resources (Norman & Shallice, 1986). In the delay of gratification paradigm for instance, suppression of attention to the rewards facilitates successful delay behavior (Mischel et al., 1996). According to action identification theory, encoding difficult activities using low levels of abstraction and thus focusing attention towards task details enhances performance on the difficult task at hand (Vallacher et al., 1989; Vallacher & Wegner, 1987).

Task circumstances that are highly similar to the ones just mentioned have been identified as involving a lot of self-control (e.g., Vohs & Baumeister, 2004a). Hence, we propose that self-control tasks will also lead to narrowing of attention and cognition. More specifically, we claim that the exertion of self-control will even induce a narrow *mindset*, in that the state of narrowed attention and cognition lingers and influences how people deal with subsequent tasks.

Broad and Narrow Mindsets, and the Link with Self-Control

We propose a distinction between broad and narrow mindsets. Previously, *mindsets* have been defined as a heightened accessibility of cognitive operations (Gollwitzer, 1990a), whereby recently used cognitive operations are assumed to have temporarily higher activation levels, thus increasing their likelihood of being used to interpret new information (cf. Higgins, 1996) or steering behavior (Gollwitzer & Bayer, 1999). Gollwitzer and colleagues (e.g., Gollwitzer, 1990a; Gollwitzer & Bayer, 1999)

distinguished deliberative (i.e., considering potential pros and cons of particular courses of actions) and implemental mindsets (i.e., planning how to carry out activities). Besides differences in cognitive tuning and biased inferences, people in deliberative mindsets have also been found to differ from people in implemental mindsets in openness to information (Fujita, Gollwitzer, & Oettingen, in press). Freitas, Gollwitzer, and Trope (2004) discriminated between abstract (i.e., construing actions at high levels of abstraction, specifying why they are performed) and concrete mindsets (i.e., construing actions at low levels of abstraction, specifying how they are performed), thus drawing on both action identification theory (Vallacher & Wegner, 1987; Vallacher et al., 1989) and construal theory (Fujita, Trope, et al., in press; Trope & Liberman, 2000).

We propose that exertion of self-control and the broadness of one's mindset are linked. Most of the conceptualizations above have been linked to self-control issues before. What they basically have in common is that they assume importance of balancing abstract, long-term aims with concrete, immediate experiences in self-control issues. In fact, there is a lot of literature stating that balancing long-term, abstract aims and immediate, concrete experiences constitutes the essence of self-control (e.g., Mischel, Shoda, & Rodriguez, 1989; Rachlin, 2000; Trope & Fishbach, 2000). We want to look at the link between broadness of mindset and self-control from another angle, however. Rather than assuming that people need a certain mindset in order to exert self-control, we propose that the act of exerting self-control induces a certain mindset in people. As indicated before, as successful performance on tasks that have important features in common with typical self-control tasks (e.g., Vohs & Baumeister, 2004a) has been found to rely on narrowing of attention and cognition (e.g., Mischel et al., 1996; Norman & Shallice, 1986; Scheier & Carver, 1988; Vallacher et al., 1989;

Vallacher & Wegner, 1987), we propose that the exertion of self-control will also rely on narrowing of attention and cognition, and will even induce a narrow mindset.

The Present Studies

It has been shown that the tendency to construe situations in a certain way can be activated by using similar construals in unrelated prior contexts (e.g., Förster, Friedman, & Lieberman, 2004) or can be induced directly through manipulations that activate cognitive procedures associated with each respective construal (Freitas et al., 2004). Hence, if we are right in assuming that the exertion of self-control induces a narrow mindset, we should be able to observe carry-over effects of self-control manipulations on broadness of one's attention and cognition for subsequent ostensibly unrelated tasks.

In three experiments, we manipulated self-control and assessed the broadness of participants' mindset. We chose a "legal brief" approach in which we attempted to summon evidence for our hypothesis using a package of disparate experiments (cf. Baumeister et al., 1998). If exerting self-control induces a narrow mindset, participants who have exerted self-control should adopt a narrow view (Study 1), apply narrow categorization (Study 2), and use concrete language (Study 3). We used various self-control tasks and various measures of broadness of mindset as a first step towards generalization. Both the self-control tasks (e.g., Kuhl & Kazen, 1999; Muraven & Slessareva, 2003; Wallace & Baumeister, 2002; Wegner, Ansfield, & Pilloff, 1998) and the measures of broadness of mindset (Gollwitzer & Bayer, 1999; Liberman, Sagristano, & Trope, 2002; Semin, Higgins, Gil de Montes, Estourget, & Valencia, 2005) have been well-established in previous literature.

Study 1

In Study 1, participants engaged in a task that either required self-control or not. Subsequently, participants watched a series of slides that displayed centrally and peripherally presented information, and performed an unexpected recognition test containing the information presented (Gollwitzer & Bayer, 1999). If exerting self-control induces a narrow mindset, participants who have exerted self-control should correctly recognize fewer peripherally but more centrally presented words than participants who have not exerted self-control.

Method

Participants were 65 undergraduate students (45 women). They received a participation fee.

Participants were asked to engage in a thought-listing task for five minutes. They were instructed to write down their thoughts and either to avoid thinking about a white bear (self-control condition) or to think about anything they wanted, including a white bear (no self-control condition). When thinking of a white bear in the self-control condition, participants had to immediately change their thoughts and try very hard not to think of a white bear again. A similar task proved to be a successful self-control manipulation in earlier research (e.g., Muraven & Slessareva, 2003).

Subsequently, they watched a series of slides centrally displaying meaningful sentences and peripherally (i.e., in the upper left-hand and lower right-hand corners) displaying unrelated nouns. Participants were instructed to make a story out of the centrally displayed sentences. No mention of the peripherally presented nouns was made

prior to the task. Later, participants performed an unexpected recognition test containing 10 centrally presented nouns (i.e., nouns appearing in the centrally displayed sentences), 10 peripherally presented nouns, and 10 previously not presented nouns. A similar task provided a successful measure of broadness of focus in earlier research (e.g., Gollwitzer & Bayer, 1999).

Participants' mood was assessed by means of the Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This was done to validate that mood states were not different depending on self-control condition, thus ruling out a possible alternative account for our findings. Indeed, negative mood states have been shown to be associated with more systematic processing (Bless, Bohner, Schwarz, & Strack, 1990), and hence might influence the broadness of one's mindset.

Results

We counted the number of nouns that were recognized correctly. Two participants who did not follow instructions were removed from further analyses. As predicted, participants who had exerted self-control recognized fewer peripherally presented nouns correctly (M = 3.21, SD = 2.26) than participants who had not exerted self-control (M = 4.50, SD = 2.25), t (61) = -2.27, p = .03, but participants who had exerted self-control recognized more centrally presented nouns correctly (M = 6.97, SD = 2.04) than participants who had not exerted self-control (M = 5.26, SD = 2.79), t (61) = 2.72, p = .01. This suggests that exerting self-control induces a narrow mindset. No differences between self-control conditions were observed for previously not presented nouns (self-control: M = 9.34, SD = 0.97; no self-control: M = 9.35, SD = 0.92; t (61) = -0.03, p = .97).

The effect of self-control on narrowness of focus cannot be explained by mood differences. Levels of positive (self-control: $M = 26.83$, $SD = 5.61$; no self-control: $M = 27.91$, $SD = 5.69$; $t\ (61) = -0.76$, $p = .45$) and negative affect (self-control: $M = 16.00$, $SD = 5.97$; no self-control: $M = 15.76$, $SD = 4.66$; $t\ (61) = 0.18$, $p = .86$) did not differ between self-control conditions. Moreover, adjusting for positive and negative affect as covariates did not change the pattern of results reported above, suggesting that mood does not mediate the effect of self-control on narrowness of focus.

Study 2

In Study 2, participants engaged in a task that either required self-control or not. Subsequently, participants imagined themselves in one of three situations (e.g., having a yard sale) and classified objects related to each situation (e.g., books, cutlery) in as many categories as they deemed suitable (Liberman et al., 2002). Forming fewer groups means applying broader, more abstract categorization, whereas forming more groups means applying narrower, more concrete categorization. If exerting self-control induces a narrow mindset, participants who have exerted self-control should form more groups than participants who have not exerted self-control.

Method

Participants were 63 undergraduate students (47 women). They received a participation fee.

Participants were asked to engage in the same thought-listing task as in Study 1. Subsequently, participants imagined that they were going on a camping trip, that they were going to be moving into a new apartment, or that they were going to have a yard

sale. Each scenario came with 38 objects that participants had to place into groups (e.g., tent and matches in the camping scenario, VCR and computer in the moving out scenario, and roller blades and board games in the yard sale scenario). This task is one of the standard measures of broadness of categorization (e.g., Liberman et al., 2002).

Participants' mood was assessed by means of the PANAS (Watson et al., 1988). This was done to validate that mood states were not different depending on self-control condition.

Results

We counted the number of groups into which participants classified the objects of each scenario. We collapsed over scenarios. As predicted, participants who had exerted self-control formed more groups (M = 6.82, SD = 1.70) than participants who had not exerted self-control (M = 6.00, SD = 1.41), t (61) = 2.06, p = .04. This suggests that exerting self-control induces a narrow mindset.

The effect of self-control on narrowness of categorization cannot be explained by mood differences. Levels of positive (self-control: M = 24.29, SD = 5.46; no self-control: M = 26.40, SD = 6.78; t (59) = -1.34, p = .19) and negative affect (self-control: M = 14.61, SD = 6.24; no self-control: M = 13.90, SD = 5.03; t (59) = 0.49, p = .63) did not differ between self-control conditions. Moreover, adjusting for positive and negative affect as covariates did not change the pattern of results reported above, suggesting that mood does not mediate the effect of self-control on narrowness of categorization.

Study 3

In Study 3, participants engaged in a task that either required self-control or not. We used a different self-control task for reasons of generalization. Subsequently, participants watched a series of five cartoons and described what they saw in writing, using one single word for each cartoon. Words were analyzed for abstractness of language, using coding schemes developed for the Linguistic Categorization Model (Semin & Fiedler, 1998). Broader, more abstract ways of thinking should be revealed through the use of more abstract language, whereas narrower, more concrete ways of thinking should be revealed through the use of more concrete language. If exerting self-control induces a narrow mindset, participants who have exerted self-control should use more concrete language than participants who have not exerted self-control.

Method

Participants were 106 undergraduate students (86 women). They received a participation fee.

Participants were asked to engage in a variation of the Stroop task and to indicate the ink color of 50 color names. Words and ink colors were either matched (e.g., RED in red ink; no self-control condition) or mismatched (e.g., RED in yellow ink; self-control condition). In addition, in the self-control condition, in case a word in blue ink appeared (i.e., in 25% of the trials), participants were instructed to indicate the word rather than the ink color. A similar task proved to be a successful self-control manipulation in earlier research (Wallace & Baumeister, 2002).

Subsequently, participants watched a series of five cartoons and described the behavior of each cartoon's main character using one single word. Two judges blind to

condition coded participants' written descriptions according to the Linguistic Categorization Model (Semin & Fiedler, 1988). According to this model, four linguistic categories (i.e., descriptive action verbs, interpretative action verbs, state verbs, and adjectives) can be organized along a dimension of concreteness to abstractness, with descriptive action verbs being the least, and adjectives being the most abstract. Typically, a weighting schema is applied to weigh descriptive action verbs (1), interpretative action verbs (2), state verbs (3), and adjectives (4) (Semin & Smith, 1999). Words describing the cartoon rather than its main character's actions (i.e., 4 % of the words) were omitted from the analysis. To control for these missing values, weighted scores were divided by the number of coded predicates for each participant. The resulting abstractness index scores (ranging from 1 to 4) calculated from each judge's ratings were highly correlated, $r = .94$, $p < .0001$. Discrepancies in codes were resolved through discussion to form a single index. This task is one of the standard measures of linguistic abstraction (e.g., Semin et al., 2005).

Participants' mood was assessed by means of the PANAS (Watson et al., 1988). This was done to validate that mood states were not different depending on self-control condition.

Results

We averaged the standardized abstractness index scores across cartoons. Codes were standardized to control for the fact that some cartoons were perceived to be more abstract than others. As predicted, participants who had exerted self-control used more concrete language ($M = -0.08$, $SD = 0.60$) than participants who had not exerted self-control ($M = 0.20$, $SD = 0.78$), $t(104) = -2.06$, $p = .04$. This suggests that exerting self-control induces a narrow mindset.

The effect of self-control on linguistic abstraction cannot be explained by mood differences. Levels of positive (self-control: $M = 29.30$, $SD = 6.15$; no self-control: $M = 28.46$, $SD = 4.31$; $t\ (104) = 0.81$, $p = .42$) and negative affect (self-control: $M = 13.02$, $SD = 3.73$; no self-control: $M = 12.96$, $SD = 3.45$; $t\ (104) = 0.08$, $p = .94$) did not differ between self-control conditions. Moreover, adjusting for positive and negative affect as covariates did not change the pattern of results reported above, suggesting that mood does not mediate the effect of self-control on linguistic abstraction.

General Discussion

In three experiments, we tested the hypothesis that exerting self-control induces a narrow mindset. Participants who exerted self-control by suppressing their thoughts applied a narrower view (Study 1) and narrower categorization (Study 2) than participants who did not suppress their thoughts and hence did not exert self-control. In Study 3, participants who exerted self-control by inhibiting their dominant responses during a taxing Stroop task used more concrete language than participants who did not inhibit their dominant responses during an easy Stroop task and hence did not exert self-control. In a meta-analysis on our findings, we calculated a difference score for the two dependent variables of interest in Study 1, and reversed scores such that lower values indicated a narrower mindset for all dependent measures. Next, we standardized our dependent measures and aggregated the findings across all three studies (N = 232). Participants who exerted self-control provided evidence of a narrower mindset ($M = -0.26$, $SD = 0.91$) than participants who did not exert self-control ($M = 0.26$, $SD = 1.01$), $t\ (230) = 4.12$, $p < .0001$. These findings suggest that a narrow mindset is a

consequence of engaging in self-control that consistently occurs after various instances of self-control.

In the present paper, we proposed a distinction between broad and narrow mindsets. Similar differentiations have emerged in previous literature. Examples are concepts such as high level and low level action identifications (Vallacher & Wegner, 1987), high level and low level construals (Trope & Liberman, 2000), simultaneous and sequential decision making (Simonson, 1990), distributed and isolated decision making (Herrnstein & Prelec, 1992), broad and narrow decision frames (Kahneman & Lovallo, 1993), decision making based on patterns and acts (Rachlin, 1995), overall and local value functions (Heyman, 1996), and broad and narrow bracketing (Read, Loewenstein, & Rabin 1999). Broad bracketing (i.e., like high level action identifications, high construals, simultaneous decision making, distributed decision making, broad decision framing, pattern-based decision making, considering overall value functions) allows people to take into account all the consequences of their actions, whereas narrow bracketing (i.e., like low level action identifications, low construals, sequential decision making, isolated decision making, narrow decision framing, act-based decision making, and considering local value functions) induces people to make each decision in isolation (Read et al., 1999).

We sought to provide a unified account of these constructs by advancing a distinction between broad and narrow mindsets. We preferred to use the term mindset over the terms bracketing or construal, because, similar to the term mindset as used by Gollwitzer (1990a), the state that we describe lingers and influences how people deal with subsequent tasks. Simultaneously, the term mindset is associated with temporality and, like other momentarily activated cognitive material, can be expected to dissolve gradually over time (e.g., Higgins, 1996). We preferred to use the term mindset over the

terms action identification level, decision making, or value function because the term mindset does not only reflect action perception, decision making, or utility calculations, but has implications for all of these constructs. Likewise, we preferred to use the terms broad and narrow over some of the other adjectives mentioned, because, similar to the adjectives broad and narrow as used by Read et al. (1999), the state that we describe induces general changes in one's breadth of attention, shifting people's attention from the macro level to the micro level, or the other way around.

We found that a narrow mindset consistently occurs after various instances of self-control. These results might have implications for research about another consequence of exerting self-control, namely, self-control depletion. It has been argued that all acts of self-control draw on a common limited resource that is akin to energy or strength. Hence, exertion of self-control is necessarily followed by a period of diminished capacity to exert subsequent self-control (i.e., depletion). Eventually, with sufficient rest, the resource should build up again (Baumeister et al., 1998; Muraven, Tice, & Baumeister, 1998). Given the present findings, it might very well be that narrow mindsets and self-control depletion are related phenomena. Although narrowing one's focus down to concrete task characteristics appears to be functional to adequately perform the self-control task at hand (Vallacher et al., 1989), it might not be functional to adequately perform a subsequent self-control task that requires a different focus. The narrow mindset that is induced as a way to deal with the first task does not vanish immediately, rendering the participant relatively unable to deal successfully with the second task. According to Gollwitzer (1990a), the transfer of cognitive procedures from one task to an unrelated task is the hallmark of mindset priming. The traditional self-control depletion effect then (i.e., people do not perform well on self-control tasks after having exerted self-control previously) might result from the detrimental effects of the

prolonged mindset induced by the first self-control task on the second self-control task. This line of reasoning nevertheless implies that the narrow mindset resulting from exerting self-control is content-specific to some extent, which is a fundamental assumption that remains to be investigated.

Ironically, the above line of reasoning would mean that a narrow mindset might sometimes be beneficial, and sometimes be detrimental for successful self-control, the latter assertion being consistent with recent literature (Fujita, Trope, et al., in press). Fujita, Trope, et al. (in press) manipulated construal levels and assessed self-control subsequently. They showed that high level construals, in comparison to low level construals, increased self-control. We proceeded the other way around, in that we manipulated self-control exertion and assessed the broadness of one's mindset subsequently. Seemingly contradictory to Fujita, Trope, et al. (in press), we observed that having exerted self-control, in comparison to not having exerted self-control, induced a more narrow mindset. These combined findings again hint at how mindsets might provide an explanation for the typical depletion effect. Although previous induction of a broad way of thinking is beneficial for self-control later on (Fujita, Trope, et al., in press), the very act of exerting self-control induces one to narrow one's attention and cognition, making subsequent self-control more difficult. More research is needed however to clarify the exact nature of the moderating factor that determines when a narrow mindset is beneficial or detrimental for self-control.

GENERAL DISCUSSION

In this general discussion, we start by summarizing the main findings and the theoretical contributions of the three presented manuscripts. In doing so, we hope to further clarify the link between the three manuscripts. We move on to identifying some compelling routes for future research.

Summary

The purpose of the present dissertation was twofold. First, we wanted to obtain more insight in the processes underlying self-control and self-control depletion. Second, we wanted to explore the applicability of self-control and self-control depletion to the consumer domain. Taking the three manuscripts together, we attempt to show how we reached this double purpose.

Manuscript I

In Manuscript I, we found that one of the most frequent activities during a shopping trip (i.e., choosing) increases consumers' susceptibility to affective product features while purchasing products. In three studies, we observed that when people made a series of active product choices they are more likely to buy an attractive but relatively expensive product (Study 1), and to buy more items of a very attractive type of candy (Studies 2 and 3) as compared to when they merely have followed a pre-established shopping plan.

Our main theoretical contribution consists of providing evidence that in a shopping context, both active choice-making and resisting the temptation of affective

product features require self-control. Hence, we not only succeed in providing more insight in the processes underlying self-control and self-control depletion, but we also demonstrate how both concepts can be crucial to understanding consumer behavior.

Manuscript II

In Manuscript II, we found that a shortage of sunshine increases people's willingness to engage in lottery play. We showed that active mood regulation attempts that accompany bad weather and that are depleting in nature result in a decreased resistance to the temptation of lottery play. In a longitudinal study on real-life lottery expenditure data, we found that a reduced exposure to sunshine in the days preceding the lottery draw resulted in higher lottery revenues, even after controlling for various other factors that have been identified as important drivers of lottery play. In three subsequent studies, we observed that lottery play is related to negative mood when people are given the opportunity to actively regulate this negative mood (Study 2), and that depletion due to active mood regulation attempts is the process underlying the link between bad mood due to weather and lottery play (Studies 3 and 4).

Our use of a combined modeling and experimental approach allows us not only to establish causal relations between our variables of interest, but also to enhance the external validity of our results. Our findings point out that both active mood regulation and resisting the temptation of lottery play require self-control. In addition, our results indicate that previous literature suggesting that consumers in bad mood states are motivated to repair their bad mood states, and hence *unwilling* to resist temptations (Baumeister, 2002; Baumeister, Heatherton, & Tice, 1994; Herman & Polivy, 2004; Tice, Bratslavsky, & Baumeister, 2001), should be re-examined in the light of the depletion hypothesis proposing that consumers in bad mood states may be *unable* to

resist temptations. Hence, again we not only succeed in providing more insight in the processes underlying self-control and self-control depletion, but we also demonstrate how both concepts can be crucial to understanding consumer behavior.

Manuscript III

In Manuscript III, we found that exerting self-control induces a narrow mindset. Participants who exerted self-control applied a narrower view (Study 1), a narrower categorization (Study 2), and used more concrete language (Study 3) than participants who did not exert self-control.

Our main theoretical contribution consists of providing evidence that a narrow mindset is a consequence of engaging in self-control that consistently occurs after various instances of self-control. Hence, we succeed in providing more insight in the processes underlying self-control. We hope to link narrow mindsets to self-control depletion in follow-up research, and thus provide more insight in the processes underlying self-control depletion as well. In a related stream of follow-up research, we aim to demonstrate how this alternative understanding of self-control depletion may be useful to understanding consumer behavior.

Future research

We identified some interesting routes for future research in the discussion sections of Manuscripts I and II. As indicated before, it would be interesting to investigate whether a state of depletion would also influence consumer decisions with respect to major durables, and whether the depletion effect would also be observed for other types of affective products cues than the ones studied (Manuscript I). In addition,

it would be appealing to find out to what extent various types of mood regulation are depleting and hence, will increase lottery play, to which other consumer behaviors besides lottery play the depletion effect would generalize, and which other antecedents of self-control depletion besides a shortage of sunlight might be relevant in a consumer behavior context (Manuscript II).

Interestingly, the findings obtained in Manuscript I enable us to answer some of the questions raised by the findings of Manuscript II, whereas the findings obtained in Manuscript II enable us to answer some of the questions raised by the findings of Manuscript I. For instance, it has become clear that the depletion effect also occurs for other types of affective product cues besides taste, such as the tempting nature of lottery play, the thrill of playing, or the promise of the reward. In addition, we observed that besides a shortage of sunlight, repeated choice-making is another antecedent of self-control depletion that is relevant in a consumer behavior context. A lot of questions still remain unanswered, however.

We believe that the mindset hypothesis that was presented in Manuscript III has important implications for our understanding of the depletion phenomenon and can provide a new explanation for the findings of Manuscript I and II. We also believe that the mindset hypothesis has several practical marketing implications. We sketch these theoretical and practical implications in the next sections.

Theoretical implications of the mindset hypothesis

In the discussion section of Manuscript III, we touched upon the possibility that narrow mindsets and self-control depletion (i.e., a diminished capacity to exert self-control) might be closely related. Indeed, both states result from previous exertion of self-control. We speculated that the lingering narrow mindset that one adopts during

engagement in a self-control task (i.e., because it is functional to adequately perform the self-control task, see Vallacher, Wegner, & Somoza, 1989) may be problematic if one wants to engage in a second self-control task requiring a different focus, as is usually the case in typical depletion studies. In general, people are found to not perform well on self-control tasks after having previously engaged in unrelated self-control tasks. Through future research, we hope to accumulate a body of evidence demonstrating that depletion effects occur because people are 'stuck' in this narrow mindset that was induced by a first episode of exerting self-control but that is dysfunctional to adequately perform a second, conceptually unrelated, self-control task. In other words, we will argue that depletion is being stuck in an inadequate narrow mindset.

As it turns out, others already pointed out that self-control failure may partly occur because of difficulties in organizing and reorganizing cognitive resources (Murtagh & Todd, 2004). More specifically, it has been argued that depletion effects may be observed because people have difficulties switching from one type of task to another. Some people might be better than others at organizing their behavior to make these transitions and most people will gain skill in coordinating cognitive resources and behaviors in familiar contexts, and thus enhance their ability to "multi-task". In experimental settings however, people may have a hard time adjusting to the novel context and its demands. This may be particularly true for typical depletion studies, in which people have to excel in two unrelated and relatively novel tasks (e.g., thought control and physical endurance). These task requirements may make it extremely difficult for people to organize their resources in such a way as to allow them to easily cope with the task demands.

Likewise, Fishbach, Friedman, and Kruglanski (2003) contended that successful self-control will only be accomplished if one keeps one's goals firmly in focus. Hence, repeated self-control attempts in a given domain may result in the forging of facilitative links between certain stimuli and their high priority goals, and the forging of inhibitory links between these stimuli and the pertinent temptations that threaten to undermine these high priority goals. Over time or after sufficient practice, these facilitative and inhibitory links may become overlearned to the point of unconscious activation and considerable cognitive efficiency and may be related to successful self-control. Bargh (1994) also advocated that processes that are frequently engaged in become automatized, resulting in increased efficiency.

In line with these conjectures, we already obtained some evidence showing that typical depletion effects after the exertion of self-control do not occur if the response conflict in the second phase is similar to the one in the first phase. For instance, we found that, as people engage longer in a given self-control task, they become increasingly better at fulfilling the task requirements of thought inhibition and response accuracy. We also found that engagement in a typically depleting thought suppression task decreased performance in a subsequent task requiring monitoring of multiple rules and frequent altering of one's responses (i.e., replicating the typical self-control depletion effect), but that engagement in a typically depleting task requiring monitoring of multiple rules and frequent altering of one's responses enhanced performance in a subsequent similar task (i.e., reversing the typical self-control depletion effect). In addition, people who inhibited their eating behavior in phase one performed worse on a subsequent self-control task that was unrelated to food restriction (i.e., replicating the typical self-control depletion effect), but performed better on a subsequent self-control task that was related to food restriction (i.e., reversing the typical self-control depletion

effect). These findings can be accounted for by a mindset explanation: People concentrate on concrete task characteristics, enabling them to do well on a given self-control task, but making it more difficult for them to do well on an unrelated self-control task.

Interestingly, in a related research project we obtained some preliminary evidence suggesting that the beneficial effects of previous exertion of self-control need not be restricted to subsequent self-control tasks that share response conflicts. More specifically, we found that depletion effects that are typically observed between cross-tasks can disappear if people are able to abandon the narrow mindset they adopted during the first task, before they engage in the second task. People who exerted self-control and were experimentally induced to broaden the mindset they adopted, performed better on a second, unrelated self-control task, thus suppressing the typical depletion effects.

Our concept of narrow mindset resembles a highly appealing concept that has been put forward in the depletion literature earlier, namely, the concept of *extended-now state* (Vohs & Schmeichel, 2003). Vohs and Schmeichel (2003) demonstrated that self-control and the subjective experience of time are closely related. More specifically, they showed that people who exerted self-control experienced time as moving forward much more slowly than people who did not exert self-control. They also showed that subjective time perception mediated the depletion effect. People believed that their self-control attempts lasted longer than they actually did, which resulted in reduced further self-control. Vohs and Schmeichel (2003) proposed that "elongated perceptions of time may render one 'stuck' in the present, a state that has negative consequences for future-oriented behavior" (p. 219). They called this state an extended-now state. Like the extended-now state, a narrow mindset results from exerting self-control and people can

be temporarily 'stuck' in it (i.e., resulting in carry-over effects on subsequent tasks). Both concepts might however enable us to make diverging predictions in certain circumstances. Future research is needed to clarify how similar or diverging the two concepts really are.

Marketing implications of the mindset hypothesis

Mindsets, affective product features, and lottery play. We believe that the mindset theory that was proposed in Manuscript III can account for several consumer behavior phenomena, including the phenomena observed in Manuscripts I and II. In fact, related mindset theories have been used to explain consumer behavior phenomena before. Examples are the concept of choice bracketing (Read, Loewenstein, & Rabin, 1999), Gollwitzer's theory of deliberative and implemental mindsets (Gollwitzer, 1990b; Gollwitzer & Bayer, 1999), and Trope's construal theory (Trope & Liberman, 2000; Fujita, Trope, Liberman, & Levin-Sagi, in press).

According to Read et al. (1999), when making many choices, people can broadly bracket them by assessing the consequences of all of them taken together, or narrowly bracket them by making each choice in isolation. Broad bracketing allows people to take into account all the consequences of their actions and generally leads to choices that yield higher utility. Narrow bracketing in contrast leaves people without overall guiding strategy, leading to non-optimal consequences. Indeed, the consequences of choices can rarely be fully appreciated in isolation.

Narrow bracketing has a lot in common with the narrow mindset that was proposed in Manuscript III. For one thing, narrow bracketing, like adopting a narrow mindset, generally shifts people's attention from the macro level to the micro level. In addition, as is the case with mindsets, many bracketing choices result from a wide

range of subtle and unconscious factors that influence how broadly or narrowly we construe the world. Interestingly, the authors identify cognitive capacity limitations as one important factor that might be important in influencing bracketing decisions. Cognitive capacity limitations sharply constrain our ability to simultaneously consider multiple decisions, and thus will favor narrow bracketing (Read et al., 1999).

Bracketing effects (i.e., mindset effects) occur whenever the outcomes chosen under narrow bracketing differ from those chosen under broad bracketing. This can result from the fact that broad bracketing facilitates the consideration of choice factors that are either not perceived or that are given relatively less weight in narrow bracketing. Adding-up effects (i.e., when perceived costs of alternatives accumulate at a different rate than their benefits) are representative examples. Consider for instance the health consequences of one cigarette or the extra weight added by one piece of cake. If consumers bracket narrowly and consider the costs and benefits of a single action, then the balance of costs and benefits will likely favor the benefits, whereas if they bracket broadly the balance can be reversed. Another interesting consequence of narrow bracketing is the so-called peanuts effect, in which repeated and seemingly inconsequential purchases of trivial items can add up to significant total expenditures (Read et al., 1999).

Even seemingly trivial decisions such as whether or not to purchase an attractive but slightly overpriced product (Manuscript I) or a lottery ticket (Manuscript II) can have detrimental cumulative effects. When people make narrowly bracketed choices, they can make a series of local choices that individually seem advantageous but that collectively lead to a bad global outcome (Read et al., 1999). Thus, mindset theories appear to be able to account for the findings obtained in Manuscripts I and II. Consumers who exert self-control by either making repeated product choices

(Manuscript I) or actively regulating their negative mood states (Manuscript II) will adopt a narrow mindset in order to fulfill the task requirements (Manuscript III). This resulting narrow mindset however, subsequently induces consumers to fail to take into account the broader consequences of there actions, and thus to purchase trivial items (Read et al., 1999).

Mindsets and other consumer behaviors. As indicated earlier, mindset theories have been used to explain several consumer behavior phenomena. For instance, Gollwitzer's (1990b; Gollwitzer & Bayer, 1999) theory of deliberative and implemental mindsets has been put forward as a possible explanation for the shopping momentum effect (Dhar, Huber, & Khan, 2005). Shopping momentum occurs when an initial purchase provides a psychological impulse whose momentum drives the purchase of a second, unrelated product. The concept arises from the idea that shopping has an inertial quality, that there is a mental hurdle in the shift from browsing to shopping, which once crossed makes further purchases more likely. Shopping momentum is said to occur because an initial purchase will move one from deliberation-induced browsing to implementation-based shopping, thus driving subsequent purchases. Support for these assertions was found in five experiments (Dhar et al., 2005). Similar to our concept of broad mindset, deliberative mindsets are associated with enhanced receptivity to all sources and types of information in order to weigh the pros and cons of pursuing several actions. In addition, similar to our concept of narrow mindset, implemental mindsets are associated with more selective information processing in order to focus on goal-oriented actions (Fujita, Gollwitzer, & Oettingen, in press).

Empirical evidence in support of a lot of related hypotheses about the link between mindsets and other consumer behaviors is still lacking and needed, however. For instance, construal levels have been argued to exert an influence on product

choices. Consumers who construe objects on a high level (i.e., who construct abstract conceptualizations of information about objects and capture the superordinate, central features of the object) should prefer products with favorable central features over products with favorable secondary features, whereas consumers who construe objects on a low level (i.e., who construct concrete conceptualizations of information about objects and capture the subordinate, incidental features of the object) might prefer products with favorable secondary features over products with favorable central features (Trope & Liberman, 2000).

Likewise, narrow bracketing has been argued to lead to time-inconsistent preferences because it induces one to fail to recognize how a choice of one alternative will influence one's desire for future alternatives, leading to addiction for instance. Bracketing might also have an effect on the scheduling of future experiences. People like to have their pleasures and pains distributed over time in specific ways (e.g., Nelson & Meyvis, 2005), and can only know which choices will help them to achieve these goals when they schedule many experiences simultaneously. Narrow bracketing has also been linked to a failure to make optimal trade-offs across choices, leading to too restrictive budgeting boundaries (i.e., a reluctance to transfer money from an account intended for one purchase category to an account intended for another purchase category) for instance. Bracketing has also been hypothesized to affect consumers' degree of risk averseness. People like to avoid risk and one way to reduce risk is to combine many risky choices, which can only be achieved through broad bracketing. Finally, bracketing might have an influence on variety seeking because consumers often prefer sets of goods that are diverse rather than homogeneous. Consumers are more likely to pay attention to this diversity when they bracket multiple choices together (Read et al., 1999).

In line with the prediction that narrow bracketing will reduce variety seeking, Redden (2005) obtained evidence for a categorization mechanism underlying satiation (i.e., any decline in the pleasure of an experience that occurs with repetition). Satiation is argued to increase as a given stimulus recruits and aggregates similar episodes from the past. This implies that the categorization of experiences during perception will influence satiation, in that more specific categorization of experiences (e.g., eating pie) will reduce satiation by inhibiting the aggregation of past stimuli, whereas less specific categorization of experiences (e.g., having dessert) will increase satiation by facilitating the aggregation of past stimuli. Given that consumers have been found to respond to satiation by seeking variety (e.g., Inman, 2001; Kahn, Ratner, & Kahneman, 1997; Simonson, 1990), we can draw the prediction that the narrow mindset that we put forward as the underlying mechanism for depletion will lead to reduced satiation and thus reduced variety seeking. Indeed, in Manuscript III we found that narrow mindsets lead to applying narrower, more concrete categorization, or forming more groups (Study 2).

Positive effects of self-control depletion. Although contrary to prevailing beliefs (Baumeister, 2002; Baumeister & Heatherton, 1996; Baumeister et al., 1994), we think that self-control depletion can be beneficial sometimes. We already discussed some preliminary evidence showing that previous exertion of self-control can positively influence one's performance on a second self-control task with a similar response conflict. There appears to be more, however.

There are some situations in which narrow bracketing results in superior decision making (Read et al., 1999). Although broad bracketing can serve motivational purposes and allow people to pursue maximization of their global well-being, narrow bracketing can make goals seem easier to attain sometimes. People sometimes adopt a particular

narrow bracket to accomplish some goal, most typically to overcome problems of self-control. For instance, many self-control programs such as Alcoholics Anonymous emphasize the importance of taking small steps towards the goal of recovery. Broad bracketing might make the task seem overwhelming. In addition, choices made under broad bracketing often involve putting up with small discomforts, annoyances or cognitive costs in order to achieve long-term gains. We need some way of comparing the overall utility of a lifetime of small annoyances and to balance cognitive costs against the big gains from broad bracketing (Read et al., 1999).

In line with these conceptualizations, there are some empirical findings documenting on the fact that preferences and judgments can become less accurate and predictive the longer one consciously deliberates about them (Wilson & Schooler, 1991). Especially choices in complex matters (i.e., such as between different houses or different cars) should be left to unconscious thought (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006). We encourage further research into these issues.

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