Tradeoffs and Depletion in Choice

Jing Wang, Nathan Novemsky, and Ravi Dhar
Yale University

Roy F. Baumeister
Florida State University

Please address correspondence to:
Jing Wang
Yale School of Management
PO Box 208200
New Haven, CT 06520
Wang.Jing@yale.edu
Phone: (203) 606-2517
Fax: (203) 432-6212

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ABSTRACT

Four experiments examined when and why a depletion mechanism causes earlier choices in a sequence to influence subsequent choices between a vice (e.g. lowbrow movie) and a virtue (e.g. highbrow movie). We show that making tradeoffs is at the root of the depletion effects arising from choice. Furthermore, the larger the tradeoffs in a preceding choice, the more pronounced effect that choice has on subsequent choices. The results are consistent with a limited executive resource model where trading off in choices depletes this resource. Lastly, we found that while individuals could intuit some depletion effects, they did not intuit that choices or tradeoffs within choices could be depleting and therefore failed to predict depletion-based interactions between successive choices.

Keywords: Consumer Behavior, Decision Making, Self-Control, Depletion

Tradeoffs and Depletion in Choice

Consumers often make a series of choices, such as at a shopping mall, in a supermarket, on the Internet, and in many work environments. Since many choices are made in the context of previous related or unrelated choices, recent research has begun to examine how earlier choices can influence later choices. In contrast to normative models that treat choices as largely independent, it has been shown that prior choices can influence subsequent choices through various means, such as reference point shifts, goal changes, and motivation (Novemsky and Dhar 2005; Dhar, Huber, and Khan 2007; Dholakia, Gopinath, and Bagozzi 2005; Ramanathan and Williams 2007).

While much work on sequential choice used a cognitive or goal framework to understand choice interactions, work on self-regulation suggests another mechanism by which unrelated choices can influence one another. This line of research has demonstrated that various types of self-regulation[1] rely on a common limited resource that can be temporarily depleted, leaving individuals less able to resist temptations (Baumeister, Bratslavsky, Muraven, and Tice, 1998; Muraven, Tice, and Baumeister 1998). Some work has extended this idea to show that various acts of executive control deplete this resource (Schmeichel 2007). Several recent studies have also shown that making choices draws upon this pool of executive resources (Bruyneel, Dewitte, Vohs, and Warlop 2006; Levav et al 2008; Pocheptsova et al forthcoming; Vohs et al. 2008a; Vohs et al. 2008b).

The present research extends this work by comparing various types of choices to begin to understand why choices are depleting and which choices are more versus less depleting. We posit that tradeoffs are an important aspect of choice that depletes executive resources. For example, consider one person who has made choices involving large tradeoffs compared to a person who

[1] Consistent with this literature, we use the terms self-control and self-regulation interchangeably.

has made choices involving small tradeoffs. Resolving large tradeoffs requires the exercise of substantial executive control and draws down the pool of resources that are required for self-regulation. The person making smaller tradeoffs will draw less on this pool as there is less tradeoff conflict to resolve via executive function. Therefore, we expect the individual who has made large tradeoffs to be less able to exert self-control subsequently and, in particular, to be more likely to choose a vice in a subsequent choice than the individual who made small tradeoffs.

We distinguish between tradeoff conflict and general subjective choice difficulty which could arise from many sources. While subjective choice difficulty can be influenced by difficulty processing information (Novemsky et al 2007), options that are similar in attractiveness (Dhar 1997), and tradeoff conflict (Chatterjee and Heath 1996), we believe that resolving conflict is a primary source of depletion, and that choice difficulty arising from other aspects of the choice does not deplete limited resources. This proposition grows out of the recent work showing that resources are depleted by acts of executive function in addition to acts of self-control (Schmeichel 2007). Since executive function is most closely linked to resolving the conflict generated by tradeoffs, not merely forming preferences around those tradeoffs, we propose that choosing rather than mere preference formation (as in matching tasks) is the crucial cause of resource depletion. Forming a preference does not resolve a conflict, may not require exertion of executive function, and therefore will not lead to depletion.

In the remainder of the paper, we review research demonstrating that prior choices can influence subsequent choices, including studies of resource depletion. We then show that consumers are more likely to choose a vice when this choice follows other unrelated choices that involve relatively large (versus small) tradeoffs. We also show that a subjective feeling of choice

difficulty arising from information processing difficulty is not sufficient to obtain these effects. By comparing choice to a matching task, we find that merely forming preferences over large tradeoffs does not deplete resources, while choice over these tradeoffs does. Lastly, we show that consumers do not anticipate the depleting effects of tradeoffs or choices on what they choose. We conclude by discussing practical and theoretical implications of these findings.

Depletion and Successive Choices

Several streams of research show effects of one choice on a subsequent choice. Most studies in this area have focused on the content of the preceding choice influencing a subsequent choice. For example, Khan and Dhar (2007) find that when a choice is seen as one of several similar choices rather than as isolated, individuals are more likely to choose a vice over a virtue. In other research, individuals become negative time discounters when they view successive choices as part of a sequence (Loewenstein and Prelec 1993). Research on risky choices shows that if the outcome of one choice leaves an individual above (below) a reference point, more risk aversion (seeking) will be observed in a subsequent choice (March and Shapira 1992, Thaler and Johnson 1990). Implicit in this research is the idea that the outcomes of successive choices are aggregated and compared to a reference point. Research on motivational influences in sequential choice has demonstrated that participation in a prior impulsive choice task significantly reduces the decision maker's likelihood of choosing impulsively in a subsequent task (Dholakia, Gopinath, and Bagozzi 2005). Other research has shown that successive choices can influence each other when those choices are related to the same goal (Novemsky and Dhar 2005) or mental account (Prelec and Loewenstein 1998).

Very recent research offers yet another mechanism, distinct from the content of choices

and from affective states arising from choices, through which preceding choices can influence subsequent choices. Mounting evidence suggests that individuals' capacity to exercise executive control and alter or override their immediate responses depends on a limited resource, akin to strength or energy (Baumeister 2002; Muraven and Baumeister 2000, Schmeichel 2007). As a result, any use of executive function appears to reduce the available quantity of this resource, resulting in poorer self-regulation in subsequent, even unrelated, tasks. Many different activities requiring executive function have been shown to diminish individuals' ability to exert self-control in a subsequent task. For example, people who had to manage or alter their emotional reactions while watching an emotionally distressing film clip subsequently quit sooner on a handgrip exerciser (Muraven, Tice, and Baumeister 1998).

Making choices has recently been shown to deplete this same executive resource. In one study, people who had made a series of choices were subsequently quicker to give up on a task of holding one's hand in aversively cold ice water, and they procrastinated more, performed worse, and/or quit faster on various arithmetic and reasoning problems (Vohs et al. 2008b). Other work on depletion reveals that making choices increases consumers' susceptibility to affective product features in a subsequent choice (Bruyneel et al. 2006). To this point, research has demonstrated that choosing is a depleting activity. The next step is to ask when and why making choices depletes executive resources. We contribute to this next generation of investigation by comparing the depletion effects of different types of choices.

By definition, a choice involves multiple options and usually each option has relative advantages and disadvantages. To choose among such options, a decision maker must trade off the relative advantages and disadvantages of the various options. These tradeoffs can induce a feeling of conflict (Dhar 1997; Tversky and Shafir 1992) because making the tradeoff requires

giving up desirable aspects of the forgone options and/or accepting undesirable aspects of the chosen option (e.g. Festinger 1962). The resolution of such conflict can be both cognitively and emotionally costly (Luce, Payne, and Bettman 1999). Consider a choice between two apartments where one has a great view and the other offers a very short commute. In making this choice, an individual must give up either the great view or the convenient commute.

Recent research has shown that depletion can follow from the exercise of many distinct executive functions (Schmeichel 2007). For example, controlling one's attention or emotional reaction or inhibiting a dominant response has been shown to draw down executive resources resulting in poor performance on subsequent tasks involving self-regulation. In the present research, we investigate whether resolving conflict in choice (e.g. foregoing something attractive) is another example of an executive function that depletes executive resources. If so, resolving tradeoffs in choice should reduce one's ability to resist temptation in subsequent unrelated choices.

While choices often require making tradeoffs, the extent of tradeoffs required varies across choices. Festinger (1957) suggests that the degree of tradeoff conflict in choice should increase with the size of the difference in attribute values. Chatterjee and Heath (1996) have varied the size of differences in attribute values between choice alternatives and found evidence of more conflict as those differences grew larger. Therefore, we expect that larger tradeoffs will cause greater conflict and require greater executive resources to resolve than smaller tradeoffs. For example, consider a choice between two very similar cell phones. While it may be difficult to choose between them, such a choice would result in lower conflict because the options would have smaller advantages and disadvantages vis-à-vis one another, and would therefore require less executive control to resolve the tradeoffs. This choice would deplete executive resources less

than a choice between two very different cell phones that requires greater executive control to resolve relatively larger tradeoffs (i.e. give up relatively large advantages). In the studies reported below, we test whether the size of the tradeoff (i.e. the amount of conflict to be resolved) impacts the amount of depletion following a choice. We predict that choices entailing larger tradeoffs (i.e. choices that generate a higher-level of tradeoff conflict) will have a greater tendency to deplete executive resources than those with smaller tradeoffs and therefore to leave the decision maker more susceptible to temptation in subsequent choices.

This view of decision-making as an executive control activity implies that certain variables will not influence the degree of depletion arising from choice. For example, the subjective difficulty of a choice can arise from many aspects of the choice and some of these may not induce depletion. Small differences in attribute values between alternatives has been shown to cause choice difficulty (Dhar 1997), but choosing among similar options does not demand a high level of executive control (because there are no substantial advantages to forgo) and therefore should not deplete executive resources. Similarly, difficulty in information processing, such as the difficulty of reading poorly printed descriptions of choice alternatives (Novemsky et al 2007), can make a choice feel difficult, but that choice may not draw much on executive resources. We propose that only activities that require executive function (e.g. tradeoffs) will increase the depleting effect of choice and, therefore, that choice difficulty is not sufficient to increase depletion from choosing.

Another implication of the executive resource view of choice is that forming preferences in itself does not seem like an executive control task and therefore should not deplete executive resources. While choosing generally requires the formation of preferences, they can also be formed without having to make tradeoffs or resolve tradeoff conflict. Consider a matching task,

where individuals are asked to fill in a missing attribute value to make them indifferent between two options. This task requires individuals to decide how much one attribute is worth to them in terms of another attribute, but they do not have to resolve any conflict or choose which of the two attributes they would sacrifice for the other. Thus, forming preferences over large attribute differences should not draw more executive resources than forming preferences over smaller attribute differences. It is only choosing among alternatives that have different attribute values that requires executive function because choosing requires foregoing attractive attributes and/or accepting unattractive ones. Our last proposition is that depletion arising from a matching task will not be dependent on the size of tradeoffs in that task.

To summarize, the present research builds on recent research to understand when and why choices can deplete executive resources. We propose that the extent of tradeoff conflict will impact the degree of depletion arising from choice because resolving this conflict requires executive control, which in turn reduces the pool of subsequently available executive resources. Specifically, resolving larger (versus smaller) tradeoffs requires greater executive control and therefore, leaves decision makers with fewer executive resources to resist temptation in subsequent choices.

Since the focus of this paper is to identify the aspects of choice that deplete executive resources, we need a way to identify when depletion has occurred. While prior research examining depletion has shown effects of prior choices on choosing cheaper versus affectively appealing products (Bruyneel et al. 2006) and performance on self-regulation tasks (Vohs et al. 2008b), we believed that choices between a vice and a virtue would be similarly influenced by resource depletion. This dependent variable would allow us to generalize previous work to another ecologically realistic measure, as many choices involve alternatives that vary in the

degree to which they offer long versus short-term benefits. Notice that the vices and virtues need not be absolute vices and virtues. They may merely differ in the degree to which they offer immediate versus long-term reward for self-regulation to be relevant, suggesting that many everyday choices may be seen as vice versus virtue. We propose that the share of the relative vice in a vice/virtue choice will increase as the size of tradeoffs in a preceding choice increases.

In the following section we present a series of experiments testing our propositions. In the first experiment, we vary the size of tradeoffs involved in choices preceding a vice/virtue choice and find that larger tradeoffs induce a higher share of vices than smaller tradeoffs, implying the former are more depleting. Study 2 varies tradeoff size independently of subjective choice difficulty and shows that large tradeoffs produce pronounced effects consistent with depletion of executive resources but choice difficulty arising from information processing difficulty has no reliable effect. Study 3 compares choice to a matching task and demonstrates that the resolution of the conflict inherent in choices with large (versus small) tradeoffs is more depleting, while merely forming preferences over large (versus small) tradeoffs is not more depleting. Our final experiment demonstrates that while individuals can predict that some activities requiring executive resources give rise to depletion and lead to greater choice share of vice over virtue, they do not intuit that making large tradeoffs in choices depletes executive resources and therefore do not anticipate the effects demonstrated in our studies. We conclude with a discussion of the implications of these findings and opportunities for further research.

Experiment 1: The Effect of Size of Tradeoffs on a Subsequent Decision

In our first study, we vary the size of tradeoffs to examine whether larger tradeoffs are

more depleting than smaller tradeoffs. As mentioned above, we wanted to examine the effects of depletion from choice on subsequent choices between relative vice and virtue. We operationalized the vice and virtue choice using lowbrow and highbrow movies adapted from Read, Loewenstein, and Kalyanaraman (1999), who suggest that highbrow movies can be viewed as a virtue relative to lowbrow movies as they offer less immediate pleasure and even occasional pain but provide long-term cultural enrichment and educational benefits, whereas lowbrow films often provide immediate momentary pleasures that will quickly dissipate.

In our study, we were particularly interested to see whether depletion would influence a choice between highbrow (virtue) and lowbrow (vice) movies that would not be viewed until at least 3 days later. While depletion of self-control resources has been shown to influence many self-control behaviors, those behaviors typically involved immediate reward for those participants who succumbed to temptation (e.g. Baumeister 2002; Muraven, Tice, and Baumeister 1998; Vohs and Heatherton 2000). In this case, the pleasure of temptation would not be experienced for some time, and we wanted to show that resource depletion induces individuals to choose more tempting options even when the reward is not immediate.

To summarize, we predict that people who make choices involving larger (versus smaller) tradeoffs will be more likely to choose a delayed vice over a delayed virtue in an ensuing choice.

Method

Forty undergraduate students at a northeastern university individually completed a short questionnaire in exchange for small gifts. Participants were told that the study was composed of two unrelated consumer surveys, and they were randomly assigned to complete either the high

tradeoff conflict or the low tradeoff conflict choice task. Participants were presented with hypothetical scenarios where they were instructed to make decisions in four domains: a USB memory key, a residential apartment, a rechargeable battery, and an automobile. For each purchase decision, three options were provided, which differed along two attributes. Participants were told to assume that the alternatives in each choice set were similar on all other attributes.

Tradeoff conflict was manipulated by varying the size of the disadvantages (vis-à-vis other options in the choice set) that were entailed in choosing. In the high tradeoff conflict choice task, the two attributes in each choice were negatively correlated across the three options, such that an increment in one attribute was always paired with a decrement in the other attribute and any option required giving up a substantial amount of one of the attributes vis-à-vis the other options. In the low tradeoff conflict choice task, the middle option in each of the four decisions was modified such that it had relatively small disadvantages compared to the high-conflict choice set (see Table 1). That is, choosing the middle option in the low-conflict condition allowed participants to make fairly small tradeoffs. For example, when choosing an apartment, participants had to trade off low rent versus a short commute. In the high tradeoff conflict condition, to obtain lower rent, participants had to increase their commute by at least 15 minutes; while to reduce commuting time, participants had to increase their rent by at least $175/month. In the low tradeoff conflict condition, the middle option was adjusted to reduce the size of these tradeoffs. Here, choosing the middle option required foregoing only a 5 minute shorter commute vis-à-vis the best available commute and only $125/month compared to the best available rent.

After completing the first task, participants were given the second (ostensibly unrelated) survey, in which they were given a randomly ordered list of three highbrow and three lowbrow movies and were asked to indicate which movie they would like to watch several days later. To

make sure that participants understood the chosen option would not be for immediate consumption, they were presented with the following paragraph before making their movie choices:

> Suppose you are a member of a DVD-by-mail service and you are ordering a movie that will arrive in a few days. On the following page, you will read about several movie options. Please review these options carefully and choose ONE movie that you would like to order by placing a check beside its title.

Detailed information was provided for each movie, including synopsis, director and cast, running time, and MPAA rating. The highbrow movies were Winged Migration, Dancer in the Dark, and Goodbye Lenin, while the lowbrow movies were Harold & Kumar go to White Castle, Cellular, and Hellboy.

After the DVD rental choices, participants rated their mood on four scales (Lee and Sternthal 1999). The four mood scales had endpoints representing sad or happy, bad mood or good mood, irritable or pleased, and depressed or cheerful. Then they rated their tiredness.

Pretest. All movies used in this study were pre-tested using two questionnaires administered to two separate groups from the same population as the main study. In the first pretest, participants rated several movies as highbrow or lowbrow on a 9-point scale (1=lowbrow and 9=highbrow). Following Read, Loewenstein, and Kalyanaraman (1999), highbrow movies were described as "movies that may have sub-titles, depressing plot or may offer less immediate pleasure but are educationally or culturally enriching," and lowbrow movies were described as "movies that generally provide little educational or cultural benefit but are good for entertainment, instant pleasure and relaxation." In a second pretest, another group of participants rated the same set of movies as a relative vice or a relative virtue on a 9-point scale (1=more of a

vice and 9=more of a virtue). A vice was described as "Something tempting that may have few long-term benefits. It is something you want but at the same time feel more guilty choosing." A relative virtue was described as "Something that is not very tempting now but may be more beneficial in the long run. It is something that you feel less guilty choosing but at the same time requires self-control to choose." These pretests confirmed that highbrow movies were considered to be more of a virtue than lowbrow movies ($M_{highbrow} = 6.51$, $M_{lowbrow} = 2.44$, $t(44) = 10.26$, $p < .001$) and high-lowbrow ratings were highly correlated with vice-virtue ratings. ($r = .99$, $p <. 01$).

Results and Discussion

As expected, in the low tradeoff conflict condition most participants chose the middle option for all four of the initial choices (83%) compared to only 11% who did so in the high tradeoff conflict condition. Recall that this is the option (in the low tradeoff conflict condition) that allowed them to choose without making large tradeoffs.

More importantly, only 32% of participants chose highbrow movies in the high tradeoff conflict condition, while 67% of participants chose highbrow movies in the low tradeoff conflict condition ($\chi^2(1) = 4.9$, $p<.05$). These results support our prediction that participants were more likely to choose lowbrow movies after making choices that involved large tradeoffs.

To test whether differences in mood or tiredness could account for the observed shift in vice/virtue choice, we compared the mood and tiredness ratings across conditions. Since the internal reliability of the 4-item mood scales was very high (Cronbach's Alpha = .94 in the low conflict condition and .81 in the high conflict condition), we averaged each participant's scores across the four items. Mood ratings were 5.16 and 5.29 in the high and low tradeoff conflict conditions respectively, $t(38) < 1$, *ns*. The mean responses to the tiredness item were: 4.74 (lower

numbers = more tired) in the high tradeoff conflict condition and 4.48 in the low tradeoff conflict condition, $t(38) < 1$, *ns*. Thus, there was no indication that making choices involving larger tradeoffs produced a more negative mood or more tiredness.

Experiment 1 provides preliminary evidence that choices vary in the degree of depletion they induce. In particular, we found that high tradeoff conflict choices (versus low tradeoff conflict choices) consumed more resources and led to a greater tendency to choose vice over virtue in a subsequent choice. This presumably occurred because the greater the tradeoff conflict, the greater the required executive resources and therefore, the greater the depletion effect.

Recall that the choice in this study involved an outcome that would not be realized for at least 3 days, yet depletion had a pronounced influence. This builds on previous findings (e.g. Bruyneel et al 2006, Vohs et al 2008b) by extending depletion effects to tempting options in a choice that does not involve immediate consumption. While previous demonstrations of resource depletion involved an increased tendency to seek immediate gratification, this study demonstrates that depleted individuals are also more likely to seek gratification for the future.

Experiment 2: Tradeoff Conflict versus Overall Choice Difficulty

The previous experiment suggests that trading off attributes may be an important factor in understanding depletion arising from choice. However, in that study the choices that involved high tradeoff conflict could feel more difficult than the decisions involving low tradeoff conflict. Although choice difficulty can be a consequence of tradeoff conflict, not all difficult choices entail difficult tradeoffs. For example, choice difficulty can also arise from difficulty in processing information about the options. To disentangle choice difficulty from tradeoff conflict

as the source of depletion, experiment 2 utilizes several sources of choice difficulty to vary choice difficulty and tradeoff size orthogonally.

Experiment 2 includes a manipulation of choice difficulty drawn from recent work on preference fluency (Novemsky, Dhar, Schwarz, and Simonson 2007) demonstrating that fluency experiences deriving from extraneous aspects of a choice task, such as the ease with which information about choice alternatives can be processed, can affect the subjective difficulty of the choice task. Specifically, they demonstrated that people found a choice task more difficult when descriptions were printed in a hard-to-read font than when the identical descriptions were printed in a standard font. Building on this finding, in this experiment, we manipulate subjective choice difficulty by printing the choice scenarios in a font that is either easy or difficult to read. In addition, to help generalize our findings to other vice and virtue options, we used a different dependent measure in this experiment—a choice between healthy granola bars and indulgent chocolate bars.

Method

Undergraduate students (N = 267) were approached on campus, where they individually completed a short questionnaire. Participants were randomly assigned to complete one of four versions of the choice task based on a 2 (difficulty: easy-to-read font vs. hard-to-read-font) X 2 (tradeoff size: small vs. large) between-participant design. All participants made four hypothetical choices from the same four categories used in experiment 2. The large tradeoff choices were constructed by making the two attributes negatively correlated and giving the options distant attribute values (choice set XYZ in figure 1). The small tradeoff choices had the same relationship between the attributes and the same middle options as the high conflict

choices, but the two extreme options in each choice set were given attribute values much more similar to those of the middle option (choice set X'YZ' in figure 1). Choice difficulty was manipulated by presenting the four choices to half of the participants with the descriptions presented in gray font and to the rest of the participants with the descriptions presented in standard font (see example in Figure 2). Upon finishing the choice task, participants were told that they could choose one of four different snack bars, which include two kinds of chocolate bars (i.e., Twix and Snickers) and two kinds granola bars (i.e., Honey Oat and Trail Mix).

Pretest. Sixty-nine participants from the same population as the main study were randomly assigned to receive one of the four versions of the choice materials used in this study and rated the difficulty of the choice task on a 9-point scale ranging from very easy to very difficult. The pretest results revealed only a main effect of font such that choices presented in gray font were rated as significantly more difficult (M= 5.76) than those presented in standard font (M= 3.66 $F(1, 68) = 20.6$, $p < .001$). Tradeoff size had no reliable effect on choice difficulty (M_{small}= 4.83, M_{large}= 4.55 $F(1, 68) = 0.07$, *n.s.*), nor did it interact with the font manipulation ($F(1, 68) = 0.64$, *n.s.*)[2].

Results and Discussion

This study allows us to distinguish between tradeoff conflict and subjective choice difficulty as drivers of depletion arising from choosing. As expected, we found that tradeoff size produced a reliable effect on the subsequent vice/virtue choice. As shown in table 2, following choices with small tradeoffs, 47% of participants chose a granola bar, while only 27% chose a granola bar following choices with large tradeoffs ($\chi^2(1) = 11.19$, $p < .01$). However the choice

[2] Dhar (1997) also found that choices with varying levels of tradeoffs can be equally difficult, in part because small differences in attribute values can make it difficult to justify choosing any option.

share of granola bars did not vary significantly between the group that received the choice materials printed in the hard-to-read font (39%) and the group that received the choice materials printed in the standard font (34%, $\chi^2(1) = 0.71$, $p = .40$).

This study manipulated choice difficulty and tradeoff size independently, showing that tradeoff size of prior choices has a significant impact on subsequent choice between a vice and a virtue while subjective choice difficulty produced no reliable effect. Therefore, it provides evidence that it is tradeoff conflict, not overall choice difficulty that depletes executive resources.

Experiment 3: Tradeoffs in Choice versus Matching

Our results thus far have provided evidence that larger tradeoffs in choices are more depleting than smaller tradeoffs. In the next study, we provide another test of the idea that it is the executive function associated with resolving tradeoff conflict, rather than other mechanisms (e.g. preference formation or increased processing) that are producing our results. If our theory is correct, merely forming preferences over large attribute differences should not deplete executive resources, because it is choosing among alternatives that requires resolution of tradeoff conflict and an act of executive control. Recent research has shown that matching is a task that is much less likely to invoke executive function and conflict resolution than choice (Frederick and Shafir 2008). Therefore, we compare choices involving large versus small tradeoffs to a matching task involving the same set of tradeoffs. By having some participants evaluate large tradeoffs outside of a choice task, we can determine whether contemplating large tradeoffs and developing one's preferences over those tradeoffs is sufficient to be depleting — or, whether, as we propose,

making choices over large tradeoffs (which requires executive function) is necessary to cause depletion.

Method

As part of a web-based questionnaire, 522 individuals participated in this study for chances to win gift certificates. Participants were randomly assigned to complete one of four versions of the questionnaire based on a 2 (task: choice vs. matching) X 2 (tradeoff size: small vs. large) design. In the choice conditions, participants made four hypothetical choices identical to those used in experiment 2. For each product category in the matching conditions, values for both attributes were provided for one of the three options, and one value was missing for each of the two other options. Participants were asked to fill in the two missing attribute values such that they would be indifferent between all three options. As in the choice conditions, in the large tradeoff matching condition, known attribute values implied large tradeoffs; while in the small tradeoff matching conditions, known attribute values implied small tradeoffs. After completing the first task, all participants were directed to a separate webpage and were presented with an ostensibly unrelated snack choice between a Stonyfield Farm Nonfat Plain Yogurt and a Mrs. Fields Milk Chocolate Cookie.

Results and Discussion

Replicating experiments 1 and 2, we again found that the amount of tradeoff conflict in choice had an impact on the subsequent vice/virtue choice. Following choices with small tradeoffs, 34% of the participants chose the yogurt, while only 22% chose the yogurt following

choices with large tradeoffs ($\chi^2(1) = 4.63$, $p < .05$). However, the size of tradeoff in the matching task did not produce a reliable effect on the subsequent vice/virtue choice. Specifically, following matching tasks with small tradeoffs 28% of the participants chose the yogurt, while 36% chose the yogurt following matching tasks with large tradeoffs ($\chi^2(1) = 1.71$, $p = .19$). The interaction between tradeoff size and task was significant (logistic regression B = .949, $p < .05$).

These results provide further evidence that making choices involving large tradeoffs depletes executive resources, leaving fewer resources for subsequent tasks. Unlike choice, merely contemplating one's preference over large tradeoffs is not sufficient to deplete resources. Participants who were forming preferences but not making a choice were no more likely to succumb to the temptation of a vice when faced with large tradeoffs than small tradeoffs.

Experiment 4: Intuitions about the Effects of Depletion on Choice

The preceding studies have built on previous work demonstrating that choices can be depleting by beginning to answer the questions of when and why choices deplete executive resources. Another important question raised by the discovery that choices are depleting is whether individuals are aware of these depleting effects. This question arises because the fact that choices are depleting raises a problem that potentially requires self-regulation. In sequential choice situations, individuals need to be aware of depletion effects if they are going to avoid having this resource dwindle when important decisions are imminent. Failure to do so would leave the decision maker open to choices that may have very regrettable long-term consequences.

While intuitive knowledge of resource depletion would be useful and adaptive, it is not clear whether individuals possess this knowledge. On one hand, people presumably have had

firsthand experience that controlling themselves and/or making decisions may be more difficult when in some subjective states than in others. On the other hand, there is ample evidence that people' intuitive self-understanding has severe limitations (e.g., Nisbett & Wilson 1977). Past research has documented that in certain situations people make biased forecasts of their future preferences and behavior (e.g. Dhar, Huber, and Khan 2007; Wilson et al. 2000; Loewenstein 1996; Nowlis and Shiv 2005). For example, some studies show that individuals do not anticipate the effect of momentary visceral states on their ability to exert self-control in choices (Loewenstein 1996). Individuals not currently in a particular state were much worse at predicting the effects of that state on their self-control than individuals in the focal state.

Other research has shown that individuals may conserve their willpower when they anticipate needing it in the future (Muraven, Shmueli, and Burkley 2006) and some work shows that many individuals view their willpower as a limited resource (Mukhopadhyay and Johar 2005). However, little is known about which situations lay individuals believe are depleting. Hence the final step in this investigation was to test whether people can intuit depletion effects from choices and other activities. If individuals are not able to accurately predict how choices can influence subsequent self-control, they will be less able to manage the choices they face to minimize self-control failures that are bound to occur in sequential choice situations.

Experiment 4 assessed people's (naïve) intuitive predictions of how they would choose among relative vices and virtues, as a function of whether they had recently engaged in a depleting non-choice experience (i.e. studying in the library) and whether they had recently made a series of large versus small tradeoff choices (as in experiment 2). Experience may teach that some activities are depleting and leave one open to subsequent temptation. However, we think it is very unlikely that individuals will learn that choices, and those with larger tradeoffs in

particular, are themselves a depleting activity. While accurate prediction would indicate that people can potentially manage this executive resource, inaccurate predictions would make effective management of this resource very unlikely and leave individuals open to making important decisions under the surreptitious influence of a depleted state.

Method

Fifty-seven undergraduate students individually completed a short questionnaire for partial course credit. Each participant read about two hypothetical college students. In the studying condition, one student was described as having studied in the library for two hours (depleted target) and the other student was said to have just arrived at the library to study (non-depleted target). These participants then gave their predictions for the hypothetical students' degree of depletion and for their choice between vice and virtue (i.e. highbrow and lowbrow movies). The depletion rating was made on a 9-point scale ranging from 1 (mentally drained) to 9 (mentally replenished). Detailed information (synopsis, director and cast, running time, language and MPAA rating) was provided for each movie. Highbrow movies were categorized as "Group 1" while lowbrow movies were referred to as "Group 2". Participants were instructed to predict which group of movies contained the movie chosen by each of the two students on a 9-point scale ranging from 1 (group 1 much more likely) to 9 (group 2 much more likely). [3] In the choice condition, participants also read about two college students; one was described as having made the large tradeoff choices from experiment 2 (depleted target) while the other was described as having made the small tradeoff choices from experiment 2 (non-depleted target). Participants in the present study were shown the actual choice materials from experiment 2 and

[3] In a separate study, we confirmed that students studying in the library were significantly more likely to choose a lowbrow movie than those just arriving to study.

asked to read through them. These participants then predicted how depleted the students would be following the large and small tradeoff choices. They also predicted whether these students would choose an indulgent or healthy snack (similar to the choices made in experiment 2)

Results and Discussion

Table 3 displays the mean predicted depletion ratings and choices. In the library scenario, participants predicted that the student who was described as having been studying in the library for two hours would be more depleted (M = 3.22) than the student who had just arrived at the library (M = 6.72, $t(31) = 10.6$, $p<.001$). Moreover, participants predicted that the depleted student would be more likely to choose a movie from the lowbrow category (M = 7.75) than the non-depleted student (M = 4.78, $t(31) = 9.0$, $p<.001$).

Participants who were presented with the choice scenario did not predict either the depletion effect arising from making large tradeoff choices or the impact of this effect on subsequent preferences. The student who was described as having made a series of large tradeoff choices was predicted to be slightly less depleted (M = 5.16) than the student who made small tradeoff choices (M = 4.96, $t(24) = -1.1$, *ns*). The mean snack choice predictions for both targets did not differ from each other (M= 5.92 following large tradeoff choices and M = 5.60 following small tradeoff choices, $t(24) < 1$).

It seems that while individuals do intuit that some activities leave them depleted and more prone to succumb to subsequent temptation, they do not realize that making large tradeoffs is one depleting activity. We followed up this study with a similar study that replaced the large versus small tradeoff condition with a condition comparing choice to a comparable rating task

(similar to the design used by Vohs et al 2008b). In that study, we replicated the finding that it is intuitive that studying in the library is depleting and increases the tendency to chose a vice, but participants demonstrated no intuitive understanding that choices are depleting (compared to non-choice tasks).

General Discussion

Summary and Theoretical Implications

There is a growing body of research examining how successive choices can influence one another. This research has examined goal activation, mood effects, reference point shifts and meta-choice strategies. Recent research suggests another mechanism, depletion of executive resources, through which unrelated successive choices could influence each other (Bruyneel et al. 2006). Consistent with this recent work, we find that successive choices that are not related to the same goals, that do not influence relevant reference points, and that do not generate ambient affect can have substantial interactions through resource depletion. Interestingly, we find that depletion induced by choices systematically shifts preferences between vices and virtues even when consumption is temporally distant from the choice. Moreover, we extend prior knowledge about depletion by exploring ***when*** and ***why*** choices draw upon the pool of executive resources. While even very mundane binary one-attribute choices can be depleting (Vohs et al 2008b), we find direct evidence that making larger higher conflict tradeoffs demands more resources and is more depleting than making smaller lower conflict tradeoffs. This effect is independent of subjective choice difficulty. This suggests that while choices can be difficult for many reasons, they seem to deplete resources through the resolution of the conflict arising from trading off desirable and undesirable aspects of the options.

We also examined consumers' intuitions about the influence of choice on depletion (experiment 4). While consumers seem to believe that some activities influence a vice/virtue choice through depletion, they did not intuit how choices affect the level of depletion. This makes effective management of this resource very unlikely, especially in sequential choice situations. Important decisions that happen to follow other decisions involving tradeoff conflict are likely to suffer from a lack of executive resources, with the potential for very regrettable long-term consequences.

Experiments 1, 2, and 3 provide evidence that tradeoffs made during the choice process are at the root of depleting effects of decision making. In contrast, subjective choice difficulty does not seem to influence the amount of depletion (experiment 2). Presumably tradeoffs are depleting because executive function is required to resolve the conflict arising from these tradeoffs. If so, future research might discover that different types of tradeoffs will be differentially depleting. For example, tradeoffs that produce greater conflict because of emotion-laden content (Luce 1998; Luce, Bettman and Payne 1997) may induce more depletion and have a greater impact on subsequent choices. It would also be interesting to examine whether choices involving temptations that are made on behalf of someone else show depletion effects. This may depend on how acutely the chooser feels the conflict generated by the tradeoffs.

Future research might also examine other aspects of tradeoffs which may moderate how depleting a particular choice is. For example, tradeoffs that involve accepting unfavorable attributes may be more depleting than tradeoffs that involve rejecting favorable attributes. The size of the tradeoff, and therefore its depleting effect, may be the affected by context. A tradeoff that seems large to one person or in one context may not seem so large, and not be so depleting, to another person or in another context.

Alternative Interpretations

We think the most plausible explanation for all our findings is that the manipulations depleted the inner resource that is needed for effective self-regulation. The differences in depletion were created by procedures that had no direct relevance to the consumer choices that constituted our dependent variable. That very disconnect between independent and dependent variables lends valuable support to the hypothesis that depletion of an inner resource was the operative factor in producing the present results. However, several possible alternative explanations could be raised to account for part or all of our data.

It is possible that following making a set of decisions, participants feel that they deserve a reward. That is, some participants might hold beliefs akin to the Protestant Ethic which preach that hard work earns a reward, and so after they exerted themselves by making a series of choices, they deserved to enjoy some pleasure such as a lowbrow film. This interpretation seems intuitive, but it has difficulty accounting for the results of Experiments 1 and 2. Experiment 2 seems particularly difficult to account for by differential deservingness of reward because if anything, participants who made difficult choices should feel more deserving of a reward. In contrast, we found that our manipulation of choice difficulty did not produce any effect on the subsequent choice.

Mood repair could be raised as a mechanism to account for our findings. By this view, activities requiring executive control are often aversive, and so afterward people may be in an unpleasant mood or emotional state. Such states motivate many people to seek out opportunities for mood repair (e.g., Cialdini, Darby, and Vincent 1973; Isen 1984; Thayer, Newman, and McClain 1994; Tice, Bratslavsky, and Baumeister 2001). However, our findings speak against

the mood repair hypothesis. Experiment 1 showed no difference in mood across conditions. A further objection to the mood repair explanation was that the movie rentals offered to participants were not for immediate enjoyment but rather for the upcoming weekend, and it seems unlikely that participants were choosing to watch a lowbrow film several days later as a way of repairing their current mood.

Practical implications

The present findings suggest that individuals will be more likely to choose more tempting options over more virtuous options when this choice follows other choices involving larger tradeoffs compared to when it follows choices with smaller tradeoffs or when it does not follow any choices. Marketers with a goal of inducing consumers to indulge themselves are better off reaching customers at the end of a series of choices involving tradeoffs, such as near the conclusion of a mall or grocery shopping trip or on a webpage viewed following many choices. Conversely, marketers seeking to encourage consumers to avoid temptation should try to reach consumers before they have made too many decisions, particularly decisions with large tradeoffs. For example, when offering consumers customized products, firms often can choose how to present the many choices required in these situations (Levav et al 2008). The present research suggests that offering the more hedonic features after choices involving extensive tradeoffs (either because they have many options or involve very important attributes) will increase the tendency of consumers to buy those hedonic features. Conversely, more virtuous features (such as environmentally friendly add-ons) are best done before consumers have been forced to make many tradeoffs. Similar prescriptions may apply to consumer negotiations (e.g. purchasing a car) to the extent that there are a lot of tradeoffs being resolved by negotiators. Marketers may be best

served by offering virtuous options prior to the bulk of the negotiation, and more hedonic options near the end of the negotiation.

Our last study suggests that depletion effects induced by choices are not intuitive to consumers. Therefore, consumers should be careful to avoid making important decisions or those involving temptations they would rather avoid when they have already made several decisions, particularly if the earlier decisions involved large, high conflict tradeoffs. They should also be careful to separate choices that involve high conflict tradeoffs, as they may have difficulty making such tradeoffs as they become more depleted. The best advice may be for individuals to conserve their resources for important choices and strategically yield to temptation when the consequences are less meaningful.

References

Baumeister, Roy F. (2002), "Yielding to temptation: Self-control failure, impulsive purchasing and consumer behavior," *Journal of Consumer Research,* 28 (March), 670-676.

Baumeister, Roy F., Ellen Bratslavsky, Mark Muraven, and Dianne M. Tice (1998), "Ego depletion: Is the active self a limited resource?" *Journal of Personality and Social Psychology,* 74 (May), 1252-1265.

Bruyneel, Sabrina, Siegfried Dewitte, Kathleen D. Vohs, and Luk Warlop. (2006), "Repeated choosing increases susceptibility to affective product features," *International Journal of Research in Marketing,* 23, 215-225.

Cialdini, Robert B., Betty L. Darby, and Joyce E. Vincent (1973), Transgression and altruism," *Journal of Experimental Social Psychology,* 9, 502-516.

Dhar, Ravi (1997), "Consumer preference for a no-choice option," *Journal of Consumer Research,* 24 (September), 215-231.

Dhar, Ravi, Joel Huber, and Uzma Khan (2007), "The shopping momentum effect," *Journal of Marketing Research,* 44 (3), 370-378.

Dholakia, Utpal M., Mahesh Gopinath, and Richard P. Bagozzi (2005), "The role of desires in sequential impulsive choices," *Organizational Behavior and Human Decision Processes,* 98, 179-194.

Festinger, Leon (1957), "A theory of cognitive dissonance," Stanford, CA: Stanford University Press.

Festinger, Leon. (1962), "Cognitive dissonance," *Scientific American,* 207 (4), 93-107.

Frederick, Shane and Eldar Shafir (2008), "Principled Choices and Mindless Matches: Tale s about Tradeoffs," *Working Paper.*

Khan, Uzma and Ravi Dhar (2007), "Where there is a will, is there a way? The effect of future choices on self-control," *Journal of Experimental Psychology: General,* 136 (2), 277-288.

Kivetz, Ran, and Anat Keinan (2006) "Repenting hyperopia: An analysis of self-control regrets," *Journal of Consumer Research,* 33 (2), 273-282.

Kivetz, Ran and Itamar Simonson (2002), "Self control for the righteous: Toward a theory of precommitment to Indulgence," *Journal of Consumer Research,* 29 (2), 199-217.

Isen, Alice M. (1984), "Towards understanding the role of affect in cognition," *Handbook of Social Cognition,* Wyer, R. S. & Srull, T. K. (Eds.). Erlbaum: Hillsdale, NJ. (3), 179-236.

Lee, Angela Y. and Brian Sternthal (1999), "The effects of positive mood on memory," *Journal of Consumer Research,* 26 (2*),* 115-128.

Levav, Jonathan, Mark Heitmann, Andreas Herrmann, and Sheena Iyengar (2008), "Order of Product Customization Decisions: Evidence from Field Experiments," *Manuscript submitted for publication.*

Loewenstein, George F. (1996), "Out of control: Visceral influences on behavior," *Organizational Behavior and Human Decision Processes,* 65 (March), 272-92.

Loewenstein, George F. and Daniel Adler (1995) "A bias in the prediction of tastes," *The Economic Journal,* 105, 929-937.

Loewenstein, George. F and Drazen Prelec (1993), "Preferences for sequences of outcomes," *Psychological Review*, 100, 91–108.

Luce, Mary Frances (1998), "Choosing to avoid: Coping with emotion-laden consumer decisions," *Journal of Consumer Research,* 24 (March), 409-433.

Luce, Mary Frances, John W. Payne, and James R. Bettman (1999), "Emotional tradeoff difficulty and choice," *Journal of Marketing Research*, 36 (May), 43-159.

Luce, Mary Frances, James R. Bettman, and John W. Payne (1997), "Choice processing in emotionally difficult decisions," *Journal of Experimental Psychology: Learning, Memory, & Cognition*, 23 (2), 384–405.

March, James G. and Zur Shapira (1992), "Variable risk preferences and the focus of attention," *Psychological Review,* 99, 172–183.

Mukhopadhyay, Anirban and Gita V. Johar (2005), "Where there is a will, is there a way? The effects of consumers' lay theories of self-control on setting and keeping resolutions," *Journal of Consumer Research,* 31 (4), 779–86.

Muraven, Mark and Roy F. Baumeister (2000), "Self-regulation and depletion of limited resources: Does self-control resemble a muscle?" *Psychological Bulletin,* 126 (March), 247-259.

Muraven, Mark, Dikla Shmueli, and Edward Burkley (2006), "Conserving self-control strength," *Journal of Personality and Social Psychology,* 91 (September), 524-537.

Muraven, Mark, Dianne M. Tice, and Roy F. Baumeister (1998) "Self-control as limited resource: Regulatory depletion patterns," *Journal of Personality and Social Psychology,* 74, 774-789.

Nisbett, Richard. E. and Timothy D. Wilson (1977), "Telling more than we can know: Verbal reports on mental processes," *Psychological Review,* 84, 231-259.

Novemsky, Nathan and Ravi Dhar (2005), "Goal fulfillment and goal targets in sequential choice," *Journal of Consumer Research,* 32 (December), 396-404.

Novemsky, Nathan, Ravi Dhar, Nobert Schwarz, and Itamar Simonson (2007), "Preference fluency in choice," *Journal of Marketing Research,* 44 (3), 347-356.

Nowlis, Stephen M. and Baba Shiv (2005) "The influence of consumer distraction on the effectiveness of food-sampling programs," *Journal of Marketing Research,* 42 (2), 157-168.

Pocheptsova, Anastasiya, Amir, On, Dhar, Ravi, and Roy F. Baumeister (forthcoming), "Deciding without Resources: Psychological Depletion and Choice in Context," *Journal of Marketing Research.*

Prelec, Drazen and George Loewenstein (1998) "The red and the black: Mental accounting of savings and debt," *Marketing Science*, 17 (Winter), 4-28.

Ramanathan, Suresh and Patti Williams (2007), "Immediate and delayed emotional consequences of indulgence: The moderating influence of personality type on mixed emotions," *Journal of Consumer Research,* 34, 212-223.

Schmeichel, Brandon J. (2007), "Attention control, memory updating, and emotion regulation temporarily reduce the capacity for executive control," *Journal of Experimental Psychology: General,* 136(2), 241-255.

Simonson, Itamar and Amos Tversky (1992), "Choice in context: Tradeoff contrast and extremeness aversion," *Journal of Marketing Research,* 29 (August), 281-296.

Thaler, Richard H. and Eric Johnson (1990), "Gambling with the house money and trying to breakeven: The effect of prior outcomes on risky choice," *Management Science,* 36, 643-660.

Thayer, Robert E., Robert J. Newman, and Tracey M. McClain (1994), "Self-regulation of mood: Strategies for changing a bad mood, raising energy, and reducing tension," *Journal of Personality and Social Psychology,* 67, 910-925.

Tice, Dianne M., Ellen Bratslavsky, and Roy F. Baumeister (2001), "Emotional distress regulation takes precedence over impulse control: If you feel bad, do it!" *Journal of Personality and Social Psychology,* 80 (January), 53-67.

Tversky, Amos and Eldar Shafir (1992), "Choice under conflict: The dynamics of deferred decision," *Psychological Science,* 3 (November), 358–61.

Vohs, Kathleen D., Roy F. Baumeister, Brandon J. Schmeichel, Jean M. Twenge, Noelle M. Nelson and Dianne M. Tice (2008a), "Making Choices Impairs Subsequent Self-Control: A Limited-Resource Account of Decision Making, Self-Regulation, and Active Initiative," *Journal of Personality and Social Psychology,* 94 (5), 883-898.

Vohs, Kathleen D., Roy F. Baumeister, Jean M. Twenge, Catherine D. Rawn, Brandon J. Schmeichel, Noelle M. Nelson and Dianne M. Tice (2008b), "Decision fatigue exhausts self-regulatory resources," Revising for resubmission at the *Journal of Consumer Research*.

Vohs, Kathleen D. and Todd F. Heatherton (2000), "Self-regulatory failure: A resource-depletion approach," *Psychological Science,* 11 (3), 249-254.

Vohs, Kathleen D. and Brandon J. Schmeichel (2003), "Self-regulation and the extended now: Controlling the self alters the subjective experience of time," *Journal of Personality and Social Psychology,* 85 (2), 217-230.

Wertenbroch, Klaus (1998), "Consumption self-control by rationing purchase quantities of virtue and vice," *Marketing Science,* 17 (4), 317-337.

Wilson, Timothy D., Thalia Wheatley, Jonathan M. Meyers, Daniel T. Gilbert, Danny Axsom (2000), "Focalism: A source of durability bias in affective forecasting," *Journal of Personality and Social Psychology,* 78 (May), 821-836.

Table 1: Choice Sets used in Experiment 1

Choice Domain	High Conflict Tradeoff Choice Task		Low Conflict Tradeoff Choice Task	
Residential Apt.	Commute	rent/month	Commute	rent/month
Option A	10 min	$800	10 min	$800
Option B	25	$625	***15***	***$575***
Option C	40	$450	40	$450
Rechargeable Battery	Energy Efficiency	Battery Life	Energy Efficiency	Battery Life
Option A	10 hours/charge	2000 recharges	10 hours/charge	2000 recharges
Option B	14	1500	***16***	***1800***
Option C	18	1000	18	1000
Automobile	Ride Quality Rating	Gas Efficiency	Ride Quality Rating	Gas Efficiency
Option A	83/100	24 miles/gallon	83/100	24 miles/gallon
Option B	73/100	32	***80/100***	***35***
Option C	63/100	40	63/100	40
USB Memory Key	Memory Capacity	Price	Memory Capacity	Price
Option A	64 MB	$40.95	64 MB	$40.95
Option B	128	$59.95	***128***	***$49.95***
Option C	256	$97.95	256	$97.95

Table 2: Experiment 2 - Percentage Choosing Granola Bars over Chocolate Bars

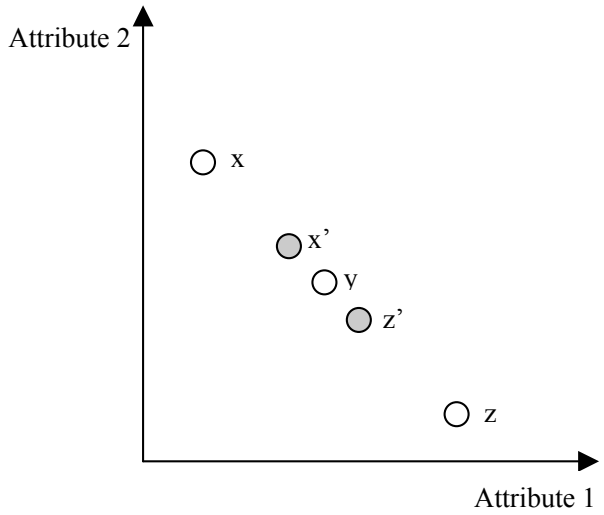
		Tradeoff Size		
		Small	Big	Overall
Choice Difficulty (Font)	Easy	44% (n=28)	24% (17)	34%
	Difficult	48% (32)	29% (20)	39%
	Overall	47%	27%	

Table 3: Experiment 4 - Predicted Degree of Depletion and Movie Choice

		Library Scenario (N=33)	Choice Scenario (N=26)
Predicted Depletion Level	Non-Depleted Target	6.72	4.96
	Depleted Target	3.22	5.16
Predicted Choice	Non-Depleted Target	4.78	5.60
	Depleted Target	7.75	5.92

Note: Lower numbers indicate greater depletion and greater preference for virtue.

Figure 1: Experiment 2 - Illustration of High and Low Tradeoff Conflict Choice Sets



Choice set {x, y, z} is an example of a high tradeoff conflict choice and choice set {x', y, z'} is an example of a low conflict choice.

Figure 2: Experiment 2 - Example of Difficult and Easy Choice Material

Difficult Choice (big gap)

You will read about 4 purchase scenarios involving different products. Please read and think about these products carefully and make your choice for each scenario. Please make the decisions as if you are facing real choices. We are just interested in your personal preferences and there are no right or wrong answers.

Scenario 1: Assume that you want to purchase a USB memory key. Now imagine you are at a local computer accessory store and find the following three memory keys attractive. These three items are generally similar in terms of all other attributes except for the memory capacity and price. Please choose the one you prefer by circling its corresponding letter.

a. 64MB; $20.95 b. 532MB; $79.95 c. 1GB; $138.95

Easy Choice (big gap)

You will read about 4 purchase scenarios involving different products. Please read and think about these products carefully and make your choice for each scenario. Please make the decisions as if you are facing real choices. We are just interested in your personal preferences and there are no right or wrong answers.

Scenario 1: Assume that you want to purchase a USB memory key. Now imagine you are at a local computer accessory store and find the following three memory keys attractive. These three items are generally similar in terms of all other attributes except for the memory capacity and price. Please choose the one you prefer by circling its corresponding letter.

a. 64MB; $20.95 b. 532MB; $79.95 c. 1GB; $138.95