

Self-Signaling and the Costs and Benefits of Temptation in Consumer Choice

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Abstract

The literature on consumer self-control focuses on the costs of facing tempting choices. We propose that temptation can entail both costs and benefits. These arise from self-signaling effects of choices that consumers make from mixed opportunity sets that contain both vices and virtues or from homogeneous opportunity sets that contain only vices or only virtues. We demonstrate that these self-signaling costs and benefits of temptation depend not only on the chosen item but also on the non-chosen options in the opportunity set. Succumbing to temptation is a (costly) signal of weak willpower, whereas resisting temptation is a (beneficial) signal of strong willpower. A series of five experiments involving choices between tempting vices and unappealing virtues shows that the self-signaling value of the non-chosen options in the choice set (1) enhances or reduces the utility of the chosen item and (2) prospectively affects consumer preferences among the choice sets themselves. We discuss theoretical implications of our findings for research on impulsive choice and self-control and on self-signaling and managerial implications for pricing and assortment strategies.

**Key words: Context effects; impulsive behavior; self-control; self-signaling.**

“It is good to be without vices, but it is not good to be without temptations.”

Walter Bagehot (1826-77), British economist, journalist, early editor of *The Economist*

The vast amount of choices in the marketplace is often a source of temptation for consumers. Such temptation is typically viewed as being costly. Fearful of the consequences of succumbing to it, consumers often limit their own access to tempting vice options through precommitment (Gul and Pesendorfer 2001; O’Donoghue and Rabin 1999; Schelling 1984; Wertenbroch 1998). Thus, smokers often choose to buy cigarettes in single packs instead of cartons to limit their consumption (Wertenbroch 2003). Yet as the Bagehot quote suggests, temptation might also confer benefits. Even though, or precisely because, consumers have to expend willpower to successfully resist temptation (Bénabou and Tirole 2004; Hoch and Loewenstein 1991; Muraven, Tice, and Baumeister 1998), consumers can make positive attributions about themselves when they resist temptation.

We explore the interplay of the psychic costs of succumbing to, and the benefits of resisting, temptation when choosing from choice sets that contain both vice (e.g., eating hamburgers, surfing the web) and virtue options (e.g., eating broccoli, reading this paper).<sup>1</sup> We refer to these sets as mixed opportunity sets. Our main contribution is to demonstrate that the composition of the mixed set can reveal either costs or benefits of temptation to oneself that impact overall utility—the costs of temptation are revealed

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<sup>1</sup> Vices are goods that are tempting to consume but whose consumption may entail negative consequences in the future; virtues are goods that are tempting not to consume, although their consumption may entail positive future consequences (see Wertenbroch 1998 for a formal definition of vices and virtues in the context of self-control problems). Related distinctions in the literature have been made between affective and cognitive goods (e.g., Shiv and Fedorikhin 1999) and between hedonic and utilitarian goods (e.g., Dhar and Wertenbroch 2000).

when consumers choose a tempting option, whereas the benefits are revealed when consumers resist a tempting option.

Consider, for instance, a consumer who is choosing from a mixed set of relative vices (e.g., unhealthy snacks such as candy bars) and relative virtues (e.g., healthy fresh fruit such as apples). We propose that, if she succumbs to the temptation and chooses a candy bar from this mixed opportunity set, her utility will be less than if she chooses the same candy bar from a homogeneous opportunity set that includes only vices.

Conversely, we propose that if she resists the temptation and chooses an apple from this mixed opportunity set, her utility will be greater than if she chooses the same apple from a homogeneous opportunity set that includes only virtues. As this example illustrates, the costs of succumbing to temptation and the benefits of resisting temptation depend on the opportunities provided by the other options in the set, which either reduce or enhance the utility of the chosen option.

To account for the effects of opportunity sets on overall utility, we develop a theoretical framework that relies on the notion of self-signaling (Bodner and Prelec 2002; Prelec and Bodner 2003) and the related notion of how inferences from choices shape beliefs about self-identity (Khan and Dhar 2006). Specifically, consumers' choices generate evidence that they possess certain (un)desirable traits or preferences, even though the choices themselves have no causal effect on the underlying characteristics.<sup>2</sup> We propose that this utility of self-signaling from one's choices depends not only on what is chosen but also on the non-chosen items in the opportunity set. We show

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<sup>2</sup> An important question beyond the current research concerns the distinction between self-signaling effects that entail transitory identity fluctuations versus those that entail more permanent updating of identity-relevant beliefs.

experimentally that this is because the non-chosen options communicate positive or negative self-signals that affect the utility associated with the chosen item. We further propose that these self-signaling costs and benefits of temptation not only affect the utility consumers derive from their choices but also prospectively affect consumer preferences. For example, we show that consumers who believe in their ability to resist temptation will prefer mixed opportunity sets that contain both virtues and vices rather than homogeneous sets that contain only virtues because resisting the temptation that emanates from mixed sets provides signaling benefits.

The remainder of our paper is organized as follows. We first develop a self-signaling framework for understanding how the utility of a chosen virtue or vice option depends on the composition of the opportunity set. From a brief review of prior research relevant to self-signaling and identity fluctuations, we develop our proposition that a mixed opportunity set can either add to, or detract from, the utility obtained from choice. Next, we test this proposition and its implications for consumer choice in five experiments using hypothetical and real choices. We conclude with a discussion of the theoretical implications of our findings for research on self-control and on self-signaling and of managerial implications for pricing and assortment strategies.

## **OPPORTUNITY SETS AND UTILITY FROM SELF-SIGNALING**

In standard economic treatment, the utility of a chosen item is independent of the non-chosen options in the choice set (Luce 1959). In the example above, this implies that a consumer who chooses an apple would derive the same utility from choosing that apple

from a mixed opportunity set {apple, candy bar} or from a homogeneous opportunity set {apple, other virtuous options}. Conversely, a consumer who chooses a candy bar would derive the same utility from choosing that candy bar from a mixed opportunity set {apple, candy bar} or from a homogeneous opportunity set {candy bar, other vices}. In contrast to this standard account, research on context effects and regret in decision-making shows that non-chosen options can potentially influence the utility associated with the chosen options (e.g., Bell 1982; Sagi and Friedland 2007; Simonson and Tversky 1992). Building on the concept of utility from self-signaling in choice, we extend the notion of context-dependent utility to choices made from different opportunity sets that include virtue and vice options.

Research on self-perception and self-signaling suggests that people infer from the option they have chosen what kind of person they are (Bem 1972; Bénabou and Tirole 2004; Dunning 2007; Bodner and Prelec 2002; Prelec and Bodner 2003). This idea is consistent with the results of a well-known study by Quattrone and Tversky (1984) who led their participants to believe that either increases or decreases in their pain tolerance when repeatedly submerging their forearm in a container of cold water were diagnostic of a long life expectancy. They found that participants' cold water tolerance changed in the direction they thought was diagnostic of a long and healthy life—even though they knew that enduring the pain would not causally alter their life expectancy. Prelec and Bodner (2003; Bodner and Prelec 2002) provide a theoretical account of how utility from such self-signaling can guide choices. To the best of our knowledge, there is no empirical work that has examined the role of self-signaling in consumer choice.

We extend this notion of self-signaling to opportunity sets by showing that the

strength of a self-signal depends not only on the person's chosen option but also on the options they rejected. For example, when people go jogging, part of their overall utility may come from being able to resist more tempting opportunities. In particular, consumers are likely to derive more self-signaling utility from jogging when the opportunity set includes more tempting options (e.g., watching their favorite TV show) rather than less tempting options. The magnitude of the self-signaling utility depends on the intensity of the temptation emanating from the non-chosen options. Thus, choosing a virtue (e.g., a less tasty but healthy apple) from a mixed opportunity set that also includes tempting vices serves as a stronger positive self-signal than choosing the virtue from a homogeneous opportunity set that consists of healthy items only.

Conversely, consider the choice of a vice (e.g., a tasty but unhealthy candy bar). The consumption of vices implies a negative self-signaling utility because it is associated with negative self-attributions (e.g., Khan and Dhar 2006; Giner-Sorolla 2001; Kivetz and Zheng 2006). We propose that the strength of the negative self-signal depends on the extent to which the opportunity set strengthens the negative self-attributions. Thus, the choice of a vice provides a more negative self-signal when the vice was chosen from a mixed set that also included more virtuous, healthier snacks than when the opportunity set included only vices.

Although utility from self-signaling and the context-independent utility of the chosen option are conceptually distinct, we assume that consumers incorporate both types of utility into an overall utility. This assumption is in line with other models of context-dependent utility (e.g., Higgins et al. 2003; Thaler 1985). In particular, Prelec and Bodner's (2003) model of strategic self-signaling suggests that choice reflects two utility

components, *outcome utility* (i.e., the context-independent utility of an option) and *diagnostic utility* (i.e., the utility or disutility of learning about the type of person one is as signaled by one's choice). In the studies below, we examine the effect of opportunity set composition on overall utility, as inferred from measures of satisfaction, willingness to pay, and choices. Our main proposition is that the negative self-signal from choosing a vice from a mixed opportunity set yields lower overall utility than that derived from the negative self-signal from choosing the vice from a homogeneous set. In contrast, the positive self-signal from choosing a virtue from a mixed opportunity set yields greater overall utility than that derived from the positive self-signal from choosing the virtue from a homogeneous opportunity set.

We summarize our predictions using the following notation. The context-independent (outcome) utility of a vice is denoted by  $v(h)$  and that of a virtue by  $v(u)$ . The context-dependent utility of choosing a vice from a mixed set that contains both the vice and the virtue is  $v(h|\{h,u\})$ . Following the same notation,  $v(u|\{h,u\})$  represents the utility of choosing a virtue from a mixed set. We contrast these with  $v(h|\{h\})$ , the utility of choosing a vice from a homogeneous set that contains only vices, and  $v(u|\{u\})$ , the utility of choosing a virtue from a choice set that contains only virtues. We predict

$$v(h|\{h\}) > v(h|\{h,u\}), \quad (1)$$

$$v(u|\{u\}) < v(u|\{h,u\}). \quad (2)$$

Next, we present five experiments to test these hypotheses. Note that if consumers have an intuition about how the opportunity set influences the overall utility of the chosen option, they will be motivated to make choices that enhance self-signaling utility. Accordingly, studies 1 and 2 test consumers' intuitions about the overall utility of

a chosen option based on the composition of the opportunity set. Study 3 shows that these intuitions are consistent with self-signaling as opposed to alternative accounts. As a further test of our theoretical framework, we then examine two crucial implications of self-signaling for consumer choice. Study 4 uses real choices to show that consumers' overall utility of a vice or a virtue as a function of the opportunity set is in line with their intuitive beliefs about self-signaling. Study 5 shows that consumers' prospective preferences for mixed and homogeneous opportunity sets align with their self-signaling intuitions.

### **STUDY 1: INTUITIONS ABOUT UTILITY FROM OPPORTUNITY SETS**

Study 1 uses hypothetical scenarios describing opportunity sets to test consumers' intuitions about the overall utility of a chosen option depending on the composition of the opportunity set. Specifically, participants are asked to assess from which opportunity set the selection of an item would provide more utility.

#### *Method*

Participants were 90 undergraduate students at a northeastern university who received course credit for their participation. There were two randomly assigned between-subjects conditions, each featuring a vignette describing a consumer choice scenario.<sup>3</sup> Respondents in the vice selection condition were asked to imagine having

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<sup>3</sup> As a robustness check, we included a second vignette in each of the scenario-based studies reported here (i.e., studies 1, 2, 3, and 5).

chosen a vice (chocolate chip cookies) on two snacking occasions, once from a mixed and once from a homogeneous set. Conversely, respondents assigned to the virtue selection condition were asked to imagine having chosen a virtue (prunes), also once from a mixed and once from a homogeneous set. The dependent variable was a measure of overall utility as indicated by their reported relative satisfaction with the chosen option as a function of the opportunity set. The vignette in the vice selection condition is illustrated below, with the manipulation in italics:

Imagine you often have an afternoon snack from a snack machine. On some occasions, you choose tasty, less healthy snacks, and on other occasions you choose less tasty but healthy snacks. Now consider the following two scenarios.

- One afternoon, the machine has both healthy, less tasty snacks such as prunes and dried raisins and great tasting but less healthy snacks such as chocolate chip cookies and salted peanuts. You have some *chocolate chip cookies*.
- Another afternoon, the machine has only *tasty, less healthy snacks such as chocolate chip cookies and salted peanuts*. You have some *chocolate chip cookies*.

On which occasion does choosing the *chocolate chip cookies* give you greater satisfaction?

- When the snack machine offers both great tasting but less healthy snacks and healthy but less tasty snacks.
- When the snack machine offers only great tasting but less healthy snacks.
- It makes no difference.

The vignette in the virtue selection condition read as follows:

Imagine you often have an afternoon snack from a snack machine. On some occasions, you choose tasty, less healthy snacks, and on other occasions you choose less tasty but healthy snacks. Now consider the following two scenarios.

- One afternoon, the machine has both healthy, less tasty snacks such as prunes and dried raisins and great tasting but less healthy snacks such as chocolate chip cookies and salted peanuts. You have some *prunes*.
- Another afternoon, the machine has only *less tasty, healthy snacks such as prunes and dried raisins*. You have some *prunes*.

On which occasion does choosing the *prunes* give you greater satisfaction?

- When the snack machine offers both great tasting but less healthy snacks and healthy but less tasty snacks.
- When the snack machine offers only healthy but less tasty snacks.
- It makes no difference.

*Results and Discussion*

The results were as predicted. The overall utility as measured by relative satisfaction with both the vice and the virtue choices depended on the type of opportunity set the item was chosen from ( $\chi^2(1) = 13.2, p < .001$ ). As shown in Figure 1, a significantly greater number of participants stated that the vice would lead to greater satisfaction when it came from the homogeneous set, where virtue options were absent, than when it came from the mixed set, where both vice and virtue options were available (54% versus 22%,  $\chi^2(1) = 5.8, p < .02$ ; 24% said the opportunity set would not affect their utility,  $n = 45$ ). Also as expected, a significantly greater number of participants said that they would be more satisfied with the virtue when it came from the mixed set, where both vice and virtue options were available, than when it came the homogeneous set, where vice options were absent (56% versus 20%,  $\chi^2(1) = 7.5, p < .01$ ; 24% said the choice set would not affect their utility,  $n = 45$ ). We replicated this pattern of results with a second vignette involving a choice of dinner entree, in which consumer intuitions about the utility of choosing a steak or choosing organic pasta similarly depended on whether these vice or virtue items were chosen from homogeneous or mixed opportunity sets ( $\chi^2(1) = 5.7, p < .05$ ).

[Insert Figure 1 about here]

While these results support our hypotheses, a potential limitation of the within-subjects design of study 1 was that it might have encouraged participants to explicitly compare the outcome of choosing from the mixed versus the homogeneous opportunity sets, thus highlighting the difference between the two sets. Although providing an explicit

no-difference response option minimizes such a concern (Dhar and Simonson 1999), we next test our hypotheses in a situation where participants are exposed only to a single opportunity set. In addition, we explore the implications of self-signaling from opportunity sets through a behavioral measure of utility. Specifically, we examine whether consumer willingness to pay (WTP) for a vice or a virtue directly reflects the self-signaling utility derived from the choice set, from which it is chosen.

## **STUDY 2: SELF-SIGNALING INTUITIONS AND WILLINGNESS TO PAY**

Our self-signaling account suggests why choosing a vice or a virtue might be associated with different degrees of overall utility depending upon the composition of the opportunity set. As proposed, selecting a vice from a mixed opportunity set induces a negative self-attribution that diminishes the overall utility of the vice. Hence, consumer WTP for a vice should be higher when it comes from a homogeneous set than when it comes from a mixed opportunity set. On the other hand, selecting a virtue from a mixed opportunity set induces a positive self-attribution that enhances the overall utility of the virtue. Hence, consumer WTP for a virtue should be higher when it comes from a mixed choice set than when it comes from a homogeneous opportunity set.

### *Method*

Participants were 178 students at a northeastern university who received course credit for their participation. They responded to a vignette involving dinner choices,

which is illustrated in appendix 2. The experiment used a 2×2 between-subjects design. The first factor varied whether participants were asked to imagine that they were choosing to consume a vice (steak) or a virtue (organic pasta). The second factor manipulated whether they were choosing from a mixed (vice and virtue options) or a homogeneous opportunity set (vice or virtue options). The dependent variable was participants' stated WTP for the chosen item.

### *Results and Discussion*

The results are shown in Figure 2, revealing the predicted interaction effect of item type (vice versus virtue) and set (mixed versus homogeneous) on WTP [ $F(1, 176) = 11.25, p < .001$ , based on logged WTP]. Participants' stated WTP for a virtue was higher when it was chosen from a mixed set than when it was chosen from a homogeneous set ( $M = \$13.26$  versus  $M = \$11.08, t = 3.01, p < .01$ ). In contrast, WTP for a vice was higher when it was chosen from a homogeneous set than when it was chosen from a mixed set ( $M = \$17.11$  versus  $M = \$15.00, t = 1.72, p < .09$ ). A second vignette involving snacks (chocolate chip cookies and prunes) yielded a similar interaction effect [ $F(1, 177) = 4.85, p < .03$ ].

[Insert Figure 2 about here]

Studies 1 and 2 show that the opportunity set from which vice and virtue options are chosen affects the overall utility that consumers derive from these vices and virtues. A possible alternative account for why virtues appear more attractive when they are chosen in the presence of vices and why vices appear more attractive when they are

chosen in the absence of virtues is that consumers might view virtue options as being more attractive than vice options. Then the presence of a vice might create a contrast that would enhance the attractiveness of a virtue in the mixed set compared to the homogeneous set. Similarly, the presence of a virtue might create a contrast that would reduce the reported utility of a vice in the mixed set compared to its reported utility in the homogeneous set. It is not clear that such contrast effects in reported measures would apply to the relative rank ordering in study 1 or to an absolute measure of preference such as willingness to pay. Furthermore, and contrary to this account, our WTP results show that our participants did not prefer the virtue over the vice options, as would have been required by the alternative account. Neither scenario revealed a main effect of greater willingness to pay for the virtue than for the vice, ruling out such a contrast effect.

These results demonstrate an important implication of the opportunity set effects we propose. Consumers directly incorporate the value of the self-signal ensuing from the opportunity set into the overall utility they derive from the chosen option. They are willing to pay more for virtues that are offered in mixed sets together with vices and more for vices that are sold from sets that do not contain virtues. To further test this self-signaling explanation and provide a boundary condition, study 3 manipulates the information value inherent in the opportunity set by varying the viability of the non-chosen options. Research shows that people's causal attributions depend on constraints on the viability of non-chosen options. For example, Miller, Visser, and Staub (2005) found that participants attributed lower honesty to a target individual who acted honestly when there was a situational constraint against acting dishonestly (e.g., a video surveillance camera) than when there was no such constraint. In a similar manner, we

proposed that the nature of self-signaling attributions is also influenced by constraints on the viability of other options in the opportunity set.

### STUDY 3: THE SIGNAL VALUE OF TEMPTATION

Consider again our proposition that a context-induced self-attribution from resisting or succumbing to temptation affects the utility of the chosen option. Specifically, a negative self-attribution from choosing a vice should be diminished when the viability of choosing a virtue option is constrained. For example, consider the following opportunity sets, **A**: {*organic pasta, steak*} and **B**: {*organic pasta with garlic sauce to which you are allergic, steak*}, where choosing the pasta dish from **B** is no longer feasible. Thus, a person who chooses the vice option from **B** will be less likely to attribute her choice to the weakness of her will than a person who chooses the vice option from **A**. As a result, we predict that choosing the vice from a mixed set that constrains the viability of the virtue options provides more utility than choosing it from an unconstrained mixed set.

Similarly, a positive self-attribution from choosing a virtue should be diminished when the viability of choosing a vice option is constrained. For example, consider the following opportunity sets, **A**: {*organic pasta, steak*} and **B**: {*organic pasta, steak with cream sauce to which you are allergic*}, where choosing the vice from **B** is not viable. Thus, a person who chooses the pasta from **B** will be less likely to attribute her choice to the strength of her willpower than a person who chooses the pasta from **A**. As a result, we predict that choosing the virtue from a mixed set that constrains the viability of the vice

options provides less utility than choosing it from an unconstrained mixed set.

### *Method*

Sixty-four individuals in New York City were recruited to participate in this experiment in return for \$1. They were randomly assigned to one of two conditions. In one condition, they were asked to imagine having chosen a vice on two separate occasions. Participants in the other condition were asked to imagine having chosen a virtue on two separate occasions. To manipulate the viability of the non-chosen options in the opportunity set, respondents were told to assume that they were allergic to an ingredient (e.g., sauce) in those options on one occasion. We asked participants to select the opportunity set, for which they would be more satisfied with the chosen item (see appendix 2).

### *Results and Discussion*

Our analysis confirmed our prediction that imposing a constraint on the viability of the non-chosen option affects the utility from self-signaling and hence the overall utility of the chosen option. As predicted, we found an interaction effect of whether the opportunity set was constrained or not and whether the chosen item was a virtue or a vice ( $\chi^2(1) = 14.1, p < .001$ ). As shown in Figure 3, participants who chose the vice reported greater overall utility when it came from a constrained opportunity set than when it came from an unstrained set (48% versus 16%,  $\chi^2(1) = 7.0, p < .01$ ; 36% said the choice

constraint would not affect their utility,  $n = 44$ ). Conversely, participants who chose the virtue reported greater overall utility when it came from an unconstrained opportunity set than when it came from a constrained set (58% versus 22%,  $\chi^2(1) = 7.1, p < .01$ ; 20% said the choice set would not affect their utility,  $n = 45$ ). This pattern of results was replicated in a second vignette involving a snack choice similar to the one described in study 1 ( $\chi^2(1) = 12.3, p < .001$ ).

[Insert Figure 3 about here]

In summary, study 3 shows that the overall utility of chosen virtues or vices depends on the viability of the non-chosen alternatives in the opportunity set. The psychic costs of succumbing to temptation and the benefits of resisting temptation inferred from one's choices vary with the diagnosticity of the self-signal. Thus, non-chosen virtue options that are viable alternatives to a chosen vice provide a stronger signal to consumers that they have succumbed to temptation. In contrast, non-chosen vice options that are viable alternatives to a chosen virtue provide a stronger signal to consumers that they have resisted temptation.

The design and the findings of study 3 rule out a second type of contrast effect as a possible alternative account for our data. Choosing a virtue in the presence of unhealthy vices may enhance its attractiveness by making the positive health effects of the virtue more salient in the mixed set. Conversely, choosing a vice in the presence of healthy virtues may reduce its attractiveness by making the negative health effects of the vice more salient in the mixed set. This account cannot explain our data in study 3 because what was varied was the viability of the opportunities, not the options themselves; the two opportunity sets which participants compared both contained virtues

and vices, holding a possible contrast with the non-chosen option fixed. If anything, choosing the virtue in the presence of a vice, to which one is allergic, should make the negative health effects of the vice even more salient and thus lead to greater satisfaction with the chosen virtue than when there is no allergy to the vice, the reverse of what we predicted and found in the virtue selection condition.

#### **STUDY 4: SELF-SIGNALING UTILITY IN CONSEQUENTIAL CHOICES**

The studies so far relied on testing the self-signaling account by looking at consumer intuitions about the utility of an item that they were asked to imagine having chosen from different opportunity sets. Because respondents did not actively make choices, we also need to demonstrate that their actual decisions correspond to their intuitions. Our self-signaling account of consumer choice suggests that people generate positive (negative) self-attributions from their choices and that these attributions enhance (reduce) the overall utility they derive from these choices. Study 4 allows participants to make real choices and compares the overall utility of a given item depending on whether it is chosen from a homogeneous or from a mixed set. To isolate the effect of the opportunity set on the utility, we had to ensure that participants chose the same item both from the homogeneous and from the mixed set. Following prior findings that non-consciously activating a goal results in goal-consistent choices (e.g., Chartrand et al. 2008), we recruited one group of student participants at a fast food restaurant so that the choice of a vice from both opportunity sets would be more likely, thereby allowing us to compare the two utilities across the two sets. Similarly, we recruited another group of

participants at a university gym so that the choice of a virtue from both opportunity sets would be more likely.

### *Method*

Participants were 156 students at a northeastern university. As stated above, we approached students either at the university gym (gym condition, N=77) or at a campus fast food restaurant (fast food condition, N=79). Participants in the fast food condition were randomly assigned to choose either from a mixed opportunity set that included both vice (a candy bar) and virtue (fresh fruit) options or to choose from a homogeneous set that included only vices. Participants in the gym condition chose from the same mixed opportunity set that included both vice and virtue options or they chose from a homogeneous set that included only virtues.<sup>4</sup> Pre-testing had confirmed that students who exited the gym would generally prefer fresh fruit to the candy bar whereas students who exited the fast food restaurant would generally prefer the candy bar to fresh fruit.

Participants filled out an unrelated survey and were then offered a choice from the respective opportunity set as compensation. In addition, participants were allowed to decline this compensation (i.e., just like in study 1, a no-choice option was provided to avoid response distortions from forced choice; Dhar and Simonson 2003). Finally, participants were asked to rate how satisfied they were with their chosen items on a 7-point scale (1= “not satisfied at all,” 7= “very satisfied”).

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<sup>4</sup> Because this design draws participants from two different sub-populations of students, we limit our analysis to a comparison within each sample (within the gym and the fast food conditions).

*Results and Discussion*

We had predicted that participants in the gym condition would be more satisfied with the virtue when it came from a mixed opportunity set than from a homogeneous set. Since seven of the 38 participants did not choose the virtue from the mixed opportunity set in the gym condition and therefore did not rate their satisfaction with the virtue (presumably they would have provided lower ratings than their ratings of the chosen vice), we excluded an equivalent proportion of participants with the lowest satisfaction ratings in the homogeneous set condition. This correction did not affect the results, but it eliminates any possible concerns about a selection bias in the mixed set condition from excluding participants who chose the vice. The results were as predicted. Figure 4 shows participants' mean ratings of satisfaction with their chosen options. Participants in the gym condition were more satisfied with their selection of the virtue when it came from a mixed set that contained both virtues and vices than when it came from the homogeneous set ( $M = 5.23$  versus  $M = 4.47$ ;  $t = 2.23$ ,  $p < .05$ ).

We had also predicted that participants in the fast food condition would be more satisfied with the vice when it came from a homogeneous opportunity set than from a mixed set. To again avoid any selection bias, eight participants were excluded from the homogeneous set condition to control for the eight who did not choose the candy bar from the mixed set. The results were also as predicted. Participants were more satisfied with their selection of the vice when it came from the homogeneous set ( $M = 5.56$ ) than when it came from a mixed set that contained both fruit and candy bars ( $M = 4.68$ ;  $t = 2.60$ ,  $p < .05$ ).

[Insert Figure 4 about here]

Study 4 shows that consumers' overall utilities differ systematically across opportunity sets in a way that corresponds to their self-signaling intuitions. Choosing a vice provides more utility when it is selected from a homogeneous set, whereas choosing a virtue provides more utility when it is selected from a mixed opportunity set.

Study 4 also rules out two more possible rival predictions for consequential choices that are not based on self-signaling. Both regret and cognitive dissonance predict that the presence of attractive but forgone choice options reduces the decision maker's overall utility (e.g., Bell 1982; Carmon, Wertenbroch, and Zeelenberg 2003; Festinger 1957). Both accounts would have predicted a symmetric effect of greater satisfaction with either item when it is chosen from a homogeneous set because that minimizes potential regret and dissonance, contrary to what we found.

## **STUDY 5: SELF-SIGNALING AND PREFERENCES AMONG OPPORTUNITY SETS**

The studies so far demonstrated that the overall utility of the chosen option varies depending upon the opportunity set as predicted by our self-signaling account. Since consumers have an intuition about the signaling value of the opportunity sets as shown in studies 1 and 2, we further predict that the anticipation of self-signaling effects on utility from choice will also drive preferences between the opportunity sets themselves.

Consider consumers with a meta-preference for virtues. These are consumers who prefer to choose virtues over vices but may choose vices on impulse on some occasions (Elster 1984; Jeffrey 1974). Standard economic analysis argues that

preferences between opportunity sets should depend only on the most preferred item, so that a consumer with a meta-preference for virtues should be indifferent between mixed and homogeneous opportunity sets that both contain the same virtues. In contrast, our self-signaling framework suggests that mixed opportunity sets provide added (dis)utility because they reveal either the costs or the benefits of temptation. Consumers with a meta-preference for virtues who believe they will be able to resist the tempting vices will prefer a mixed opportunity set that contains both virtues and vices to a homogeneous set that contains only virtues because the mixed set provides added self-signaling utility. That preference for the mixed set will weaken to the extent that consumers believe that they may succumb to the tempting vices in the mixed set.

To test this prediction, we manipulate participants' beliefs in being able to resist temptation by varying the timing of choice. Both research on hyperbolic discounting (cf. Frederick, Loewenstein, and O'Donoghue 2003) and on construal level theory (Eyal et al. 2004; Trope and Liberman 2003) suggests that immediate choices between vices and virtues induce stronger temptation than delayed choices. Hence, a consumer who faces a delayed choice (i.e., temptation is weaker) will be more likely than a consumer who faces an immediate choice (i.e., temptation is stronger) to believe in their ability to resist temptation and thus would prefer a mixed set due to the self-signaling benefits.

### *Method*

We recruited 110 individuals in New York City as participants in this experiment. As in study 3, each received \$1 for their participation. They read a vignette, in which they

were asked to imagine themselves facing a choice between two hotels with different breakfast menus. One hotel offered a mixed menu and the other offered a virtue-only menu. We manipulated between subjects when individual items had to be chosen for consumption from each of these menus, the same day (immediate choice condition) or a month later (delayed choice condition). The dependent variable was which hotel participants chose. We induced a meta-preference for virtues by asking participants to imagine that they preferred to eat healthy but less tasty dishes for breakfast while traveling, but that they might be tempted to eat great-tasting but unhealthy dishes on some occasions. The vignette including the choice delay manipulation is given in appendix 3. We counterbalanced which two virtue items listed in the appendix was offered in the mixed menu at Hotel A.

### *Results and Discussion*

As predicted, participants' preference for the mixed menu over the virtue-only menu was stronger when the consumption choice was delayed than when it was immediate as is shown in Figure 5 ( $\chi^2(1) = 19.1, p < .0001$ ). Specifically, a significant majority of the participants preferred the mixed menu to the virtue-only menu when the consumption choice was delayed (82% versus 7%,  $\chi^2(1) = 34.3, p < .0001$ ; 11% said they would be indifferent between the menus,  $n = 55$ ). In contrast, that preference for the mixed menu disappeared when the consumption choice was immediate (45% versus 42%,  $\chi^2(1) = .08, p < 1$ ; 13% said they would be indifferent between the menus,  $n = 55$ ). A second vignette involving choices among dinner menus yielded a similar difference in

overall utility between the two delay conditions ( $\chi^2(1) = 5.8, p < .05$ ). These findings illustrate an important behavioral implication of the self-signaling effects of opportunity sets. When faced with a choice between such opportunity sets, or menus, consumers prefer to consume virtues from mixed menus that contain both virtues and vices, but only when they believe that they can resist the temptation of the vice.

[Insert Figure 5 about here]

It is possible that a stronger preference for the mixed menu (which contained more alternatives than the virtues-only menu) under delayed than under immediate choice may have resulted from a preference for flexibility (Kreps 1979). To test this explanation, we replicated the experiment with a second sample of 110 individuals in New York City, this time presenting them with a choice between two virtue-only menus, one larger (with four sample items) and the other smaller (with two sample items). However, we found no difference in the preference for the larger menu between the immediate and delayed choice conditions, arguing against an effect of a preference for flexibility on our results.

## DISCUSSION

Across five experiments, we have demonstrated that temptation can create costs and benefits for consumers. The utility of an item they have chosen is reduced (enhanced), when they can interpret their choice as evidence that they have weak (strong) willpower in resisting temptation. Importantly, these temptation costs and benefits arise not only from consumers' inferences about themselves from what they have chosen but also from what else they could have chosen. Thus, the signal value of choosing a vice or

a virtue depends on the opportunity set. In studies 1 and 2, we showed that consumers believe that a vice provides more utility when it is chosen from a homogeneous rather than from a mixed opportunity set, whereas a virtue provides more utility when it is chosen from a mixed rather than from a homogeneous opportunity set. Study 3 provided a test of the signaling mechanism by manipulating the signal value of a given choice via the feasibility of other options in the opportunity set. Study 4 showed that these consumer intuitions reflect the actual utility people derive from consequential choices of vices and virtues from mixed or homogeneous choice sets. Study 5 showed that consumers' ex-ante preferences among the opportunity sets themselves depend on whether they anticipate being able to resist temptation and thus derive positive signaling value from a set.

*Theoretical Implications.* Our findings make the following theoretical contributions. First, we add to the literature on consumer impulsiveness and self-control by showing that temptation has psychological costs and benefits that arise after a choice between a vice and a virtue. Prior research has mainly focused on the ex-ante costs, such as resisting temptation through expending willpower or by incurring pre-commitment costs from limiting access to vices (e.g., Baumeister 2002; Bénabou and Tirole 2004; Hoch and Loewenstein 1991; Trope and Fishbach 2000; Wertenbroch 1998). In contrast, we demonstrate the ex-post psychological benefits of non-chosen options. In addition, we also show that the anticipation of such benefits can guide ex-ante choices. In contrast to prior research on self-control by precommitment that suggests that people limit their access to vices or avoid choice sets that include vices (e.g., Gul and Pesendorfer 2001; Wertenbroch 1998), a consumer who believes in her ability to resist temptation would prefer an opportunity set that includes tempting options. Thus, paradoxically, having

vices in your opportunity set enhances the utility of choosing a virtue.

Second, we add to the theoretical literature on self-signaling (e.g., Bénabou and Tirole 2004; Prelec and Bodner 2003) by showing that the self-signaling utility that creates temptation costs and benefits depends not only on what a person has chosen but also on the composition of the opportunity set. For example, the negative signal of choosing to consume a candy bar is amplified when the opportunity set contained more virtuous alternatives. Thus, the inferences people make about themselves as a result of their choices also depend on the non-chosen options. The opportunity set serves to amplify the costs of succumbing to temptation as well as the benefits of resisting temptation. These self-signaling effects have much broader marketing implications for many different product categories and choice domains, even though we conducted our studies in the context of food consumption. For example, we would expect self-signaling effects when consumers face opportunity sets that include expensive luxury brands as well as less expensive, more utilitarian brands. However, unlike the utility from social signaling that depends on the visibility of consumption to others, the utility from self-signaling should not be sensitive to whether or not others observe the consumption behavior.

Third, to the best of our knowledge, our paper is the first empirical demonstration that self-signaling contributes to the utility of the chosen item in a consumer choice context, in line with Prelec and Bodner's (2003) proposition that the total utility from choice is derived from the outcome itself as well from its diagnosticity as a signal.

*Future Research.* Our findings suggest opportunities for future research into the following issues. First, we investigated self-signaling by examining its effects on choices

and satisfaction with the chosen items, which is relevant to consumer choice and marketing contexts. Future research could directly measure changes in participants' self-perceptions as a function of choosing from homogeneous or mixed opportunity sets (Khan and Dhar 2006) and test if these perceptions mediate effects on the overall utility of chosen vice and virtue items.

Second, anecdotal evidence suggests that often people eventually come to enjoy the taste of initially less appealing yet relatively virtuous products (e.g., diet coke, baked chips). An interesting question is whether repeated self-signaling by consuming diet coke in the presence of regular coke over time transfers the utility from signaling to the outcome itself, thereby enhancing the perceived taste over time. In that case, marketers and consumers themselves could strategically shape the latter's preferences for less appealing virtues by consistently constructing choice sets with self-signaling benefits.

A third question is whether the signaling effects shown here can be generated through counterfactual thinking alone even when opportunity sets are homogenous. Thus, consumers might be more satisfied or pay higher prices to shop at health food stores that primarily offer virtue products but communicate explicitly to their shoppers what is not in the opportunity set (e.g., "We do not serve greasy food.").

Fourth, our account of self-signaling effects from the choice context is not limited to consumer choice among products and should thus extend to decisions outside of the typical consumer choice domain we have explored here. For instance, decisions involving moral conflict and charitable giving should also be impacted by the composition of the choice set. In line with this conjecture, additional data collected by the authors suggest that self-signaling effects of opportunity set composition generalize beyond choices of

consumer goods to moral choices (e.g., assisting a soup kitchen for the poor versus indulging in a Sunday brunch).

Fifth, the signal value of forgoing a vice when you are consuming a virtue may vary with the extremity of the forgone vice. For example, volunteering at a soup kitchen may be much more satisfying when you forego watching a playoff game as opposed to a regular season game of your favorite sports.

Finally, our findings suggest that self-signaling effects from the presence or absence of vices or virtues in the opportunity set may also enhance the extent to which people exercise temperance or indulgence. Data collected by the authors suggest that consumers are more likely to choose a more indulgent over a less indulgent vice when virtues are absent from the choice set, implying that the presence of virtues induces some temperance in vice consumers.

*Managerial Implications.* Our research has marketing implications for pricing and assortment policies and for retailer competition. The pricing of vice or virtue items should reflect the extent to which utility varies with the opportunity set. *Ceteris paribus*, marketers should charge a premium for relative virtues (e.g., baked potato crisps) when they are sold in the presence of vices (e.g., regular potato chips). For instance, a retailer may benefit by designing assortments of virtue items (e.g., a healthy snacks shelf) by introducing a few vice items adjacent to these offerings.

Retailers often compete based on the size and variety of their assortments. In standard economic analysis, the utility of the assortment is the utility of the most preferred item in the assortment. Our findings suggest that, all else equal, consumer preferences among assortments are also affected by the utility from self-signaling in the

purchase context as highlighted by an assortment. For example, retailers who sell virtues such as health food may boost their store or menu attractiveness by including a few vices. This follows directly from showing that items that are not likely to be selected from the menu can still enhance the attractiveness of the menu because of the signaling value of the non-chosen option.

Similarly, our findings also have implications for how retailers of vices may be able to attract customers who would otherwise not visit their stores. By adding a few virtue items to their assortments or menus, these vice retailers could also attract consumers to their stores who have a meta-preference for virtues and think they can resist the vices. For example, the introduction of salad bars may attract new customers to McDonald's restaurants who believe they can resist burger temptation and thus prefer choosing a salad at McDonald's rather than at Subway's. That is because McDonald's provides these consumers with an opportunity to enhance the utility of eating healthy with a signal of their own virtuousness—if they can resist the lure of the Big Mac. Of course, if eaters are wary of succumbing to their temptation, they might prefer to preclude any possibility of ending up choosing a burger and avoid McDonald's altogether.

This example illustrates yet another implication of our findings. Just like consumption experiences can generate (dis)utility from anticipation, consumers may also derive self-signaling (dis)utility from anticipating choices from mixed opportunity sets when there is a delay between choice and consumption as in study 5. For example, if you believe you can resist the temptation of ordering a hamburger at a McDonald's restaurant that is equipped with a salad bar, you can derive self-signaling benefits from anticipating a healthy choice before you even get to the restaurant. If you then really do resist the

hamburger, you will derive additional self-signaling benefits from your actual choice.

Alternatively, if you can't resist, you will have to balance the self-signaling benefits from anticipation with the self-signaling costs from consumption. McDonald's advertising for its salad bars may thus also deliver self-signaling benefits from anticipation to those of its customers who have a meta-preference for virtues.

In conclusion, we have shown that temptation is not necessarily always costly; it can also be beneficial. The costs and benefits of temptation depend on whether the composition of the opportunity set creates a positive or a negative self-signal and hence a positive or a negative effect on the overall utility of the chosen option. We have thus explored at least one sense, in which "it is not good to be without temptations." There may well be others, but we leave it up to the reader's introspection to explore those.

## APPENDIX 1: STUDY 2 VIGNETTES

The wording in the vice [virtue] selection condition is in *italics* [brackets]. The homogeneous choice set-condition read:

Imagine that you go out to dinner with friends. The restaurant has *only tasty, less healthy dishes such as delicious steak* [only healthy, less tasty dishes such as organic pasta]. You choose *steak* [organic pasta].

In this situation, what is the maximum amount you would be willing to pay for this kind of dish? Please fill in a dollar (to the penny if you like) amount here. \$ [\_\_\_\_.\_\_\_\_]

The mixed choice set-condition read:

Imagine that you go out to dinner with friends. The restaurant has both tasty, less healthy dishes such as delicious steak and healthy, less tasty dishes such as organic pasta. You choose *steak* [organic pasta].

In this situation, what is the maximum amount you would be willing to pay for this kind of dish? Please fill in a dollar (to the penny if you like) amount here. \$ [\_\_\_\_.\_\_\_\_]

## APPENDIX 2: STUDY 3 VIGNETTES

The vice selection condition read:

Imagine you often eat out. Sometimes you eat rich, greasy meat dishes that taste great. At other times you eat low-fat and organic pasta dishes that are less tasty. Now consider the following two scenarios.

- One evening, the restaurant you visit offers rich, greasy, great-tasting meat dishes such as steak and low-fat, less tasty dishes such as organic pasta. You choose a *steak*.
- Another evening, the restaurant you visit also offers rich, greasy, great-tasting meat dishes such as steak and low-fat, less tasty dishes such as organic pasta. However, that evening, *the pasta dishes are prepared with garlic sauce*, to which you are allergic. You choose a *steak*.

On which occasion are you more satisfied with your choice of the *steak*?

- When the restaurant offers great tasting, meat dishes and low-fat, less tasty pasta dishes.
- When the restaurant offers great tasting, meat dishes and low-fat, less tasty pasta dishes that are prepared with *the garlic sauce*.
- It makes no difference.

The virtue selection condition read:

Imagine you often eat out. Sometimes you eat rich, greasy meat dishes that taste great. At other times you eat low-fat and organic pasta dishes that are less tasty. Now consider the following two scenarios.

- One evening, the restaurant you visit offers rich, greasy, great-tasting meat dishes such as steak and low-fat, less tasty dishes such as organic pasta. You choose *organic pasta*.
- Another evening, the restaurant you visit also offers rich, greasy, great-tasting meat dishes such as steak and low-fat, less tasty dishes such as organic pasta. However, that evening, *the meat dishes are prepared with cream sauce*, to which you are allergic. You choose *organic pasta*.

On which occasion are you more satisfied with your choice of the *organic pasta*?

- When the restaurant offers great tasting, meat dishes and low-fat, less tasty pasta dishes.
- When the restaurant offers great tasting, meat dishes that are prepared with *the cream sauce* and low-fat, less tasty pasta dishes.
- It makes no difference.

### APPENDIX 3: STUDY 5 VIGNETTES

The between-subjects temporal distance manipulation is shown in italics versus brackets.

Imagine that you are leaving for a trip to Los Angeles *today* [*a month from now*]. While traveling, you might be tempted to eat great-tasting but unhealthy dishes for breakfast, even though you prefer to eat healthy but less tasty dishes. Your travel agent has a special arrangement with the following two otherwise identical hotels.

- Hotel A offers both great-tasting but unhealthy items and healthy but less tasty items for breakfast (see sample menu below).
- Hotel B offers mostly healthy but less tasty breakfast items (see sample menu).

#### **Breakfast at Hotel A**

##### **Sample healthy breakfast items:**

- Whole-wheat bread with low-fat cheese
- Low-fat natural yoghurt

##### **Sample unhealthy breakfast items:**

- Eggs Benedict
- Ham and cheese croissant

#### **Breakfast at Hotel B**

##### **Sample healthy breakfast items:**

- Salt-free whole-grain fruit cereal
- Fresh watermelon

Since both hotels are quite popular, you have to make a reservation **now** for the trip *today* [*a month from now*]. Which hotel do you choose?

- Hotel A (where the breakfast menu contains great-tasting unhealthy items as well as healthy but less tasty items).
- Hotel B (where the breakfast menu contains only healthy but less tasty items).
- It makes no difference.

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Figure 1  
PROPORTIONS OF RESPONDENTS IN STUDY 1 INDICATING GREATER  
OVERALL UTILITY FROM CHOOSING FROM MIXED OR HOMOGENEOUS  
OPPORTUNITY SETS

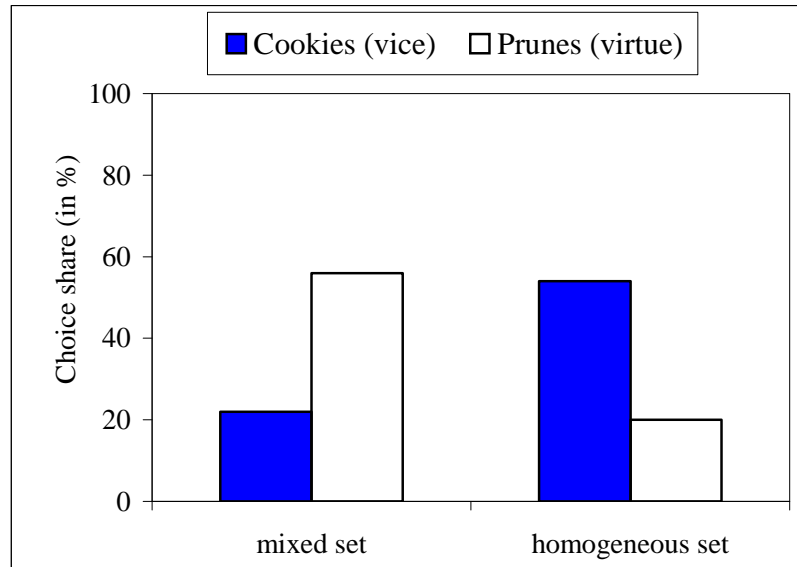


Figure 2  
MEAN WILLINGNESS TO PAY IN STUDY 2 AS A FUNCTION OF OPPORTUNITY SET

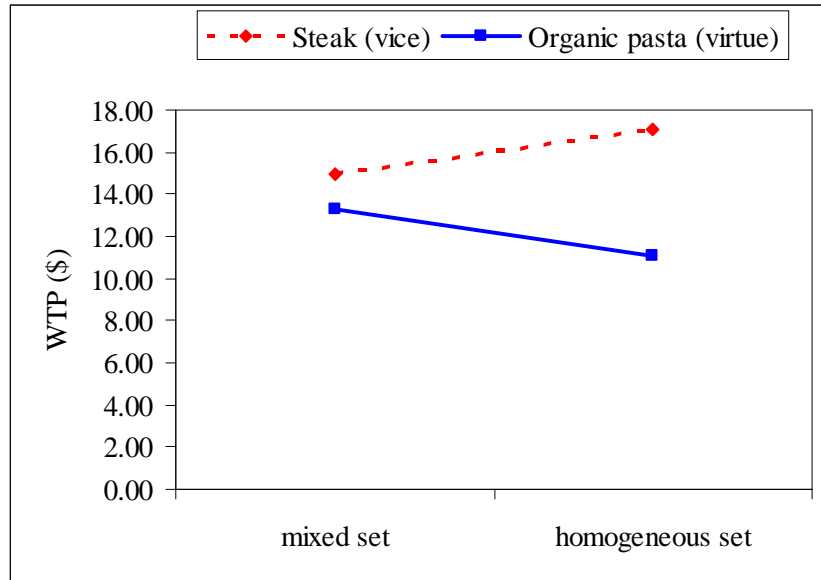


Figure 3  
PROPORTIONS OF RESPONDENTS IN STUDY 3 INDICATING GREATER  
OVERALL UTILITY FROM UNCONSTRAINED AND CONSTRAINED  
OPPORTUNITY SETS

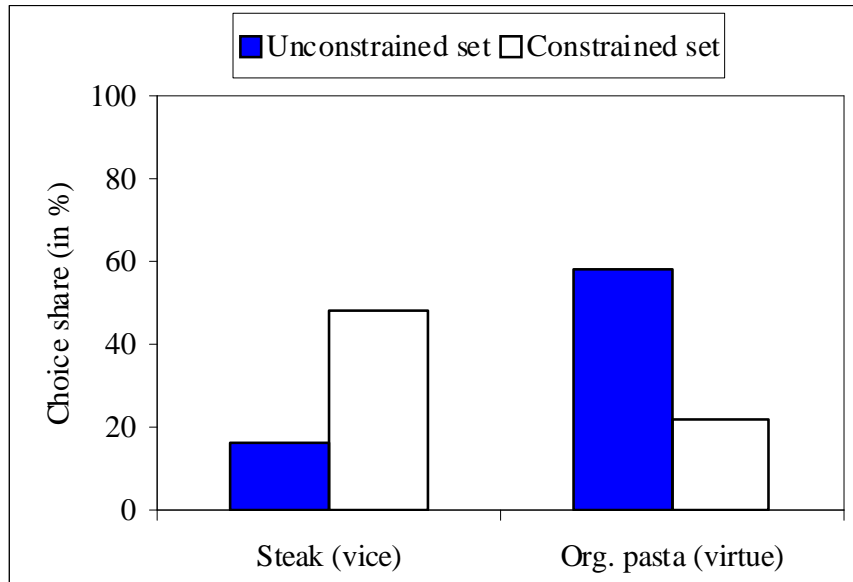


Figure 4  
MEAN CHOICE SATISFACTION RATINGS AS A FUNCTION OF HAVING  
SELECTED A VICE OR A VIRTUE IN STUDY 4

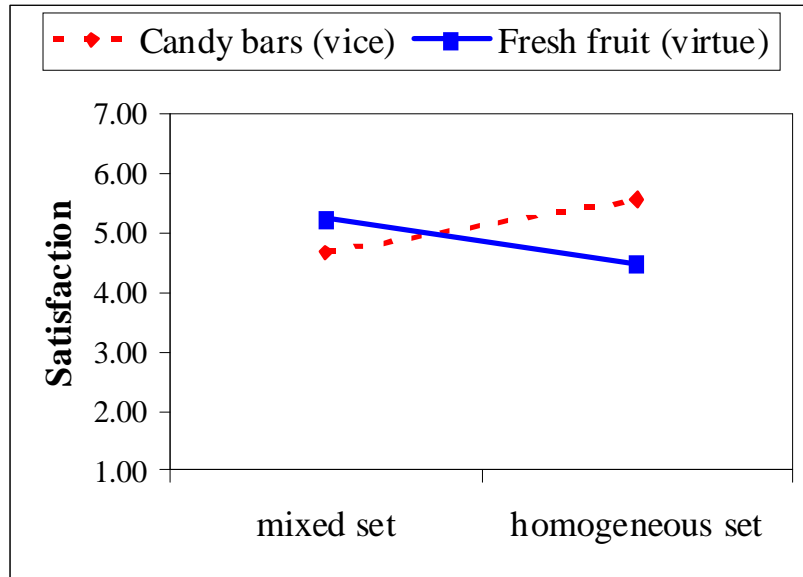


Figure 5  
PREFERENCE FOR MENUS (MIXED VERSUS VIRTUE-ONLY) IN STUDY 5 AS A  
FUNCTION OF STRENGTH OF TEMPTATION (CHOICE SHARES IN PERCENT)

