

Time and the Marketplace

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Abstract

Consumers are often confronted with choices between options that vary in their short and long term benefit, or what we call immediate and delayed utility. This paper describes the marketing implications of what economists and psychologists have learned about how consumers make these choices. The focus is on how consumers will often put disproportionate weight on immediate utility, thereby over-consuming goods offering small early benefits at a larger, later cost (vices), and under-consuming those offering large delayed benefits at a smaller, sooner cost (virtues). The various manifestations of this tendency in consumer choice are described, followed by a consideration of the sometimes subtle strategic issues surrounding the marketing of vices and virtues to consumers whose preferences change as a function of time to consumption. Special attention is paid to the ‘market for willpower,’ which is the market for goods that enable sophisticated consumers to overcome their difficult-to-control drive for short-term gratification. We conclude by asking what consumers ‘really’ want, and considering how marketers can and should respond to these desires.

Time and the marketplace

In February 1995 Taco Bell, the American fast-food giant, launched Border Lights, a reduced-fat, reduced-calorie alternative to its traditional menu. The new menu was a response to the bad publicity that Mexican food was then receiving, such as the widely publicized report from the Center for Science in the Public Interest on its high fat content (Hurley & Schmidt, 1994), as well as an apparently growing level of demand for healthier food. Taco Bell's market share had been declining, and Border Lights were expected to stop or even reverse this decline. Despite a \$75 million marketing campaign, Border Lights, however, were an unmitigated failure. Not only did they fail to attract new customers, they may even have chased away Taco Bell's traditional clients: Sales dropped 4% in the year they were introduced (Paperniuk, 1995a). Within a year Taco Bell had sharply scaled back Border Lights, retreating to a 'Lighten Up' option, in which their regular products could come with low fat cheese or sour cream. Primarily because of this debacle, John Martin, the CEO who masterminded Border Lights, was fired (Martin, 1996). That very year, Taco Bell's two partners in the PepsiCo stable – KFC and Pizza Hut – gained major increases in profits and market share by introducing high-fat, high-calorie items, such as stuffed crust pizza (Paperniuk, 1995a). By 1999, Taco Bell had got the message, and put its faith in the Chalupa, a deep fried taco, and the Enchirito, which they described as a 'ton of seasoned beef wrapped in a warm flour tortilla covered in zesty red sauce and topped with lots of rich gooey cheese.' According to *Brandweek* (Howard, 1999), the 'Chalupa is targeted dead-center at the core 18-34 male demo with a greasy chewy and crunchy product designed to create strong crave appeal. (p. 5)'

Taco Bell's experience with healthy meals was far from unique. Most fast-food chains experimented with healthier options, and these almost invariably disappeared from the menus after a protracted period of struggling sales. Long gone, for instance, is McDonald's much heralded but never popular McLean Deluxe. Introduced in 1991 with an excited introductory campaign, it never caught on and lingered on the menu until its mercy killing in 1996 (Hume, 1993; Pollack & Gleason, 1996). Other attempts at producing healthy fast food suffered similar fates (Sykes, 1996).

The discovery by fast food restaurants that healthy doesn't pay occurred at the same time that consumers were talking big about healthy food (e.g., Dryer, 1996; Matuszewski, 1996). In countless focus groups and surveys, people spoke of their desire for low fat fare, and healthy food was on every front page. Moreover, supermarkets found it essential to stock a burgeoning variety of healthy alternatives, such as pretzels and 'lean cuisine.' These healthy foods sold, and continue to sell, respectably, although they never took off in the way that was expected (e.g., Frazao & Allhouse, 1995; Harrison, 1999; Riell, 2000; Thompson, 1998)¹.

The experience of restaurateurs and food retailers is summarised in Figure 1, which depicts choices between healthy and junk food – or virtues and vices, to introduce terms that will be soon be clarified. When people make abstract statements about their preferences, such as in questionnaires or focus groups, they voice a strong preference for that which they perceive as good for them. They want their food to have less fat and less calories. When making advance choices, meaning real choices, like those in the supermarket, that will not come into effect for some time, the desire for healthy food wanes somewhat. Thus, they buy fewer healthy choices than they said they would. When choosing for immediate consumption, however, such as when they are in a

restaurant, the desire for healthy food becomes markedly diminished, and junk food is overwhelmingly preferred.

FIGURE 1 ABOUT HERE

Food is only one of many domains where there is a discrepancy between good intentions and subsequent choice (Christensen-Szalanski, 1984; Read, Loewenstein & Kalyanaraman, 1999; Read & Van Leeuwen, 1998; Wertenbroch, 1998). We see it in the moviegoer who intends to see a difficult foreign film but changes his mind when the time comes and goes to see an action movie instead; in the ambitious student sets her alarm for 6:00 and then savagely switches it off when it rings and rolls over for a few more blissful hours; in the aspiring athlete who promises to spend one hour on the treadmill but peters out after 15 minutes; in the taxpayer who promises that this year he will complete his return in plenty of time this year, but again leaves it to the last minute; and in the would-be saver who always spends a little more each month than planned. In all these cases people face a choice between that which would be best for them in the long run, and that which is immediately appealing. They know what they *should* take, but they often take something else. In this paper I discuss the psychological principles that underlie these choices, and show their relevance to a wide range of marketing issues. Whenever consumers have to make an intertemporal trade-off – meaning they must choose between options that differ in how their costs and benefits are distributed over time – then these principles can help us understand what decision they will make.

What kinds of choices are there?

The consequences of all choices can be described, in their most abstract form, as a stream of pleasure or pain. A hot dog bought from a street vendor, for instance, may involve a minute or two of pleasure from eating, a period of satiety, another period of mild digestive complaint, and a final period during which one's weight is marginally greater than it would have been without the hot dog. From the moment we eat the hot dog to the moment we die, our experience will be partly attributable to the hot dog, and partly attributable to 'everything else.' Naturally, the hot dog's contribution will quickly become very small, and even negligible, within hours of consumption, but even a single choice can have a momentous and lasting consequences. Someone who gives into the temptation to commit a serious crime, for instance, may find that the rest of their life is made appreciably less pleasant as a consequence of that decision.

In this paper, I use the term 'utility' to describe choice consequences. Utility is a word that has a history of different uses and there is always a danger of confusion, so it will be profitable to first offer some definitions. I will use utility, in the way recently advocated by Kahneman and his colleagues (Kahneman, 1994; Kahneman, Wakker & Sarin, 1997; Sarin & Wakker, 1997), to describe a cardinal measure of experience having both positive and negative aspects, which correspond to what Bentham called the two 'sovereign masters' of pleasure and pain. Any choice gives rise to a utility stream, which is the temporal distribution of its consequences, such as the ongoing contribution of yesterday's hot dog to our happiness. We can denote the utility stream as $\{u_0, u_1, u_2, \dots, u_t, \dots, u_T\}$, with the subscripts corresponding to moments and T being the end of the relevant period, usually the lifetime. To use Kahneman's terminology, the utility occurring at each moment is the *instant utility*, and the *total utility* is the sum of all utility in the stream:

$$U^0(u_0, u_1, \dots, u_T) = \sum_{t=0}^T u_t. \quad (1)$$

This represents the net contribution to lifetime utility due to an experience when evaluated from the vantage point of the present ($t=0$). In a choice between two options, decision makers will have happier lives if they choose the option yielding the greater total utility. Two other terms will play an important role in the subsequent discussion: *immediate utility* which is that which occurs immediately after a choice is made (u_0), and *delayed utility* is that which comes later.

Options can be classified in terms of the relationship between instant and total utility. Consider the following five example utility streams, each defined over four periods, which might correspond to the everyday experiences listed in parentheses (the bold numbers denote instant utility):

- A) {**4**, 2, 2, 2} (Total utility = 10, eating a banana, winning the lottery)
- B) {**4**, -2, -2, -2} (-2, eating pecan pie, telling off your boss)
- C) {**-4**, 2, 2, 2} (2, eating spinach, writing a paper)
- D) {**-4**, -2, -2, -2} (-10, eating lard, spending a year in prison)
- N) {**0**, 0, 0, 0} (0, N for neutral, or doing nothing)

The positive and negative utility is defined in terms of the neutral reference stream N. A negative number means that the person is worse off (relative to the status quo) during that period because of the option chosen, while a positive number means the person is better off. Eating a banana, for example, is pleasurable while it is being eaten and, since it is good for you, its long term consequences are also positive. Telling off your boss, on the other hand, might be fun when you do it, but its consequences are unpleasant and long-lasting.

There are two important classes of choice between pairs of options. In the first class, one option dominates the other, meaning that both the immediate and total utility of that option exceeds or at least matches its rival and so no intertemporal trade-off is required. These are the choices between [A, B], [A, C], [A, D], [A, E], [B, D], [C, D] and [E, D]. These are *unconflicted* choices, or choices between *goods* and *bads*, with the option on the left being the good and the one on the right being the bad. Eating a banana is better than eating lard in both the short and the long run. It is likely that most choices are between goods and bads, and we are never tempted to take the bad: we do not need self-control to choose shoes that fit over those that do not, to drink water rather than go thirsty, or to sleep when we are tired.

The choices that really trouble us, however, are those demanding a trade-off between immediate and delayed utility. When an option yields more immediate utility, but less total utility, than its alternative, we can call it a *vice*, and its alternative a *virtue* (e.g., Wertenbroch, 1998). These are the choices between [C, B], [E, B] and [C, E], with the leftmost option being the virtue. When the alarm rings, getting up versus going back to sleep constitutes two such alternatives. It is painful to get up, but in the long run it is better for us than sleeping in. Chocolates are, for many, vices relative to apples. They prefer the short term rewards of good taste and rapid hunger appeasement offered by chocolate, but they would prefer the apple for its long-term effects on weight and health.

The terms vice, virtue, good and bad describe relationships between options and not the options themselves: the category into which an option falls depends on its

alternatives. To illustrate, for a weight-and-health conscious consumer at McDonalds a McChicken sandwich might be a good relative to a cheeseburger, a vice relative to a salad, a virtue relative to a Big Mac, and a bad relative to a hamburger. In any given set of options, all except at most four (the ones with the greatest and the least total and immediate utility) can take on all four roles depending on the alternative with which they are paired. In the set of five options above, the neutral stream (N), which comes from taking no action, is a vice relative to (C), we might call it *sloth*, a virtue relative to (B, *prudence* or *self-control*), a good relative to (D), and a bad relative to (A)². Moreover, what are relative virtues and vices depends entirely on the utility functions of the individual decision maker. For instance, many people (workaholics) feel so much guilt at the prospect of giving in to beneficial hedonic impulses (such as sleeping in on Sunday or taking a vacation) that these become virtues relative to the vice of hard work (Kivetz & Simonson, 2002).

To understand why people's desires for things like health food, work and saving are influenced by the delay between choice and consumption (as shown in Figure 1) we must understand how the utility stream is assigned decision weight. The conventional account of this influence is discounted utility theory. In the next section we describe this theory, and discuss what it can explain and what it cannot.

Discounted utility

A cornerstone of economic theory is that the value we place on options is a function of their delay. The *discounted utility* (DU) model, which is the standard in economic analysis, assumes that future utility is discounted by a constant rate (P. Samuelson, 1937). According to this model, the present value of a utility stream is given by:

$$U^0(u_0, u_1, \dots, u_T) = \sum_{t=0}^T \delta^t u_t, \quad (2)$$

Where δ is a *discount factor*, and u_t is the amount of instant utility experienced at time t . This model holds that the value placed on instant utility decreases in absolute value with every increase in delay (i.e., δ falls between 0 and 1) and that both losses and gains become less important the farther away they are.

Discounted utility theory can help explain why convenience stores and vending machines can charge more than supermarkets for the same thing³. Usually, the delay between purchase and consumption is greater when buying from a supermarket, and this means that the product has a lower present value. To illustrate, imagine a consumer trying to decide whether to buy cigarettes at £2 a pack. To make the smoker's preferences concrete, suppose that the utility stream coming from a pack of cigarettes is $\{4, -2, -2, -2.\}$, and assume that the smoker's discount factor is $\delta = 0.5$ (a extreme value chosen for illustrative purposes). According to the DU model the utility from a pack of cigarettes *right now* (its present value) is:

$$U^0 = 4 + 0.5 \times -2 + 0.5^2 \times -2 + 0.5^3 \times -2 = 2.25$$

To make the discussion simpler, I will assume that each utility unit is worth £1, so that the present value of an alternative can be directly translated into a monetary value. This means the smoker is willing to pay up to £2.25 for the cigarettes right now, and this is what the vending machine can charge. Now imagine the same smoker in the supermarket. He knows he will need cigarettes tomorrow, but currently has an unopened pack in his pocket. If he buys some now, therefore, they will only start

giving him utility tomorrow, so the utility stream from the new pack will be $\{0, 4, -2, -2, -2\}$, with present value:

$$U^0 = 0 + 0.5 \times 4 + 0.5^2 \times -2 + 0.5^3 \times -2 + 0.5^4 \times -2 \approx 1.12.$$

So the supermarket cannot charge more than £1.12. In general, according to the DU model, the shorter the interval between purchase and consumption, the more the consumer will be willing to pay.

The same reasoning can help explain why consumers demand volume discounts. Large quantities are consumed over longer periods than smaller quantities, and consumption is valued less the more it is delayed. A carton of cigarettes, for instance, will be smoked over a week or so, and the present value of cigarettes smoked in two weeks is less than that of those smoked in one week, which in turn is less than that of those smoked today. Consider the smoker from the previous example who is considering buying two packs of cigarettes bundled together. As established above, the first pack is worth £2.25, the second is worth £1.12, so the maximum he would be willing to pay for two packs is £3.37. While he would be willing to pay £2.25 per pack if they are bought individually on the day he smokes them, he will only pay £1.69 per pack if they are bundled in pairs.

Discounted utility is not, however, an altogether satisfactory account of how consumer preferences vary with delay. Its shortcomings involve both quantitative and qualitative characteristics of behaviour by actual consumers. The quantitative issues concern the magnitude of the discount rates implied either by observed choices or by the prices of goods in the marketplace. Although not explicit in the DU equation, it is usually held that the discount factor for market goods should correspond more-or-less to the prevailing interest rate⁴. To continue with the cigarette purchase example, if our smoker knows (as most do) that he will buy a pack of cigarettes tomorrow, and he can either buy those cigarettes today for £X or tomorrow for £X+p, then he should buy them today whenever the premium £p is more than the amount that he could gain from the best alternative investment of £X. This is no different than saying that if you have two investment opportunities, one returning 10% and the other 12%, you should go for the 12% one.

The difference between the price put on goods sold for immediate and delayed consumption are impossible to explain in terms of such a rational discount factor. Indeed, they often appear closer to the illustrative but highly-unrealistic 50% per-day example used above. To illustrate, it is routine for a vending machine to charge 30p for a candy bar that will cost 25p at a supermarket. If the typical delay to consumption from a supermarket purchase is liberally estimated at one week, and the corresponding delay for the vending machine purchase is conservatively estimated at zero, then someone who does not buy the candy bar from the supermarket but does buy it from the vending machine has an implied annual discount rate of over 948% (a 16.6% return in one week for an investment of 25p). A similar argument shows why quantity discounts are difficult to account for on the basis of time discounting alone. The implied discount rate of a pack-a-day smoker who can buy a carton of 5 packs of cigarettes for £17.99 but pays £4.04 per day instead (current prices for Silk Cut cigarettes at my local supermarket) is 6% *per day*. There are no other investment opportunities that offer such a high rate of return.

There are many ways to reconcile such excessive discount rates with conventional economic factors. Many people will buy small quantities at high unit prices because

they have no need for larger quantities. An occasional smoker, for instance, might be unable to anticipate his need for cigarettes, and therefore will not know that he will need cigarettes tomorrow. Likewise, there are storage and other transaction costs associated with buying in quantity, as well as the possibility of spoilage. Such rationalisations, however, are only occasionally satisfying. Many people, for instance, pay premium prices day-after-day for cigarettes, soft drinks and candy bars. It is difficult to believe that keeping four extra cigarette packs on hand is cumbersome, or that habitual smokers cannot predict their future consumption needs.

Excessive discounting is not the only challenge to DU's status as a descriptive model of choice. There are also a host of 'anomalies', which suggest that the discount factor δ implied by choices are systematically related to many normatively irrelevant contextual factors (Loewenstein & Thaler, 1989). The magnitude of the discount factor, it turns out, depends on *when* the period of discounting begins, *what* is being discounted, and *how much* is being discounted⁵. These anomalies are the key to understanding the inconsistent preferences described in the introduction.

Anomalies in intertemporal choice

According to DU theory, the discount factor δ is constant and independent of when a given delay interval begins. To return to our smoker with $\delta=0.5$ per day, if a pack of cigarettes available *today* is worth £3.00, a pack available tomorrow is worth £1.50, and a pack available in two days is worth £0.75 and so on. On each day, the value is reduced by 50%. Regardless of the discount factor, this regularity leads to an unlikely prediction. If the smoker prefers one pack today to two packs in one week, then the smoker will also prefer one pack in 51 weeks to two packs in 52 weeks. Our intuitions immediately tell us that this is untrue, and experimental tests have shown that this prediction of the stationarity assumption is often violated (Green, Fristoe & Myerson, 1994; Kirby & Herrnstein, 1995; Solnick, Kannenberg, Eckerman & Waller, 1980). Kirby and Herrnstein, for instance, gave subjects real choices between two expensive prizes (personal stereos) with a constant inter-prize delay (the better prize came later). Participants wanted the smaller prize when it was available immediately, but when a delay was introduced, most changed their choice to the larger of the two prizes. This suggests that δ is *timing-dependent*: it is higher for options that will be received immediately than for ones that will be delayed.

Discounted utility theory also predicts that δ is independent of what is being discounted. The main implication of this is that the preferences between options available at the same time in the future will be independent of how long the delay is. Again, however, both common sense and empirical research suggest that this is untrue. To illustrate, imagine a smoker trying to quit who chooses between a stick of gum and a cigarette, with the chosen option to be received in 24 hours. Since he is trying to quit, the smoker will probably choose the gum. But 24 hours later, if asked again, we would not be surprised if he chooses the cigarette. This phenomenon was demonstrated by Read and Van Leeuwen (1998) in the domain of food choices. They offered people two choices between *unhealthy* (beer nuts and chocolate bars) or *healthy* snacks (apples and bananas). An *advance* choice was made one week before the time of consumption, and an *immediate* choice just moments before (that is, they could change their mind). Of the 49% who chose a healthy snack in advance, 74% changed their mind when they

actually had to execute their choice. This suggests that the discount rate is *item-dependent*, and, specifically, that that it is greater for vices than for virtues.

A special result of item-dependence is seen in *valence-reversal*, where some options are positively undesirable when they are still some way off, but desirable when they are available immediately. When this occurs, the same people can be found willing to pay for something at one time, but pay to avoid it at other times. Today a smoker will pay to have no cigarettes tomorrow (investing in a quitting program), but tomorrow will pay to have the cigarettes. Aspiring dieters will do the same thing. Likewise, an option can be undesirable when it is to be consumed immediately, but desirable if it is delayed. In this category might fall rollercoaster rides, dentist appointments and exercise. Using the notation introduced above, these are [B,N] and [C,N] choices.

A final anomaly is *magnitude-dependence*. This is perhaps the most robust finding in intertemporal choice – the value of δ for large amounts is larger than that for small amounts. Thaler (1981), for instance, observed that the median value of δ (per year) was 0.42 for a prize of \$15, and 0.78 for a prize of \$3,000.

In the next section I describe how all three anomalies can be understood as variations on the same theme of choice between virtue and vice, in which the discount rate for vice is greater than that for virtue. Timing dependence occurs because the immediate utility from a smaller-sooner alternative is greater than that from a larger-later one, although the smaller-sooner alternative yields less total utility. That is, $\{0,4,2,2,2\}$ is a virtue relative to $\{3,1,1,1,0\}$. Likewise junk food is a vice relative to fruit and cigarettes are vices relative to chewing gum, and in general item-dependence occurs because one of the options (the one with the higher discount rate) is a vice relative to the other. The two kinds of valence reversal depend on whether the option being considered is a vice or virtue relative to the neutral option. People might pay to avoid these vices prior to the moment of consumption, yet pay for them at that moment. In addition, they might pay for virtues before they are to be consumed, but pay to avoid them at the moment. Magnitude-dependence, occurs because the shape of the payoff distribution from larger amounts is more virtue-like than that from smaller amounts.

The immediacy effect

Many researchers have proposed alternatives to the DU model based on the notion that immediate utility is given disproportionate weight relative to delayed utility (Ainslie, 1975, 1991; Becker & Mulligan, 1997; Harvey, 1994; Herrnstein, 1997; Kirby, 1997; Loewenstein & Prelec, 1992; Mazur, 1987; Strotz, 1956). One formulation that has been widely adopted by economists (e.g., Laibson, 1997; O'Donoghue & Rabin, 2000) takes the following form:

$$U^0(u_0, u_1, \dots, u_T) = u_0 + \beta \sum_{t=1}^T \delta^t u_t, \quad 0 \leq \beta \leq 1. \quad (3)$$

As in Equation 1, U^0 is the present value of a utility stream, u_t is the utility experienced at time t , and $\delta \leq 1$ is a constant discount factor. The new parameter, β is an *immediacy effect* – in addition to the conventional level of positive time preference represented by δ , immediate utility is valued more than delayed utility by a factor of $1/\beta$.

If there is an immediacy effect, the relationship between the present value of a utility stream and the delay to the onset of that stream depends on how the utility is distributed. Figure 2 shows how the present value of the five options discussed above

changes as the delay to those options decreases. Figure 3 shows how value changes for two options where one option (e.g., {4, 2, 2, 2}) is a virtue relative to the other (e.g., {6, 1, 1, 1}), but both options are better than the neutral option. Both figures show that when a sequence is ‘front-loaded,’ meaning it begins with a disproportionate shot of positive or negative utility, then its value changes sharply as it is delayed. That is, delay has the greatest impact on these front-loaded utility streams. This fact is enough to account for all three anomalies described above.

FIGURES 2 AND 3 ABOUT HERE

Timing-dependence occurs because utility streams, such as (A) and (C), which begin with a large gain rapidly grow in value when they become available immediately, and those such as (B) or (D) which begin with a large loss will rapidly decrease in value. *Item-dependence* occurs because options that have a high proportion of their benefits in the first period will be discounted faster than those that have a high proportion of their benefits in later periods. In particular, valence reversal occurs because alternatives with benefits in the first period followed by net costs can fall on the negative side of the divide when they are delayed, but the positive side when they are not delayed; and alternatives that begin with costs and end with gains can go from unattractive to attractive when delayed.

Magnitude-dependence occurs because the shape of the consumption distribution from smaller amounts is more front-loaded than that for larger amounts. Consider, for instance, the hypothetical prizes of \$15 and \$3,000 offered by Thaler (1981). It is likely that when somebody receives \$15, they will spend it right away, probably on something (such as lunch or a movie) that will be consumed more-or-less immediately and will have short-lived consequences. Someone who receives \$3,000, on the other hand, will likely want to invest some of the money (hence deferring consumption) as well as spend some of it. Moreover, even what they do spend it on is likely to be something that will last, such as a watch or a coat. That is, the proportion of the smaller prize that will lead to ‘immediate utility’ will be greater for the smaller than for the larger prize. This is not only true for money. Indeed we have already discussed this in relation to objects like cigarettes – the utility from several packs of cigarettes is spread over a long period, while that for one pack is front-loaded. Thus, even though two packs of cigarettes will always be preferred to one no matter how long they are delayed, the rate of change in value as we move from making the cigarettes available immediately versus delaying them is greater for one pack than for two.

Timing and marketing

Marketing is about discovering and creating consumer needs, and then meeting them. Once we know how consumer’s preferences change as a function of the time intervening between preference evaluation and consumption, we can also customise the marketing environment so that we are meeting the customer’s needs in the form they take when they are acted on. I will focus on the prototypical case of the restaurant, although the principles discussed are relevant to all marketing of options that can be described as a utility stream – that is, everything.

The success of a restaurant (especially one that relies on high turnaround and repeat business with low profit margins) depends on the ability to satisfy wide variation in consumer preference. Some variation is due to time perspective. Even if we restrict our attention to the simple choice between virtuous healthy and vicious unhealthy foods, there will be several kinds of customer, each with differing marketing needs.

There are those who plan to eat healthy food and do so (call them HH), there are those who plan to eat unhealthy food and do so (UU); and there are those who change their minds (UH and HU). The data from the study by Read and Van Leeuwen (1998), given in Table 1, can be used as a illustrative estimate of the size of each group in the population. Recall that in that study everybody made two choices between healthy and unhealthy snacks, the first an *advance* choice one week before consumption, the second an *immediate* choice moments before consumption. The largest single group of participants was the consistent UU group, but the next largest group – 35% of the sample – was the HU group whose virtuous plans were changed at the last minute. Consistent with what we would expect if these preferences reversals were due to an immediacy-effect, the UH group was virtually empty – few people who planned to eat junk food changed their mind.

TABLE 1 ABOUT HERE

The only information most restaurateurs will have is the immediate second choice of each customer, as depicted on the bottom of the table. Based on this evidence alone, it might seem clear that the optimal marketing strategy is to cater to those who want unhealthy snacks, and to give little consideration to the 16% who want healthy items, because they constitute such a small proportion of the customer base. With such a small market, the cost of offering a healthy-item menu could easily exceed the revenue it brings. This reasoning, however, is flawed because people do not decide on a restaurant based on what they will eat, but on what they *think* they will eat. Those who plan to eat healthily, even if they ultimately change their mind, will not go to a restaurant that offers a poor selection of healthy items. If a restaurant wishes to attract HU diners, therefore, it must ensure that they can plan to eat healthy food, and this means having healthy items on the menu⁶.

This does not, however, exhaust the strategic considerations. Members of the HU group will differ in their level of what O'Donoghue and Rabin (1999; c.f. Strotz, 1956) call *sophistication*, or their awareness of how their preferences will change once faced with a choice between virtue and vice. *Naïve* HU diners believe (incorrectly) that they will eat healthy food. In principal, the needs of these diners can be met by advertising healthy food that is never available in the restaurant. *Sophisticated* HU diners know that once faced with temptation, they will succumb. They will be reluctant to go to a restaurant, even one that offers a healthy menu, unless they believe it will help them to achieve the goals they have set while they were in their 'right mind.' Such diners can be catered to by allowing them to order their meals in advance, by giving an option of separate 'healthy' menus that will reduce temptation⁷, or by offering a restaurant which provides only healthy food. Something like the latter strategy has been adopted by Subway, who promotes itself heavily as a healthy place to eat. Subway is the fifth largest Sandwich chain in the US, with approximately 6% of sales. It is possible that this 6% is close to the true size of the 'healthy sandwich' market, since none of the other major sandwich chains have any kind of healthy image – approximately 70% of this market is shared amongst McDonalds, Burger King, Taco Bell and Wendy's (Zuber, 2001).

The issues described apply to all markets of goods or services that are likely to be used repeatedly, and for which choices can involve trade-offs between immediate and delayed utility. This includes food and addictive goods (like drugs or gambling), and also entertainment, including museums, books and movies. We can illustrate this with movies, a domain in which there has been relevant research. 'Vice' movies are those

which people want to see because of the immediate pleasure of the experience, but which are forgettable and maybe even a bit embarrassing to admit having seen; and ‘virtue’ movies which people want to *have seen* but are maybe less enthusiastic about actually seeing. In a study of choices between such movies, Read, Loewenstein and Kalyanaraman (1999) found that when people anticipated watching the movie in the very near future, they tended to choose vice movies (e.g., *The Mask*,), but if they thought the experience was some time away, they chose virtue movies (*Schindler’s List*).

The variety of consumers, as defined on the virtue/vice dimensions, suggests that the *menu*, broadly defined as the choice set offered to consumers both before choice as well as at the moment of choice, is an important marketing tool. Moreover, the contribution of each item on a menu cannot be determined only from the sales of that item. Offering a healthy option in a restaurant may bring people in who would not otherwise come, even if they end up buying something unhealthy. Likewise, a multiplex cinema might get a lot of revenue from offering a wide variety of films, even if most of their audience ultimately see only one or two of these. The great variety acts as a kind of lure to the consumer, in which their various remote tastes are catered for and draw them to the cinema (Bown & Read, 2002), but when they arrive their immediate preference for the blockbuster overwhelms them and they buy a ticket to a lowbrow movie (Read et al., 1999). This is an application of a principle which has wide application in marketing. People will come to a retail establishment because of their perception of the range and quality of what is available, but once there they will buy what they want.

Promoting virtues at the point of sale in an attempt to get those whose with HU tastes to take virtue can have a hidden cost. The promotion of virtues can remind those who wanted to take vice that their choice has consequences. For example, imagine advertising healthy food using svelte models in an attempt to emphasize its long term benefits. This may help potential consumers to stick with their healthy plans (increasing the size of the HH cell), but it might also embarrass UU customers and be particularly painful to those who remain in the HU cell – they will be very aware of what they are foregoing. Indeed, one curious fact about Taco Bell’s introduction of Border Lights is that it led to a 7% *reduction* in overall sales. This occurred despite extraordinarily heavy promotion for Taco Bell, and despite the fact that the size of its menu had been virtually doubled – Border Lights did not replace the old menu, merely supplemented it. While it is not possible to determine precisely why Taco Bell’s sales went down, we can speculate that the presence of healthy items (and people eating them) may have made their traditional customers uncomfortable, driving them to restaurants offering unalloyed enjoyment (see L. Samuelson & Swinkels, 2002).

The issues discussed in this section are all implicated in the more general question of how to meet the needs of consumers whose preferences vary systematically as a function of delay-to-consumption. In the next section I consider what can be done, in the marketplace, to help consumers to choose virtue over vice. Or, more colloquially, to resist temptation.

The market for willpower

A choice between virtue and vice leads to temptation. We are drawn to take a short term reward, or forego a short term pain, in exchange for an overall loss. Not all temptations are alike. They differ especially in the intensity of the drive to choose vice

over virtue (determined largely by the difference in immediate utility), and consequently in the kinds of interventions that can be expected to influence choice. Figure 4 depicts the continuum of temptation along with descriptive labels for methods that might influence choice at each point on the continuum. At one end decision makers are fully ‘in control’, meaning that they are *capable* of choosing virtue, but might need some information to help them recognise which options are virtuous. At the other end they are completely ‘out of control’ and therefore incapable of choosing virtue unless they are physically *constrained* from doing otherwise. As we move to the right of the continuum, the interventions that can produce virtuous choice become increasingly radical. Consider two typical temptations, one from each extreme of the continuum. First, a student chooses between two bank accounts. The vice account offers a mobile phone as a reward for opening an account, while the virtue account offers a higher interest rate and a larger overdraft. The student might be tempted by the phone, but once *informed* that she will be financially better off with the other account, it takes little strength of will to resist vice and choose virtue. Now take a chain smoker, deprive him of cigarettes for 24 hours and then offer him a choice between a cigarette or a stick of gum. Even if the smoker knows the gum will be better for him in the long run, he will not be *able* to make that choice. For us to induce the smoker to resist, we have to deny him the choice – he gets a stick of gum or nothing. In both temptations (bank account and cigarette) the underlying mechanism is qualitatively the same – the pull toward the greater immediate gratification – but the strength of that pull varies greatly, as does the kind of intervention needed to resist that pull.

FIGURE 4 ABOUT HERE

The methods depicted in Figure 4 fall into two general categories: changing the available option, and changing the costs or benefits of those options. Changing the options means to either remove vices or add goods. If there are no vices available, the consumer cannot choose them; if goods are added to the choice set, the vices, by definition, become bads and will therefore be rejected. Changing the costs or benefits of options means making virtues more attractive, or making vices less attractive. The most effective changes will be to immediate utility (the β parameter in Eq. 2), because of the disproportionate weight it receives in decision making.

The two categories do not have clear boundaries. At their most effective, changing the costs or benefits of options will transform vices into bads and virtues into goods, effectively changing the choice set. A special kind of intervention, is to bring forward the time at which irrevocable choices are made. Because of the immediacy effect this reduces the importance of immediate utility, and thus increases the (relative) immediate utility of virtue to vice, transforming the vice into a bad and the virtue into a good⁸. At this point, consumers are willing to restrict their own future options to the ones that they know will be best for them in the long run.

Whenever sophisticated consumers know they will face choices between virtue and vice, they will seek mechanisms to aid them in making the correct choice. There are currently many publicly available means to facilitate the choice of virtue over vice. Some are commercially available, and others are provided through public institutions like the medical or criminal justice system (see Elster, 2001; Wertenbroch, 2003). All can be described in terms of the basic strategies just described. Consider weight control programs, such as Weight Watchers, or any commercial diet. These all make use of the following methods:

Restricting the choice set by classifying some foods as ‘illegal’;
Adding to the choice set by offering relatively desirable alternatives to fattening food;

Decreasing the immediate utility of vice by counting calories, which which increases the salience of each calorie consumed,⁹ and also by providing social monitoring, which makes lapses embarrassing;

Increasing the immediate utility of virtue by providing social support;

Shifting decision making to an earlier point by encouraging prior menu planning.

All sorts of consumption and behavioural problems are dealt with using similar methods. Addicts can remove vices from their choice set by going to rehab centers, and drugs can be used to turn vices into bads (e.g., antabuse), or as not-so-bad alternatives to vice (methadone). Social support both makes staying dry more attractive, and imposes costs on relapse. Even jail can be seen as a government imposed form of control, in which the vice of crime is removed from the choice set of the offender – although in this case the offender has usually not sought to be controlled.

Apart from such explicit methods, the market offers many aids to self-control that may not be designed or marketed as such (Thaler and Shefrin, 1981, Wertenbroch, 2003). These are particularly evident in the market for intertemporal income distribution, which gives earners ways to ameliorate their tendency to spend as they earn. For instance, many US taxpayers overpay on their income tax, thereby giving an interest-free loan to the government, so that they will get a refund at the end of the tax year (Ayers, Kachelmeier & Robinson, 1999). This ensures that they will save at least some money over the year. The desire for enforced saving is also probably one of the reasons why the salaries for most professions increases with seniority, even in occupations where productivity does not increase with experience (Frank & Hutchens, 1993). People want their expenditure to increase over their lifetime, but know that they will not achieve this unless their income increases as well. Studies of people’s stated reasons for their preferences over income distributions show that many explicitly base their decision making on a desire for a distribution that forces them to save. Read and Powell (2002), for instance, found that people liked to have a fixed yearly income distributed in equal increments for 11 months, followed by a double-sized paycheque, just as it would be if they overpaid income taxes and received a refund. When asked to explain this, many asserted that the bonus provided them with ‘savings’ that they would not otherwise be able to achieve (see also, Loewenstein & Sicherman, 1994). Further evidence of ‘self-binding’ to achieve a preferred consumption distribution is found in the choices frequently made by a tribe of earners who can either take their yearly income in the form of small regular payments, or in the form of larger but irregular payments. These are US academics, who can receive their salary spread evenly over 12 or 10 months (with two summer months during which they are technically not employed). In principle, the 10 month distribution should be better, because it can earn more interest and increases their financial flexibility. Someone with a tendency to live from paycheque to paycheque, however, might like to get the smaller more regular cheques – otherwise they could have some impoverished summers – and indeed a large proportion of academics do prefer the 12 month distribution (Archibald, 1994). All these ways of achieving self-control work because they enable people to eliminate the vice of overspending from their future choice sets.

These financial self-control strategies also have another characteristic – they represent a conscious decision on the part of consumers to limit their access to available

goods or resources, for fear of overusing them. This is not an unrealistic fear, since research shows that the rate at which resources are consumed is in proportion to the amount of those resources available (Wansink, 1996). Wertenbroch (1998, 2003) argues that consumer self-control can be seen as a kind of resource management, with consumers restricting their own access to products to reduce consumption rate. One form that this takes is *purchase-quantity rationing*, in which consumers buy vices in small quantities (Hemenway, 1977 ; Wertenbroch, 1998). There are several ways that purchase quantity rationing can reduce total consumption of vices, all of them being variations on the tactics discussed earlier. First, there is the conventional cause: because buying in small quantities costs more per unit in both time and money, it will increase the monetary and transaction cost of vice. Second, the cost of vice is made more salient by having to make frequent trips to the store. Finally, it provides an easy way to draw a line between acceptable and unacceptable levels of consumption. In the case of cigarettes, if there is more than one trip per day to the corner store, you are smoking too much¹⁰. This is an area where the market has apparently responded by decreasing the costs of vice in order to induce greater consumption. As Wertenbroch (1998) argues, if people like buying vices in small quantities, marketers will have to offer exceptionally large quantity discounts to induce people to buy in bulk. He compared quantity discounts for matched pairs of products that differed in their degree of viciousness, and found that the quantity discount was greater, sometimes profoundly so, for the relative vice in the pair. For example, quantity discounts are greater for regular beer than for non-alcoholic beer; greater for ice cream than for frozen yoghurt; and greater for pornographic magazines than for news magazines.

Many mechanisms are available to consumers to help them influence their future choice. While they can rarely make irrevocable commitments to choose virtue over vice, they can do things that will make it easier to choose virtue when the time comes. One way is to pay for virtue in advance. A theatregoer can subscribe to a season of highbrow plays, and those who wish to stay fit will pay a sizable membership fee before they can use the gym. There are several ways that prepayment increases the likelihood of choosing virtue over vice at the moment of consumption (see also, Thaler, 1980). First, it reduces the immediate cost of virtue. If you have already bought a nonrefundable ticket for *King Lear* you do not have to factor that money into the calculation when deciding between *Lear* and a night at the pub. Second, because of our tendency to include sunk costs in our decision making, failing to attend will be accompanied by a feeling that the money is being 'wasted' (Prelec & Loewenstein, 1998). Moreover, merely by making an advance commitment to choose virtue the consumer is more likely to follow through. Read and Van Leeuwen (1998), for instance, found that consumers were much more likely to eat a healthy snack if they had been induced to make an earlier non-binding choice for such a snack. Membership fees which are not linked to specific times of attendance are probably less effective – although not going to the gym may make one feel guilty, the guilt is usually less clearly linked with a specific act of non-attendance. An athletic club could increase attendance by charging an exorbitant membership fee, that could be gradually reduced (through refunds) to a normal membership fee through regular usage.

Despite the number of self-control mechanisms already available, it is likely that the market for aids to virtuous choice is yet to be fully developed. First, many of the currently existing mechanisms have not been designed for this purpose (and consequently are typically quite blunt instruments for achieving it), and are are not

explicitly marketed as such. Certainly, for instance, the possibility of having too much tax withheld for savings purposes was not part of the IRS's plan; nor are small cigarette packs made available to help smokers control consumption – rather, these are options that were designed for one purpose, but can be used for another.

In addition, there are domains where marketers have never trod, yet where their intervention would likely be welcomed. One that is of particular interest for freelance workers like academics is procrastination. Perhaps because procrastination is the vice to which academics are most addicted, procrastination has received wide discussion in recent years (e.g., Akerlof, 1991; Ariely & Wertenbroch, 2002; Sabini & Silver, 1982; O'Donoghue & Rabin, 1999; Read, Loewenstein & Rabin, 1998; Read, 2001; Schelling, 1984; Tice & Baumeister, 1997). Procrastination is a vice relative to 'getting down to it' because not doing something is more pleasant, right now, than doing it, but in the long run it is better to do it now.

As with all self-control methods, there are two kinds of cure for procrastination. The first cure is to eliminate alternative actions. Procrastination occurs because there is something else to do. Schelling (1982) cited an anecdote illustrating this. When George Steiner first visited Georg Lukacs, he was overwhelmed by the volume of Lukacs work. When he asked how he could accomplish so much, Lukacs replied "House arrest, Steiner, house arrest." As someone who frequently longs for a bout of house arrest, I can testify that the market currently has no mechanism for providing short-term bouts of house arrest to procrastinators. I would pay £100 a day to someone who will lock me in a clean room with a desk, a chair, a computer (*not* connected to the internet) and a few papers (only those necessary for the work I am doing).

A second (and second-best) way to decrease procrastination is to make it costly, and the traditional way to do this is through the imposition of deadline penalties. This is how professors get students to hand in work that would otherwise never get done, and how newspaper editors force recalcitrant hacks to complete their columns. Recent research has shown that people are aware of the importance of deadline-penalties for getting things done, and are therefore willing to impose them on themselves. Trope and Fishbach (2000) gave their subjects a chance to impose a non-completion penalty on themselves for either an unpleasant or pleasant task. Their subjects wanted to impose harsher penalties for the unpleasant staff, showing that they recognised the potential effectiveness of the penalty. Ariely and Wertenbroch (2001) allowed students to self-impose deadlines for completing three assignments. Rather than choosing the most 'forgiving' of deadline schedules (i.e., delaying the deadline for as long as possible), Ariely and Wertenbroch's students chose strict deadlines that would lead to more timely completion of their work – provided they had self-control problems. Unfortunately, there are few ways for procrastinators to impose credible deadlines on themselves. I suspect that there is a market for a kind of reverse insurance in which an actor places a sum of money in escrow, which is returned if a deadline is met, but otherwise retained by the organisation holding the money. To ensure that no cheating occurs, the actor could make a commitment to produce work of a publicly verifiable standard. Personally, I would use such a service, and I predict many others would do so as well¹¹.

Conclusion: On consumer sovereignty

This section has pointed out some of the possible choices that might be made by sophisticated consumers who are looking for ways to assist them in their quest for control. But even when consumers are *naïve* or unaware of the existence of a

virtue/vice distinction in their choice set, there may be an implicit demand for virtue, driven by the repeat business from consumers who attain the greater satisfaction that comes from a choice of virtue, even if they don't necessarily know how that choice was achieved, nor necessarily even to have unambiguously wanted to make that choice when they made it. For example, imagine visiting a co-author with the goal of completing a project. During the visit you are constantly tempted by the desire to 'chat,' but your Calvinist colleague keeps your nose to the grindstone. Returning from the visit you reflect on how much you have accomplished and are satisfied and resolve to return at the earliest opportunity. Compare this with another hypothetical visit to a more sociable colleague with whom you have a great time, but end up accomplishing nothing. On the way home you are angry with yourself with wasting your time. This illustrates the fact that satisfaction will not always be best achieved by allowing consumers to choose what they want, *when* they want it. Sometimes, they may be made happiest by being given a restricted choice set, or by having their choices 'guided' in the right direction. A video rental place may obtain success by not stocking 'lowbrow' movies even if their customers would rent them if they were on the shelves. Perhaps a restaurant is better off not tempting their customers with a 16 ounce steak.

This argument is a challenge to our notion of consumer sovereignty. It suggests that consumers might not be better off taking what they want. The argument is presented graphically in Figure 5, which shows how preferences for two options (a virtue and a vice) change as a function of time – both the time before receiving one option, and the time afterwards. Most who have given into temptation will recognise the pattern. When consumption is distant, there is a preference for virtue. When consumption is imminent, however, preferences reverse in the direction of vice. Afterwards, however, preferences change immediately: if vice has been chosen there is a feeling of disappointment, and if virtue is chosen there is a feeling of relief or satisfaction.

FIGURE 5 ABOUT HERE

Such dynamic inconsistency constitutes a challenge to the principle of consumer sovereignty, according to which consumers are the best judges of what is in their interests, and will take it if given a free choice. If preferences depend on when they are sampled, then we cannot infer from the choice of an option that it is, in fact, the one that a consumer wants. To illustrate, consider the HU consumer from the previous discussion. Some time prior to consumption, this consumer wants to eat healthy food, but at the moment of choice, when the tempting foods are arrayed before him, the consumer takes the unhealthy item. We can ask a number of difficult questions about this choice, with two being of paramount importance. The first is whether the consumer made the best choice. Or, to put it another way, is this what the consumer *really* wants? The second question depends, in part, on the answer to the first. If there are circumstances under which consumers do not choose what they really want, then should marketers offer them the choice at all?

The answer to the first question is difficult. There are many arguments suggesting that the consumer's 'true' wants are reflected in their virtuous pre-reversal preference. One argument is that the preference for virtue is more long-lasting than the preference for vice (e.g., Nozick, 1993). This may not seem obviously true. Consider a smoker who 'wants' to quit. He may spend most of his life smoking, and so we certainly cannot say that most of his time is spent in a state of not desiring cigarettes. For any *given* cigarette, however, this is true. Although he will want *a* cigarette right

now, he will prefer not to have the *next* cigarette (call this cigarette X). Later he will want cigarette X, and he will smoke it, but afterwards he will have preferred that he had not smoked it – even though he will then want cigarette Y. For each individual cigarette, we can divide the smoker's life into a time when he preferred the cigarette – this may be only a few minutes – and a time when he would have preferred to have not had that cigarette – this might be 50 years. The argument goes, therefore, that the ‘majority’ should rule, and that consumers most want what they want most of the time.

A second argument is that virtuous preferences are based on more rational choice processes than are non-virtuous ones. Many authors have suggested that dynamic inconsistency arises from the operation of two motivational systems (Hoch & Loewenstein, 1991; Loewenstein, 1996; Metcalfe & Mischel, 1999; Thaler & Shefrin, 1981)¹². One is a ‘hot’ system that is emotional, impulsive and reflexive, while the other is a ‘cool’ system that is, in the words of Metcalfe and Mischel (1999) ‘cognitive, emotionally neutral, and contemplative.’ The hot system is a vital evolutionary adaptation, because it facilitates (and may even underlie) the fight or flight responses. Yet in situations where fast responses are unnecessary, the cooler system enables the decision maker to make reasoned judgments. That is, it is better to run even if there is only a small possibility that there is a tiger (the hot system), but if there is time to reflect it is better to run only if there really is a tiger (the cool system). The immediacy effect (which leads to the rapid increase in the desire for vice when it is very close) is thought to reflect the operation of the hot system, which chooses based only on primitive ‘visceral’ desires and immediate consequences. The cool system, on the other hand, which takes a more dispassionate, long-term and reasoned view of matters, takes into account all (or at least more of) the consequences of one’s decisions. Therefore, its decisions are ‘better’ than the others, and are indeed what the person taken as whole really wants.

A third argument is that the person is *better off* if they choose virtue over vice. This argument is based on the utilitarian view, already alluded to above, that the best decisions are those that maximise total lifetime utility. Since vices (by definition) offer less total utility than virtues, people are objectively better off choosing virtue, and so their preferences for vice are misguided.

These arguments suggest that the unquestioning assumption of consumer sovereignty may not be appropriate – ethical marketers will not wish to profit from regrettable weaknesses of will, and at the expense of the consumer’s long term interests. Yet simply knowing that such weaknesses of will occur does not enable us to identify when they are occurring. As discussed above, the concept of virtue and vice does not refer to specifiable options, but rather to the experience of those options by the individual consumer. Merely because a consumer demands what seems (to us) to be a vice does not mean that their choices are actually based on a momentary weakness of will. Consider again the data of Table 1. The majority (59%) of those who ended up choosing the unhealthy snacks were consistent in their preferences. For these participants, the unhealthy snacks were goods relative to bananas and apples.

Second, there are no unambiguous behavioural measures of whether options are relative virtues and vices. Even the preference reversals – either before choice, after choice (in the form of regret), or both – are not an unequivocal demonstration. There are many other reasons for a consumer to change their preference shortly before consumption, and even to do so consistently. A dieter who always states that she will ‘skip dessert’ may consistently change her mind when the dessert tray comes around not

because she is weak-willed, but because she is chronically unable to anticipate how good dessert is. The sight of the dessert, therefore, does not overcome her better judgment but provide her with information that enables her to make better judgments. Even the presence of regret (whether or not it follows a preference reversal) is also no demonstration that the decision maker has made a bad judgment. Regret is an unreliable index because it occurs *after* many of the benefits of a choice are enjoyed, and when the costs are now being borne. Our dieter may increase her total lifetime happiness by enjoying a marvelous dessert, even if she later wishes she had not burdened herself with the extra calories.

In this paper I have tried to show that an understanding of dynamic inconsistency is a crucial part of our understanding of how to meet the needs of consumers. Taco Bell, it was suggested, failed to recognise that the same consumers who want healthy food when they don't have to eat it, might want unhealthy food when they do have to eat it. How this understanding can be used is up to us. Should we put temptation in the way of consumers, or should we try to keep them out of temptation's way? This is, of course, an individual decision and the previous discussion can only tell us what decisions there are to make.

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Table 1: Distribution of choice patterns for healthy and unhealthy snacks reported by Read and Van Leeuwen (1998).

		<u>Immediate choice</u>		
		Healthy	Unhealthy	Total
<u>Advance choice</u>	Healthy	14%	35%	49%
	Unhealthy	3%	48%	51%
	Total	17%	83%	

¹ What the industry calls ‘health food’ is often far from what a nutritionist would call health food. High fat soya milk, granola bars, and organic cereals sweetened with brown sugar are no more ‘healthy’ than whole milk, Snickers bars and Captain Crunch. Low fat, high soluble-fibre, and (especially) low calorie foods have never caught on in a big way.

² Calling a stream neutral does not mean that it has no effect, but only that its value is factored into the value of the option to which it is compared in the form of forgone pleasure or pain -- it is the reference point against which the option is compared. For example, consider option C: taking the neutral alternative will mean missing 4 units of pain in the first period, but losing 2 units of pleasure in each of three later periods. In principle, any alternative can be rescaled so that it becomes a string of zeros relative to an alternative (if option C was so rescaled, doing nothing would then be the same as option B). It is convenient, but not essential, to assign the alternative ‘doing nothing’ the role of neutral alternative. Doing nothing is the usual alternative to doing something.

³ It should be emphasised that time discounting is not the sole cause of any of the phenomena discussed in this paper (Frederick, Loewenstein & O’Donoghue, 2002). My goal is to show how time discounting contributes to decision making, and so, apart from a few hedge words, I make little reference to other factors.

⁴ The interest rate r for a given period can be derived from δ : $r = \frac{1 - \delta}{\delta}$.

⁵ A fourth anomaly is frequently discussed: an asymmetry between losses and gains, with losses being discounted less rapidly than gains. This anomaly is not discussed here, although it is worth mentioning that it can be explained in terms of differences between losses and gains in their intertemporal utility distribution, or as being an artifact due to differences in the utility function for losses and gains. The latter explanation is discussed in Loewenstein and Prelec (1992).

⁶ This issue is the subject of formal analysis in a recent paper by Samuelson and Swinkels (2002).

⁷ While many restaurants offer different menus for children and adults, I have never seen one that offers a different ‘light’ and ‘indulgent’ menu. There are good reasons for this. While sophisticated HU diners might appreciate a menu choice, socially sensitive UU diners might be embarrassed to choose the indulgent menu when their fellow diners are doing otherwise, and might even feel obliged to choose the light menu. It is unlikely that such self-sorting on the basis of different levels of a socially desirable characteristic will be conducive to a good dining experience.

⁸ Note that for true virtues and vices this will always occur with the introduction of a delay.

⁹ Note that counting calories against a target also reduces any uncertainty about what is legitimate and illegitimate behavior. Schelling (1984) emphasized the importance of having such clear demarcations in attempts to increase self-control.

¹⁰ An additional benefit, perhaps not in the same spirit as the other ones discussed herein, is that it can allow the consumer to ‘run out’ occasionally and thus reduce total consumption. This may be particularly true for less addictive vices like cookies.

¹¹ A colleague has recently informed me that a distinguished American economist actually offers this service to his recalcitrant co-authors.

¹² The idea that there is an internal conflict between an ‘impulsive’ and ‘contemplative’ side of the person, with the impulsive side having to be held in check by the more rational one, is one of the oldest. It was already a standard notion by the time of Socrates (Price, 1996).

Figure 1: Typical pattern of preferences for health food and junk food during hypothetical (abstract), prospective and imminent choice.

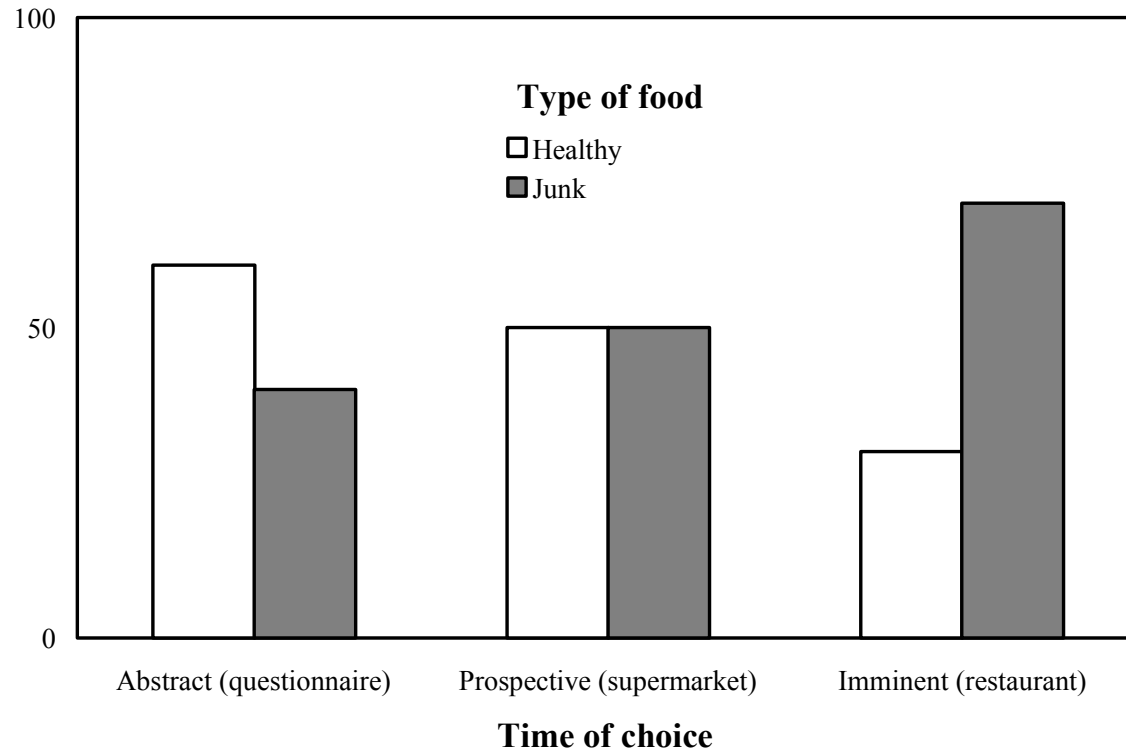
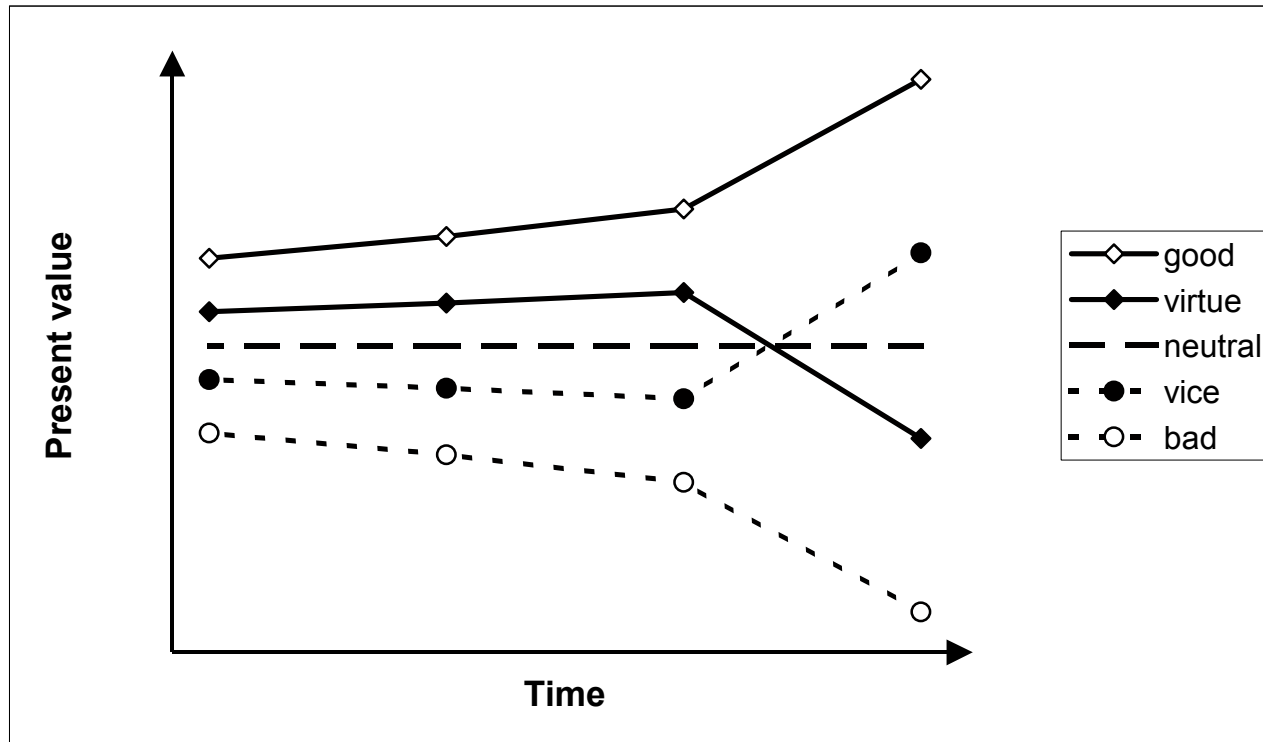


Figure 2



Five options discounted with increasing delay. Observe how the values of virtue and vice crossover as delay approaches zero. Virtue is valued more than either the vice or neutral option when there is a delay, but when choice is for immediate consumption vice is preferred to virtue.

Figure 3: Relative values for two options, a vice and virtue both having value greater than the neutral option, with the vice to be received sooner than the virtue. Note that when receipt is imminent, the smaller-valued vice is valued more than the virtue.

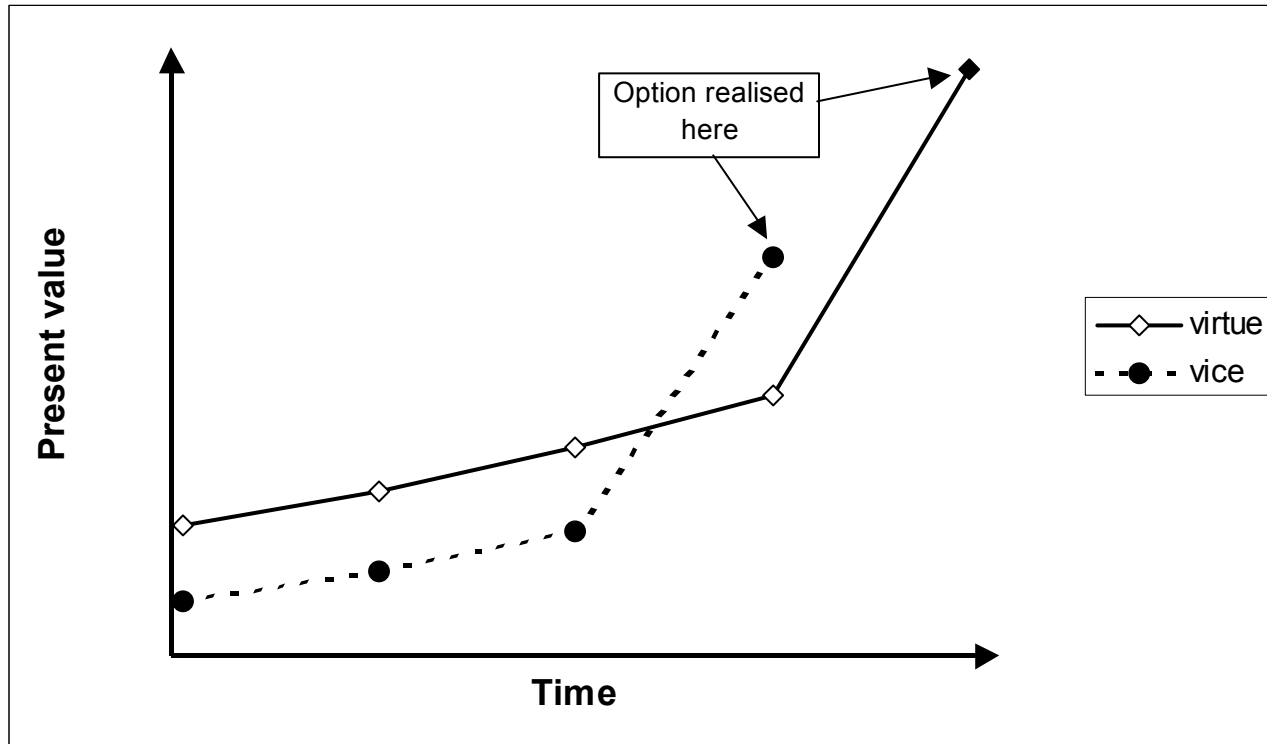


Figure 4. Effective methods for managing the behavior of oneself or others for different levels of act controllability.

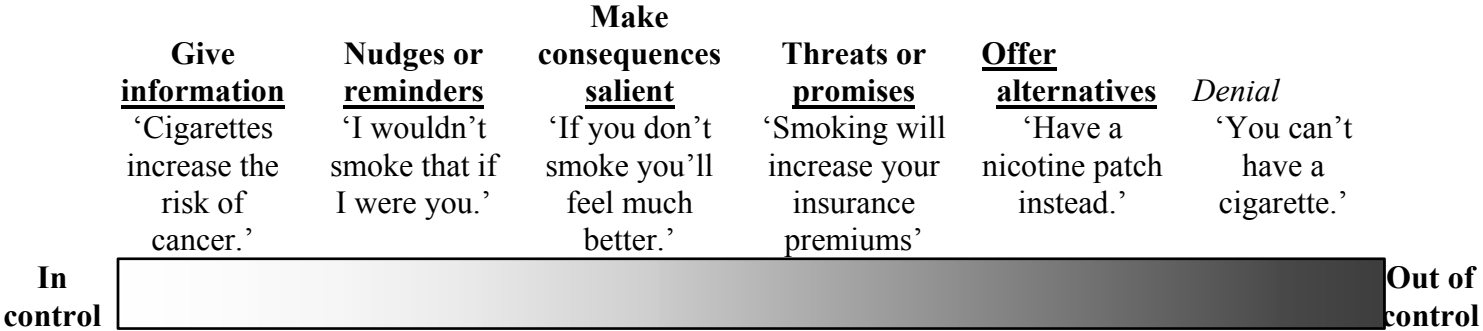
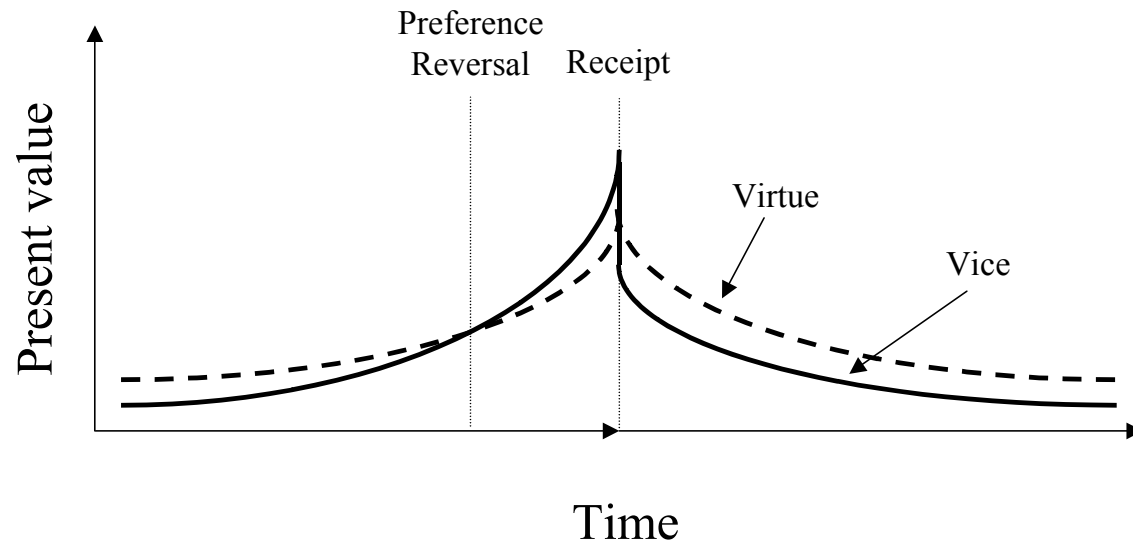


Figure 5: How preferences for relative virtues and vice change as a function of time – both prospectively and retrospectively.



Note that the virtue and vice options only have their distinctive properties during the period after the preference reversal to the moment of receipt. At all other times the virtue is preferred to the vice and is effectively a good.