Mixing Virtue and Vice: Combining the Immediacy Effect and the Diversification Heuristic

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ABSTRACT

Many of the most significant choices that people make are between vices, which exchange small immediate rewards for large delayed costs, and virtues, which exchange small immediate costs for large delayed rewards. We investigate the consequences of making a series of such choices either simultaneously or sequentially. We made two predictions. First, because many alternatives chosen under simultaneous choice will only be experienced following a delay, and because hyperbolic time discounting predicts that people will prefer delayed virtues but immediate vices, we predicted that people would choose more virtues in simultaneous than sequential choice. Second, due to the tendency to diversify portfolios of choices, we predicted a greater mix of virtues and vices in simultaneous than sequential choice. These predictions were confirmed in two experiments involving real choices; one between 'highbrow' and 'lowbrow' movies, and the other between 'instant-win' and 'prize-draw' lottery tickets. We conclude by posing the question of whether simultaneous or sequential choice results in decisions that more closely approximate what people 'really' want. Copyright © 1999 John Wiley & Sons, Ltd.

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Many of the decisions that get us into trouble involve minor, but repeated, choices between *virtues* and *vices*. Virtues and vices are defined relative to one another, based on the timing of their cost and benefits. For any pair of goods, a virtue provides more utility in the long run than its alternative, but

less utility in the period shortly after it is received (e.g. Wertenbroch, in press). The traditional Christian virtues, for instance, demand forbearance on earth in exchange for an eternity in heaven, whereas the vices exchange earthly pleasure for an eternity in Hell. In general, the costs of virtues are relatively small but are experienced early in the consumption sequence, while the costs of vices are larger but come later. Brussels sprouts, jogging, and reading journal articles are virtues relative to such vices as French fries, watching television, and surfing the Internet. Although the consequences of opting for a vice once or twice are typically trivial, the cumulative effects of repeatedly choosing vices encompass a large fraction of the ills that humans impose on themselves: rotting teeth, obesity, cirrhosis, intellectual stultification, and so on.

In choosing between virtues and vices, we sometimes have the option of choosing a series ahead of time — e.g. deciding on which evenings we will watch sitcoms and on which *Masterpiece Theatre*. At other times we make each decision singly, usually just before it is to take effect. Simonson (1990) refers to the former choice mode as *simultaneous choice* and the latter as *sequential choice*. The studies described in this paper demonstrate that whether decisions are made simultaneously or sequentially has complex but predictable ramifications for choices between virtues and vices.

The distinction between simultaneous and sequential choice has received a great deal of attention, although authors have referred to it using different terms: Kahneman and Lovallo (1993) used *narrow* and *broad* decision frames; Herrnstein and Prelec (1992) used *isolated* and *distributed* choice; Rachlin (1995) used decision making based on *acts* and *patterns*; and Heyman (1996) used *local* and *overall* value functions. These and other researchers have shown that when people make choices simultaneously as opposed to sequentially, they are likely to:

(1) Choose a more diverse consumption bundle (Read and Loewenstein, 1995; Simonson, 1990; Simonson and Winer, 1992)
(2) Display greater risk-seeking (Bernartzi and Thaler, 1995; Kahneman and Lovallo, 1993; Keren and Wagenaar, 1987; Lopes, 1981; Redelmeier and Tversky, 1992)
(3) Pay more attention to the impact of their choices on their own future tastes (Herrnstein and Prelec, 1992; Herrnstein *et al.*, 1993) and
(4) Put more weight on the delayed consequences of their decisions (Ainslie, 1975, 1992; Heyman, 1996; Rachlin, 1995).

Each of these discrepancies between sequential and simultaneous choice may be produced by different underlying mechanisms — in some cases by more than one. We suggest, for example, that the tendency to choose more diverse sequences of consumption in simultaneous choice results in part from a tendency to exaggerate anticipated satiation, and in part from a *diversification heuristic* that is evoked when a decision is framed as a portfolio choice (Read and Loewenstein, 1995). The increased risk-taking observed in simultaneous choice occurs because people recognize that each risky choice will be combined with others, and that the aggregate risk of the portfolio will be less than that of its components (Kahneman and Lovallo, 1993; Read, Loewenstein, and Rabin, in press). The greater attention paid to delayed consequences in simultaneous choice reflects the greater visibility of these consequences when many of them are combined (Ainslie, 1992; Read *et al.*, in press). And the tendency to place greater relative weight on delayed consequences in simultaneous choice follows from the *immediacy effect* (Prelec and Loewenstein, 1991) in time discounting.

In some situations more than one of these mechanisms might apply. For example, imagine someone faced with a series of choices between gambles: A versus B; A versus C; A versus D, and so on, in which A is always the riskier gamble but has higher expected value. The tendency to be more risk seeking in simultaneous choice (Kahneman and Lovallo, 1993) would favor A in each case, but the tendency to choose a more diverse portfolio (Simonson, 1990) would favor choice of at least some non-A gambles.

Two mechanisms are particularly relevant to choices between virtues and vices. First, because of the diversification heuristic, people might choose a greater mix of virtues and vices in simultaneous than in sequential choice. Second, because of the immediacy effect we would expect people to choose more virtues in simultaneous than in sequential choice. In the present paper we show that both of these effects can be seen in choices between virtues and vices, and explore the circumstances in which one effect or the other exerts a dominant influence on decision making. We start by discussing the immediacy effect and the diversification heuristic in greater depth.

THE IMMEDIACY EFFECT

The standard (discounted utility) model of intertemporal choice assumes a constant rate of time discounting, so that the net present value of a series of outcomes is specified by the formula:

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

where u_t designates the utility that one will obtain at time t, and $\delta \leq 1$ is the rate at which utility is discounted as a function of its delay. Such exponential time discounting has the special property that if one series is preferred to another, the same series will be preferred if both are delayed by a common period. Many studies have shown, however, that exponential time discounting does not accurately describe behavior. People are *dynamically inconsistent*, and show a systematic tendency to change their mind in the direction of vices as the moment of consumption approaches. For instance, approximately half of the subjects in a study by Read and Van Leeuwen (1998) chose a virtuous piece of fruit over junk food one week before they were to consume it, but immediately before consumption most of them changed their mind so that over 80% ended up with chocolate bars or crisps (see also Kirby and Herrnstein, 1995).

Many models of time preference incorporating an immediacy effect have been proposed (Ainslie, 1975, 1992; Becker and Mulligan, 1997; Harvey, 1994; Loewenstein and Prelec, 1992; Mazur, 1987), and most psychologists and many economists believe that the immediacy effect is an important source of dynamic inconsistency (Ainslie, 1992; Elster, 1977; Strotz, 1956; Winston, 1980). One model, proposed by Phelps and Pollack (1986), and since put to good use by several recent writers (Laibson, 1997; O'Donoghue and Rabin, 1997, in press), takes the following form:

$$U^0(u_0, u_1, \ldots, u_T) = u_0 + \beta \sum_{t=1}^{T} \delta^t u_t$$

where U^0 is the present value of a utility stream, u_t is the utility experienced at each time t, $\delta \leq 1$ corresponds to a constant discount rate, and $\beta \leq 1$ is an index of the immediacy effect — immediate utility is valued more than delayed utility by a factor of $1/\beta$ in addition to the normal level of positive time preference represented by δ. Laibson (1997) refers to this as a *quasi-hyperbolic* discount function, because of its similarity to the familiar hyperbolic discount function (Ainslie, 1975; Kirby, 1997).

Someone who discounts the future in a hyperbolic or quasi-hyperbolic manner will be likely to prefer an immediate vice over an immediate virtue, since the vice offers a larger reward in the present. The same individual, however, might well take the virtue if both are delayed, since in this case the initial reward offered by the vice will no longer receive disproportionate weight. Consider a choice between a virtue, which will yield 25 in the first period (when it is received) and 200 in the second, and a vice which will yield 100 in both periods. For simplicity, assume an immediacy effect of $\beta = 0.5$ with no other time

preference (i.e. $\delta = 1$). If consumption begins immediately, the utility stream is (25, 200) for the virtue, and (100, 100) for the vice. Their present value is, therefore:

Virtue: $25 + 0.5 \times 200 = 125$
Vice: $100 + 0.05 \times 100 = 150$

The vice will be preferred. On the other hand, if both sequences are delayed by one period, then the entire stream is discounted by β:

Virtue: $0 + 0.5 \times (25 + 200) = 112.5$
Vice: $0 + 0.5 \times (100 + 100) = 100$

Now the virtue will be preferred to the vice.

The immediacy effect leads to several predictions concerning the difference between sequential and simultaneous choices between virtues and vices. Since the alternatives taken in sequential choice are typically received or consumed right away, the immediacy effect will favor vices over virtues for every choice. When a series of choices are made simultaneously, on the other hand, typically only the first alternative in the series will be consumed immediately, and the others will not be consumed until later. We expect, therefore, that simultaneous choice will commonly result in vices being chosen early in the sequence, and virtues being chosen for later. This can be described in a series of closely related hypotheses:

H1: People will choose more virtues overall in simultaneous choice than in sequential choice.
H2: The proportion of *first* choices for virtue will be the same in both sequential and simultaneous choice.
H3: In simultaneous choice, more virtues will be chosen for delayed than for immediate consumption.

Simultaneous choice, therefore, produces a specific mix of virtues and vices: early vices and delayed virtues. In sequential choice, vices will predominate throughout the sequence. Of course, whether such a pattern is realized will depend on the relative desirability of the vice and virtue, and on the individual's specific time preferences.

DIVERSIFICATION HEURISTIC

The tendency to choose more diversity during simultaneous than during sequential choice has been demonstrated in a number of studies. In Simonson's (1990) original study, subjects made three separate choices between six types of snack foods. The snacks were consumed during meetings of a class which met once a week. Sequential choice subjects made the three choices separately, each on the day that the snack was to be received, whereas simultaneous choice subjects scheduled all three snacks on the first day. Although the modal sequential choice subject chose three identical snacks, most simultaneous choice subjects chose two or three different snacks (Simonson, 1990). In a follow-up study of real-world consumer behavior using scanner data, Simonson and Winer (1992) found that for a family who purchased a given number of yogurt cartons, the amount of variety in flavors was greater if they were purchased all at once than in several separate shopping trips. Read and Loewenstein (1995) observed a similar pattern amongst young trick-or-treaters, who always took different chocolate bars if they were received at the same house, but typically opted for the same bar at different houses. In that paper the authors also discussed and tested a wide range of possible explanations for the discrepancy between simultaneous and sequential choice. They concluded that the effect results in part from the fact that, in simultaneous choice, people take into account real or imagined preference interactions between goods

(such as complementarity or substitutability) that are not considered during sequential choice, and in part from an overall desire for variety, a *diversification heuristic*, which people apply when they are choosing many things at once, but which has little or no influence when they are choosing one at a time. This diversification heuristic makes a straightforward prediction for multiple choices between virtues and vices:

> H4: People will prefer more equal mixes of virtues and vices when making simultaneous, as opposed to sequential, choices.

COMBINING THE TWO EFFECTS

Both the immediacy effect and the diversification heuristic predict that there will be more mixing of virtues and vices in simultaneous than in sequential choice. They differ, however, in the details of how they predict that mixing will occur. The immediacy effect predicts that, while sequential choice will lead to a uniform stream of vices, simultaneous choice will lead to a series that begins with a vice and is continued by a stream of virtues. The diversification heuristic, on the other hand, predicts that, while sequential choice will lead to a uniform stream of either virtues or vices, simultaneous choice will lead to more of a mixture. The diversification heuristic is agnostic about the specific form that this mixture will take.[1]

The immediacy effect, as the label suggests, applies to outcomes that are immediate. In the procedures employed in earlier experiments, this is true of all outcomes in sequential choice and the first outcome in simultaneous choice. Because later choices in simultaneous choice are delayed, and therefore not subject to the immediacy effect, they are likely to reveal less desire for immediate gratification than any of the sequential choices or the initial simultaneous choice.

The diversification heuristic has different enabling conditions. For the amount of diversification to differ as a function of the choice mode, diversification must be possible (in that a completely homogeneous choice set cannot yield diversification) and it must not be inevitable (as it would be if all elements in the choice set differed on many significant dimensions). To illustrate the second condition, in a society made up of two distinct races, it would be natural to diversify along this dimension when filling classrooms, choosing juries, sampling for consumer research, and so forth. In a society in which there are almost as many races as people, diversification would be meaningless. The likelihood that the diversification heuristic will be applied is at its maximum when there are two categories, and declines as categories become more numerous. Not only must there by few categories, they must also be salient. People *can* be classified, for example, into those who are shorter or taller than the median height but such a distinction is unlikely to be used as a criterion for diversification or classification, with the possible exception of amateur basketball teams. This suggests an additional hypothesis:

> H5: The pattern of deviation between simultaneous and sequential choice predicted by the diversification heuristic will be more likely to occur when the distinction between virtues and vices is highly salient.

We describe two experiments in which subjects chose between virtues and vices under conditions that, we predicted, would influence the amount of variety desired and the order in which the options were sequenced. Experiment 1 focuses on the immediacy effect, and tests H1, H2, and H3, which hold that choosing simultaneously leads the decision maker to take more virtues than vices, and to choose

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[1] In fact, diversification tends to produce symmetric or alternating patterns in simultaneous choice. In a three-choice sequence, for example, diversification is more likely to produce an ABA pattern — that is, two virtues separated by a vice, or two vices separated by a virtue (Read and Loewenstein, 1995).

them in the pattern vice–virtue–virtue, while sequential choice leads to the pattern vice–vice–vice. Experiment 2 is an investigation of the simultaneous operation of both the immediacy effect and the diversification heuristic, and includes tests of H1 through H4. Finally, a comparison between the results of Experiments 1 and 2 provides a test of H5, that there will be more diversification when the distinction between two kinds of goods is salient.

EXPERIMENT 1: THE IMMEDIACY EFFECT

Experiment 1 was inspired by observations of our own behavior in renting videos. Each of us has had the experience of planning to rent a *highbrow* film (e.g. one with a depressing plot or with subtitles) on a particular evening, yet returning home with a *lowbrow* movie, such as a light comedy or action film. Upon arriving at the video store, we suddenly decide that we needed to 'unwind from a hard week' or that we 'just can't tolerate a sad film tonight'.

Highbrow movies can be viewed as virtues relative to lowbrow movies in that they typically offer less immediate pleasure (or even some pain), but provide long-term benefits in the form of educational or cultural enrichment. Highbrow movies are those that we would like to *have seen* more than to see. Lowbrow movies fall more into the vice category because they are fun but forgettable. We may regret having 'wasted' our time on a lowbrow movie, but are unlikely to regret having gone to a highbrow one.[2]

Films have certain benefits for studies involving virtues and vices. First, people enjoy watching movies and will do so voluntarily, even on the schedule demanded by an experimenter. Second, they allow for unobtrusive choices between virtues and vices because most people do not explicitly classify them in that way. Subjects choosing from a list of highbrow and lowbrow movies will not be as aware that they are making choices between virtues and vices, as they might be, for example, when they choose between healthy and unhealthy snacks.

In Experiment 1, subjects chose a series of three movies to watch on three different days, from a heterogeneous list of highbrow and lowbrow movies (listed in Exhibit 1). We offered movies that could be readily sorted into the highbrow/lowbrow categories but were not so obvious that our purpose would be transparent. Moreover, all the options were plausible choices for our subject population (i.e. they were neither too esoteric nor too trashy). *Sequential choice* (SEQ) subjects chose each movie on the day when they would watch it; *simultaneous choice* subjects chose all three movies on the first day that they met the experimenter. We refer to the latter condition as SIM/IMM (immediate), to contrast it with SIM/DEL (delayed), an experimental condition which we introduce later.

In Experiment 1 we tested H1 and H3. We predicted that simultaneous choice would lead to more highbrow movies being chosen overall than would sequential choice (H1). This would occur because, whereas both groups would choose the same proportion of lowbrow movies on the first day (H2), there would be more highbrow movies chosen during sequential choice (H3) on later days. A discussion of H5, involving a comparison between Experiments 1 and 2, is postponed until later.

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[2] In this paper, we study the effects of repeated consumption on the choice of virtues and vices. As many readers will observe, the goods that we test differ subtly in their degree of virtue. Few people would think they were living a more beatific life if they watched highbrow movies instead of lowbrow ones (as in Experiment 1), or bought prize-draw instead of instant-win lottery tickets (as in Experiment 2). Choices between *extreme* virtues and vices are difficult to examine under controlled conditions. The reasons for this are sometimes practical, but usually ethical. We cannot offer people the theoretically interesting opportunities to drink excessively, take drugs, or engage in unprotected sex. There is still work to be done, therefore, on the differences between simultaneous and sequential choice for vices which everyone will unhesitatingly agree are 'bad for you' and 'good for you'.

Exhibit 1. Movies between which subjects chose in Experiment 1, with sample synopses, and mean 'highbrowness' ratings

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Lowbrow movies
The Breakfast Club (1985; 2.3)
Clear and Present Danger (1994; 2.8)
Four Weddings and a Funeral (1993; 3.1)
Groundhog Day (1993; 2.4)
I Love Trouble (1994; 2.0)
In the Line of Fire (1993; 3.0)
Indecent Proposal (1994; 2.9)
The Mask (1994; 1.6)
Mrs Doubtfire (1993; 2.9)
My Cousin Vinny (1992; 3.0)
Sleepless in Seattle (1993; 2.5)
So I Married an Axe Murderer (1993; 2.3)
The Specialist (1994; 2.1)
Speed (1994; 2.5)

Highbrow movies
Blue (1993; 5.1) (subtitled)
Blue Sky (1994; 3.8) (Oscar winner)
Dear Diary (1994; 3.1) (subtitled)
Hoop Dreams (1993; 3.3) (documentary)
Like Water for Chocolate (1993; 4.5) (subtitled)
Naked (1993; 4.0)
Raise the Red Lantern (1991; 3.7) (subtitled)
Schindler's List (1993; 6.8) (Oscar winner)
The Piano (1993; 5.7) (Oscar winner)
The Scent of Green Papaya (1993; 3.8) (subtitled)

Sample synopses
Clear and Present Danger (1994)
Director: Phillip Noyce
Writer: Steven Zaillian, Donald Stewart, John Milius
Music: James Horner
Length: 141 min
Cast: Harrison Ford, Anne Archer, James Earl Jones, Willem DaFoe
Synopsis: Jack Ryan, the American James Bond, has to fight a coalition between Latin American drug smugglers and corrupt US politicians. Slick post Cold War thriller from a best-selling novel.

Blue (1993)
Director: Krystof Kieslowski
Writer: Krystof Kieslowski
Music: Zbiegniew Preissner
Length: 105 min
Cast: Juliette Binoche
Synopsis: Juliette Binoche withdraws from society after the tragic loss of her son and husband (a famous composer) in a car accident. She devotes herself to completing her husband's final composition. First of Kieslowski's trilogy on the themes of liberty (*Blue*), equality (*White*) and fraternity (*Red*). In French with subtitles.

Subjects

Subjects were members of the university community at the University of Illinois, Urbana-Champaign, recruited through Internet and university bulletin board advertisements that promised free video rentals in exchange for participation. Seventy-seven subjects completed the experiment, 36 in the SEQ

group, and 41 in the SIM/IMM group. Four (out of 40) sequential choice subjects failed to complete the study and were not included in the analysis.

Materials

Subjects chose videotapes from a list of 24 that were currently available from a video rental store near the university. The list contained titles, years of release, and brief synopses. Highbrow and lowbrow movies were mixed up in the list, and the two kinds of movies were not categorized. The two sets were heterogeneous, and we did not use a single criterion to select them. Lowbrow movies were primarily big box office hits, with attractive and popular stars, and an emphasis on action, comedy, or romance. Highbrow movies usually had less familiar stars, often had subtitles, were intellectually challenging, and were typically less popular (although some, like *The Piano*, *Schindler's List*, and *Like Water for Chocolate*, were quite successful). Because we anticipated that subjects would have already seen many of the lowbrow movies, we included 14 of these and only 10 highbrow ones.

Manipulation checks

Some time after completing Experiment 1, we conducted a manipulation check to ensure that the movies we classified as highbrow and lowbrow were indeed considered so by people like our subjects. Fifteen people at the University of Leeds rated all the movies on 'highbrowness' scale. They were told the definition of two types of movies:

> Type I: These movies are fun or pleasurable to watch, but they tend to be quickly forgotten. [Lowbrow movies.]
> Type II: These tend to be less pleasurable to watch than Type I movies, but you are more likely to remember them and think about them afterwards. [Highbrow movies.]

They then read each movie synopsis and rated it on a 7-point scale, with Type I and Type II as the endpoints. The mean ratings are provided in Exhibit 1. As can be seen, all the movies that we judged to be highbrow received higher ratings than did those we judged to be lowbrow, and the mean difference in their ratings was statistically significant: highbrow = 4.4; lowbrow = 2.5; $t(22) = 5.6$.

Procedure

Subjects met the experimenter individually in a restaurant adjacent to the rental store. They first stated the three dates on which they wanted to watch videos. To minimize 'double bill' effects (such as choosing two movies that would combine to form a good evening's entertainment), we stipulated that only one of the chosen videos could be watched on each day, and that each viewing day had to be separated by at least two days. On the first day, SEQ subjects chose the movie that they wanted to see on that day. These subjects returned on both other days to choose their second and third movies. SIM/IMM subjects scheduled all three movies at once, one for the evening of choice, and one for each later evening. Once subjects had chosen, they were given a coupon that allowed them to borrow these movies on the specified dates.

Results

Exhibit 2 shows the proportion of highbrow movies chosen on each day for all conditions of Experiment 1. Because our hypotheses concerned comparisons of choices made on the first day with

Exhibit 2. Percent of highbrow movies chosen for each day of choice

| | Experiment 1 | | |
| | Day of choice | | |
Condition	One	Two	Three
SEQ	42%	47%	44%
SIM/IMM	44%	63%	71%
	Supplementary experiment		
Condition	One	Two	Three
SIM/IMM	31%	46%	69%
SIM/DEL	62%	85%	62%

SIM and SEQ: Simultaneous and sequential choice; IMM and DEL: Immediate or delayed receipt of chosen alternative.

those made on Days 2 and 3, we combined the results for the latter two days and refer to these as *later days*. We conducted several analyses:

H1: As predicted, more highbrow movies were chosen in SIM/IMM (59%) than in SEQ (43%), $t(75) = 2.04$, $p < 0.05$.

H2: Because movies chosen in the first day of both SEQ and SIM/IMM will be viewed on the day they are chosen, we predicted that there would be no difference in the proportion of highbrow movies chosen. This prediction was clearly supported, the proportions chosen were nearly identical (42% versus 44%), with $t < 1$.

H3: As predicted, more highbrow movies were chosen in later days of SIM/IMM (67%) than on the first day (44%), $t(40) = 2.55$, $p < 0.02$.

We conducted two additional analyses. First, because movies chosen in later days of SIM/IMM are for delayed consumption, and movies chosen in later days of SEQ are for immediate consumption, we predicted that more highbrow movies would be chosen for later days in SIM/IMM than in the corresponding days of SEQ. This prediction was supported. On average, 67% highbrow movies were chosen during SIM/IMM, and 46% during SEQ, $t(75) = 2.55$, $p < 0.01$. As a second test, we calculated the correlation coefficient between each movie's mean rating on the highbrowness scale, and the *mean day* on which it was chosen. The mean day was a weighted average of the day of choice (i.e. 1, 2, or 3). There was a strong positive correlation for the SIM/IMM group ($r[22] = 0.43$, $p < 0.01$), indicating that highbrow movies were more likely to be chosen on later days, and no correlation for the SEQ group ($r[22] = -0.17$, $p > 0.10$).

Supplementary experiment

We carried out an additional study to test our prediction that the preference for lowbrow films in the first day of simultaneous choice occurred because the films were to be watched that evening. This study is described briefly because, although its results are suggestive, it was opportunistically conducted over a limited time-period during the summer, when few subjects could be found, and consequently has a very small sample size (26) and low power. As in Experiment 1, the subjects were members of the Urbana-Champaign university community. The subjects chose videotapes from a list similar to that used in Experiment 1, but somewhat updated. There were two simultaneous choice conditions. The

first was identical to the standard SIM/IMM condition from Experiment 1. In the second, simultaneous/*delay* (SIM/DEL) condition, the first movie was not watched on the evening of choice, but at least two nights later. Thus, all the choices, including the first one, were delayed.

Exhibit 2 shows the proportion of highbrow movies chosen on each day for all conditions, under the heading 'supplementary experiment'. Consistent with H3, there were fewer highbrow movies chosen on Day 1 of SIM/IMM than in the later days, $t(24) = 2.01$, $p < 0.07$. Moreover, there were significantly fewer highbrow movies chosen on the first day of SIM/IMM than on the average of the three days in SIM/DEL, $t(24) = 2.48$, $p < 0.05$. Finally, there was, as expected, a larger proportion of highbrow movies chosen on the first day of SIM/DEL than on the first day of SIM/IMM, although the test statistic was not significant, $t(24) = 1.56$.

Conclusions and discussion

Experiment 1 gives substantial support for the hypothesis that simultaneous and sequential choice differ in the manner predicted by an immediacy effect. In particular, simultaneous choice for a series starting immediately showed a strong preference for the pattern vice–virtue–virtue. When choices were made sequentially, the pattern was commonly vice–vice–vice. Moreover, when choices were made simultaneously for a series that was preceded by a delay (SIM/DEL, of the supplementary experiment) the dominant pattern was virtue–virtue–virtue.

An additional analysis points to the potential magnitude of the difference between choosing highbrow movies in advance and choosing them shortly before viewing. When the authors first began to discuss the highbrow movie phenomenon, the paradigmatic highbrow movie we had in mind was *Schindler's List*. We observed that our friends 'planned' to see *Schindler's List*, yet many took weeks before they finally did see it, and often never did get around to it. It wasn't that these friends didn't go to see movies at all, but just that when they did go, they often ended up seeing something else. It seemed that *Schindler's List* was a movie that everybody wanted to have seen so that they could talk about it, but not a movie that they actually wanted to watch at any given moment. It was on the lists used in both studies. In the two studies combined, there were 162 movies chosen on the day they were to be watched (comprising all of SEQ, plus SIM/IMM-Day 1), and 121 movies chosen for later days (comprising SIM/IMM-later days, and SIM/DEL). *Schindler's List* was chosen 14 times: only once on the day it was to be watched, and 13 times for later days. If the desire to watch *Schindler's List* was independent of when it was to be watched, these 14 choices should have been distributed over the two classes of day in proportion to the number of viewing days in each category. That is, it would have been chosen approximately eight times on the day of choice, and six times on later days. A χ^2 test reveals that the difference between the observed and expected distribution of these choices was highly significant ($\chi^2(1) = 18.7$, $p < 0.001$). Another way of looking at this result is that, in our admittedly small sample, the market share of *Schindler's List* was increased *thirteenfold* by having subjects choose the movie they wanted to watch in advance.

Movie marketers have terms that are closely related to what we call virtues and vices. They distinguish between *marketable* movies, which can draw people into the cinema, and *playable* movies, which are enjoyed and recommended to one's friends. *Marketability* can get people into the cinema on the opening weekend, but only *playability* can turn a movie into a real hit (Wyatt, 1997). Marketability is analogous to a high immediate payoff, and playability to long-term or distributed payoff. Movies (such as *Titanic* and *Saving Private Ryan*) that are high on both dimensions are a marketer's dream — not only do people not require much prompting to see the movie, but once they have done so, they tell everyone else they should and they are also likely to return themselves — and movies that are low on both dimensions (*The Postman*) are write-offs. The intermediate movies, which correspond to our vices (high marketability, low playability) and virtues (low marketability, high playability), are the greater

marketing challenges. The typical response to high/low movies is pre-release 'hype', seen in the recent campaigns for *Speed 2* and *The Avengers*, and saturation booking. High/low movies typically open strong and die quickly.

Low/high movies require more considered treatment. *Schindler's List* was a classic low/high film, in that it was difficult to get people into the cinema, yet once they had watched it, they were glad that they did, they recommended it to their friends, and they discussed it widely. Our research suggests that one of the best ways to procure an audience for such movies is to induce people to make an irreversible precommitment. This strategy is used by marketers of 'prestige' films like *Schindler's List*. They promote advance ticket sales and book the films into single-screen cinemas. Consumers, therefore, have little incentive to change their mind in the moments before consumption when the temptation to do so is strongest (there are no alternatives), and once that consumption is over, they will be pleased that they made the choice they did.

The results of Experiment 1 also have bearing on one aspect of H5, according to which the diversification heuristic is more likely to make a difference when the choice alternatives can be sorted into a few, highly salient categories. In this respect, our movie list yielded virtually the opposite situation. The list was heterogeneous, consisting of films from many genres, and every film was unique in such important features as leading actors, directors, and even themes. Even the dimension which we manipulated, highbrow versus lowbrow, was intended to be non-obvious to our subjects. Indeed, the distinction between highbrow and lowbrow was more like the difference between 'short' and 'tall', defined by whether the person is above or below median height, than the difference between (say) classical and popular music. Thus, if subjects wanted to diversify during simultaneous choice, they could do so by picking any three movies. In the event, subjects were no more likely to diversify on the highbrow/lowbrow dimension during simultaneous than during sequential choice. The proportion of subjects choosing a mix of movies (i.e. one of one kind and two of the other) was identical in both conditions: 34% during simultaneous choice, 33% during sequential choice. In Experiment 2, subjects chose between a single vice and a single virtue that differed in a very salient way. By investigating choice between only two goods, we were thus able to unambiguously specify the dimensions over which diversification could occur.

EXPERIMENT 2

In Experiment 2, subjects chose between two kinds of lottery ticket, which differed in the time at which their outcome was resolved — either instantly (*instant-win* tickets) or during a *prize-draw* which took place some days after the ticket was received. Instant-win tickets are vices relative to prize-draw tickets: instant-win tickets give immediate but short-lived gratification, whereas prize-draw tickets offer more lasting rewards in the form of a period of anticipation (Elster and Loewenstein, 1992; Loewenstein, 1987), combined with the pleasure of watching the television show during which the winning numbers were determined.

In all experimental conditions, subjects chose two lottery tickets to be received one week apart. Half chose simultaneously (SIM) and half chose sequentially (SEQ). In addition, half of each of these groups were in an *immediate* receipt condition in which they received a ticket immediately after choosing (IMM), and half were in a *delayed* receipt condition in which their first ticket came one week after their initial choice (DEL).

We predicted that people would want more diversity during simultaneous than sequential choice (H4). That is, the proportion of people choosing two different tickets would be greater in both SIM/IMM and SIM/DEL than in SEQ/IMM or SEQ/DEL. If diversification is due to hyperbolic discounting, then greater diversification would be observed in SIM/IMM only, with SIM/DEL and

SEQ/DEL showing a bias toward prize-draw tickets, and SEQ/IMM showing a preference for instant-win tickets. Experiment 2 also includes tests of H1, H2, and H3.

Subjects

The experiment was conducted in Romania. The subjects were 171 undergraduate students of Babes-Bolyai University in Cluj, Transylvania. Subjects participated in small class groups.

Materials

The two kinds of ticket were familiar to the population of Cluj. The instant-win tickets were *Loz* tickets with a face value of 400 Lei ($0.13), which had a top prize of 10 days each year in a villa, worth approximately 3 million Lei. Prize-draw tickets were *Robingo* tickets with face value of 500 Lei ($0.17), and a top prize of 7 million Lei. The Robingo tickets had the added attraction of being the focus of a popular bingo-style television program during which the winning numbers were determined by contestants answering trivia questions. The Robingo tickets given out were for the draw on the Sunday following the day on which they were received, so no subject would receive two tickets for the same draw. The average delay between receipt of a Robingo ticket and the television program was about 4.5 days. To keep the low prices of the tickets in perspective, at the time the experiment was conducted, the average monthly salary for a university lecturer was in the neighborhood of 150,000 Lei ($50).

Manipulation check

Our designation of instant-win tickets as vices relative to prize-draw tickets is based on the assumption that the instant-win tickets are most exciting immediately after purchase, but prize-draw tickets give the most total satisfaction. We tested this by asking 23 people from the University of Leeds community to respond to the following questionnaire:

> There are two kinds of lottery ticket on the market. One is the 'instant-win' variety. With these tickets you learn instantly whether you have won a prize or not. The other is the 'prize-draw' variety. With these, you learn after a draw which is usually televised.
> Please answer the following questions.
>
> 1. Which ticket gives the most pleasure immediately after it is purchased?
>   instant-win (77%)   prize-draw
> 2. Which ticket gives the most pleasure in the long run?
>   instant-win (18%)   prize-draw

The proportion answering 'instant-win' is given in parentheses. As can be seen, our respondents agreed with our characterization of the two kinds of ticket.

Design

The complete design is depicted in Exhibit 3, which includes the events on each day for each condition, along with the order in which they occurred. We used a 2×2 design with two levels of delay in receiving tickets (receipt was *immediate* or *delayed* for one week), and two modes of choosing tickets (*simultaneous* versus *sequential*). SIM choice subjects chose two tickets at once. In the SIM/IMM condition, one ticket (*Ticket 1*) was received right away, and a second ticket one week later (*Ticket 2*), while in the SIM/DEL condition, *Ticket 1* was received one week after the day of choice, and *Ticket 2*

Exhibit 3. Design of Experiment 2

Condition	Week 1	Week 2	Week 3
SEQ/IMM	Choice 1 Ticket 1	Choice 2 Ticket 2	
SEQ/DEL	Choice 1	Ticket 1 Choice 2	Ticket 2
SIM/IMM	Choice 1 Choice 2 Ticket 1	Ticket 2	
SIM/DEL	Choice 1 Choice 2	Ticket 1	Ticket 2

SIM and SEQ: Simultaneous and sequential choice; IMM and DEL: Immediate or delayed receipt of chosen alternative.
Choice 1 and Choice 2: Subjects choose their first or second ticket.
Ticket 1 and Ticket 2: Subjects receive the ticket.

in the following week. SEQ subjects chose one ticket each week: SIM/IMM subjects chose tickets that would be received immediately; SEQ/DEL subjects chose tickets that would be received in one week.

Procedure

After greeting subjects, the experimenter first described the lottery tickets, and then gave instructions appropriate to their experimental condition. SIM subjects were informed that they would be given two lottery tickets of their choice, and were then told whether they would receive the first ticket in the current class or next week. To eliminate potential demand effects, we emphasized that they could get two tickets of the same kind if they wished, or one of each kind. During the first week, SEQ subjects were told that they could choose a ticket, but they were not told that there would be a second choice. No mention was made of their earlier choice when they made Choice 2. In earlier research, two of the authors found that whether subjects in sequential choice know that they will face similar decisions in the future has little impact on their choices (Read and Loewenstein, 1995).

Results

Diversification heuristic

H4 predicts that subjects will choose more variety during simultaneous than sequential choice. The proportion of subjects choosing two different lottery tickets in all four conditions is given in Exhibit 4. As can be seen, there was much more diversification (choice of two different tickets) during simultaneous choice, regardless of whether the ticket was delayed or not. On average, 58% of SIM subjects chose two different tickets, as opposed to 34% of SEQ subjects, $t(170) = 3.5$, $p < 0.001$.

The immediacy effect

Exhibit 5 presents the proportion of instant-win tickets chosen by subjects in the four conditions. We predicted that subjects would choose more instant-win tickets if they were to be received immediately than in one week. Tickets were received immediately in Day 1 of SIM/IMM and Days 1 and 2 of SEQ/IMM, and were received later on all other days. If there is an immediacy effect, there will be more

Exhibit 4. Percent who chose two different lottery tickets

Choice mode	Time of receipt	
	IMM	DEL
SIM	58%	58%
SEQ	29%	36%

SIM and SEQ: Simultaneous and sequential choice; IMM and DEL: Immediate or delayed receipt of chosen alternative.

Exhibit 5. Percent of prize-draw tickets by experimental condition

Condition	Ticket 1	Ticket 2
SIM/IMM	42%	51%
SIM/DEL	56%	49%
SEQ/IMM	31%	31%
SEQ/DEL	38%	53%

SIM and SEQ: Simultaneous and sequential choice; IMM and DEL: Immediate or delayed receipt of chosen alternative.

instant-win tickets chosen in both days of SEQ/IMM than in SEQ/DEL, and more chosen in the first day of SIM/IMM than in either day of SIM/DEL. As can be seen, all the means were in the order predicted. We conducted an omnibus test to determine if more instant-win tickets were chosen in {SEQ/IMM, SIM/IMM[Day 1]} than in {SEQ/DEL, SIM/DEL}. Each subject was assigned a score corresponding to the proportion of instant-win tickets chosen, for both days in the case of SEQ subjects, but for Day 1 only for SIM/IMM subjects (their second ticket was delayed). The difference between the proportion of instant-win tickets chosen by the immediate-receipt group (65%) and the delayed-receipt group (51%) was significant, $t(170) = 2.2$, $p < 0.03$. Just as in the previous experiments, there was a clear preference for more vices when they were to be received immediately than when they were to be delayed.

Sequential versus simultaneous choice

An unanticipated finding was that subjects were more likely to choose instant-win tickets during sequential (62%) than simultaneous choice (51%), $t(170) = 2.1$, $p < 0.01$. This may be contributed to by the larger number of delayed choices in SEQ conditions, but when this factor is removed by analyzing Ticket 1 choices only, the same pattern is observed: SEQ, 65%; SIM, 49%, $t(170) = 2.22$, $p < 0.05$.

We speculate that this pattern may be due to 'set' effects that emerge when a number of options are considered at once, independently of when they are to be experienced. For instance, a smoker may prefer a single cigarette to a stick of gum, but if he thinks of many such choices, he may believe that the cumulative effect of the gum is better than that of cigarettes. Likewise, a reader who chooses one novel at a time may opt for Stephen King, but one who thinks of the effects of a year's reading may prefer William Faulkner. The possibility that considering repeated consumption may lead one to make more far-sighted choices (that is, choose fewer vices) has been raised by many authors (e.g. Ainslie, 1975; Heyman, 1996; Rachlin, 1995, and many others). We suggest, therefore, that when many tickets are considered, a portfolio of prize-draw tickets increases in value relative to a portfolio of instant-win tickets, independent of when the tickets are to be received.

DISCUSSION: WHAT DO PEOPLE 'REALLY' WANT?

The diversification heuristic adds another item to the list of documented violations of *invariance* — a fundamental axiom of choice which states that preferences should be independent of the way the options are framed (e.g. Tversky and Kahneman, 1986). As with all failures of invariance, those produced by the diversification heuristic raise the problem of what do people 'really' want. Do people get the best deal when they choose simultaneously or when they choose sequentially? Consider people who, during simultaneous choice, choose varied bundles of goods. Will they enjoy their experience more than those who choose a uniform bundle, or will they later wish they had made different choices? In an earlier study, we found that subjects who made diverse simultaneous choices frequently reverted to less variety when given a chance to change their mind on the day of consumption (Read and Loewenstein, 1995). However, this does not mean that they necessarily like their original choice more in a global sense, it is only an additional verification of the fact that, when choosing sequentially, people typically want less variety. Likewise, it is commonplace for people to make resolutions to implement a series of choices but to subsequently break down, later bemoaning their own lapse. Indeed, in this regard there is a central similarity between hyperbolic discounting and diversification: in both cases, people commit themselves to a series of choices that they are unlikely to implement if they have a choice.

We believe that the logical next step in this research program is to examine the difficult question of whether, and when, people are better off choosing simultaneously or sequentially.[3] Based on both empirical and theoretical considerations, Antonides *et al.* (1998) have proposed a *normative compatibility principle*, which holds that the best bundle is chosen when the choice mode reflects or is similar to the conditions under which the chosen goods will be experienced (cf. Hsee *et al.*, 1998).

The rationale for the normative compatibility principle has been described by Read *et al.* (in press). Simultaneous choices enable the decision maker to take into account preference interactions between the goods that they choose. When there are real and sizable interactions, then simultaneous choice is best. When there are no interactions or only trivial ones, however, then simultaneous choice may lead people to imagine non-existent ones or exaggerate minor ones. To illustrate such an error, consider a study reported by Kahneman and Snell (1992). They asked subjects who were going to eat one small bowl of plain yogurt every day for a week how much they would like the yogurt they ate on the seventh day. Subjects actually grew to like the yogurt more, but they predicted that they would *dislike* it more on the seventh day. If these subjects had been simultaneously choosing what to eat for all seven days, their overprediction of satiation (a preference interaction) would have led them to underconsume yogurt. But if they chose sequentially, on each day they would have focused on what they wanted to eat on that day only, and any irrelevant interactions would have been disregarded.

Usually, therefore, simultaneous choice is best for simultaneous experience, and sequential choice is best for sequential experience. To illustrate the first case, it is better to buy shoes and belts on the same shopping trip, because they will be worn together. To illustrate the second case, it is better to buy two different CDs on different shopping trips, because they will be listened to separately.

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[3] There are some technical problems involved in making intrapersonal and interpersonal comparisons of utility. We assume, for the purposes of our discussion, that they can be solved, perhaps using the kinds of techniques discussed by Kahneman, Wakker, and Sarin (1998).

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