



The Effect of Windfall Gains on the Sunk-Cost Effect

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Abstract

Prior research has extensively documented the sunk-cost effect – an irrational attention to irrecoverable past costs while making pending investment or consumption decisions. In a series of experiments, we show that the sunk-cost effect weakens and sometimes disappears when consumers receive a windfall (unexpected) income at the time of making a decision. This unbudgeted income allows consumers to write off their past losses, thereby eliminating the pressure to consume in order to satisfactorily close the account. We further show that the similarity between the nature of the windfall income and the past sunk-cost moderates this relationship. More generally, we argue that mental accounts can be flexible and consumers may have discretion in moving money between different mental accounts.

Key words: mental accounting, sunk-cost effect, windfall gains, consumption and choice decisions

Research in consumer decision making has shown that people often fall prey to the sunk-cost effect (Arkes and Blumer 1985; Garland 1990; Garland and Newport 1991; Thaler 1980). Specifically, this line of research has shown that consumers will respond to previous investments by becoming increasingly willing to invest additional resources, a tendency also referred to as the escalation of commitment in response to sunk-costs (Staw 1981). In the marketing literature, the sunk-cost effect has been shown to have important consequences for both consumer purchase (cf. Heath and Soll 1996) and consumption decisions (cf. Gourville and Soman 1998); and for managerial decision-making (cf. Biyalagorsky, Boulding and Staelin 1998).

This tendency to consider irrecoverable past costs contradicts a basic principle in economics that the past should be irrelevant to current decisions (Frank 1994). However, Thaler (1980, 1985) argues that consumers practice a form of cognitive bookkeeping called mental accounting in order to evaluate transactions. Specifically, when investing in (or prepaying for) a particular endeavor, consumers create a mental account for that endeavor and allocate the disutility of the payment to this account. This account will stay open until the consumer has completed the endeavor and obtained some benefit, and the same mental account can then be closed after being credited with the value of this benefit (Prelec and Loewenstein 1998; Thaler 1980, 1999). Note that once an account has been set

up, it can only be satisfactorily closed by consuming the benefit. If this does not happen, consumers will be forced to close the account “in the red” (i.e. with a net loss, Prelec and Loewenstein 1998). Since this is aversive to most consumers, they are driven to complete the endeavor (consume the benefit) to try and balance the negative value of their prior costs and close their mental account “in the black” (Prelec and Loewenstein 1998).

Much of the literature in mental accounting implicitly assumes that the decision-maker can link the cost and benefit components of a transaction in an unambiguous manner. In explaining the sunk-cost effect, for example, the mental accounting model argues that the consumer opens a *transaction specific* account that can only be closed by consuming the specific benefit. The cost and benefit arising from the transaction are unambiguously linked to that specific mental account and hence the account can be termed “rigid”. However, recent research shows that mental accounts are often not as rigid as the model suggests (Soman and Gourville 1998). For instance, in the case of price bundling where one price covers many benefits (e.g. paying \$1000 for a vacation package that includes airfares, hotel and sightseeing), a consumer may have some degree of flexibility in allocating the total cost across each of the benefits, and in a buy-one-get-one promotion, a consumer may choose to allocate the cost to any one of the two units (and treat the other unit as free) or divide it (equally or unequally) across the two units. In the present research, we argue that mental accounts can often be flexible, and the presence of such flexibility gives consumers the ability to move money around between accounts. Further, we demonstrate one situation in which flexibility causes one particular prediction of mental accounting – the sunk-cost effect – to disappear.

Consider a consumer who experiences a windfall gain (Arkes et al. 1994) at the time of making a decision about an endeavor that involves some sunk-costs. Since a windfall gain represents unexpected income, consumers will not have budgeted this money for any specified expense and hence will have flexibility in assigning it either to a new mental account or to extant accounts. We hypothesize that a windfall gain will allow her to “write off” the past investment, lower the need to consume in order to close the account in the red and hence weaken the sunk-cost effect. Our objectives in this paper are to a) demonstrate the weakening of the sunk-cost effect in the face of a windfall gain and b) identify boundary conditions for this weakening.

The rest of this paper is organized in three sections. First, we demonstrate the weakening of the sunk-cost effect in the face of windfall gains. Second, we identify conditions that are necessary for flexibility and show that if these conditions are not met, behavior is consistent with “rigid” mental accounting. Third, we conclude with a general discussion, speculate on additional sources and effects of flexibility and discuss avenues for future research.

1. The Effect of Windfall Gains on the Sunk-Cost Effect

Our first objective was to investigate whether the sunk-cost effect persists in the simultaneous presence of windfall gains. We ran a series of experiments with students

at two universities in the U.S. All subjects were randomly assigned to an experimental condition and each subject participated in only one of the following scenarios.

In order to investigate the presence of the sunk-cost effect, we adapted some scenarios used in classical demonstrations of the sunk cost effect (Arkes and Blumer 1985; Thaler 1980). In reporting all experiments, we scale the dependent variable such that larger numbers indicate a greater attention to sunk costs.

1.1. Experiment 1, Concert Ticket

Sixty-two students participated in this study. Some of the subjects ($n = 31$) read:

“You recently purchased a ticket to a rock concert by one of your favorite bands for \$35. Shortly afterwards, you are invited to join a good friend on a free ski-getaway weekend. Unfortunately, the invitation is for the same weekend as the concert. The ticket is non-refundable and non-transferable, so if you decide to go skiing, it will have to go to waste. *As you stop by to pick up a paycheck of \$185 (compensation for work you did at a local music store), you wonder whether you should attend the concert or go skiing.*”

For the remaining half of the students ($n = 31$), the sentence in italics was replaced by:

“As you stop by to pick up a paycheck of \$150 (compensation for work you did at a local music store), you were pleasantly surprised to learn that you had earned a bonus and received a total of \$185. You wonder whether you should attend the concert or go skiing.”

Subjects reported their relative preference on a 9-point scale (1 = Definitely Go Skiing, 9 = Definitely Attend Concert). We note that subjects across the two versions of the scenario were in identical financial conditions and faced an identical choice. As such, irrespective of whether subjects attended to the sunk-cost or behaved like marginal decision-makers, we should have seen no difference across these two groups of subjects. However, results showed that subjects who read the first version of the scenario reported a mean preference score ($X = 5.65$) that was significantly higher than that reported by subjects in the second version ($X = 4.23$, $t_{60} = 2.70$, $p < 0.01$). Subjects who had received an unexpected \$35 in their paycheck seemed to be more willing to write off their sunk cost and hence were more willing to forego the paid-for concert.

1.2. Experiment 2, Tennis Lessons

Thirty-five students participated in this study. Some of the subjects ($n = 19$) read:

“You have prepaid \$150 for a series of six tennis lessons. You attend the first three and are very happy with the lessons. Unfortunately, you start developing a tennis elbow that is rather painful. Your doctor gives you medication but also recommends skipping the remaining lessons as they will cause much discomfort. On the way back, you pick up your mail, which includes a \$600 paycheck from your job at the local health club (your only income). You call the tennis club and find out that your prepayment is non-refundable, and wonder whether to forego the remaining classes.”

The remaining subjects ($n = 16$) read an identical scenario with the following sentence inserted before the last sentence: “You were expecting \$500, but had forgotten that you were due for a \$100 annual bonus.” All subjects finally indicated on a 9-point scale their relative likelihood of skipping the remaining lessons (1 = Definitely Skip, 9 = Definitely Attend). Results indicated that subjects who had received the unexpected bonus were more likely to skip the remaining lessons ($X = 3.89$) than subjects whose paycheck did not include a windfall gain ($X = 5.32$, $t_{33} = 1.69$, $p < 0.05$). Again, we find support for our prediction that the windfall gain weakens the sunk-cost effect.

1.3. Experiment 3, Apartment Deposit

Fifty graduate students participated in this study. Some of these ($n = 27$) read:

“You have accepted a job that requires you to move to a different city for a one-year period. Given the limited time, you strongly prefer to rent an apartment near your place of work. Unfortunately, there are no good apartments available nearby, so you choose one that is 10 miles away and pay a non-refundable \$3000 deposit (the monthly rent is \$1000, and transportation will cost another \$100). A few weeks before moving, you get two letters in the mail. The first is from your previous landlord with a \$6000 check for a rent deposit refund. The second letter says that a comparable apartment with a monthly rent of \$1100 has opened up right near work (it’s marginally smaller, but just as attractive).”

The remaining subjects ($n = 23$) read a slightly modified version of this scenario in which the description of the \$6000 check from the previous landlord said: “You were expecting \$3000 for a rent deposit refund, but you had actually also paid a security deposit that you had forgotten about.”

All subjects were asked for their relative preference for foregoing the deposit on the distant apartment and opting to take the nearby apartment (1 = Definitely take nearby apartment, 5 = Indifferent, 9 = Definitely stick to distant apartment). Results showed that subjects in the windfall gain condition were much more likely to forego the prepaid deposit and reported a mean preference ($X = 4.92$) that was significantly lower than the mean preference in the no-windfall condition ($X = 6.30$, $t_{48} = 2.11$, $p < 0.05$).

Based on the first set of experiments, we found support for our prediction that the presence of a windfall gain at the time of decision-making can weaken the sunk-cost effect. Specifically, in all three experiments, the presence of the windfall gain seemed to allow subjects to write off their past losses, hence reducing the strength of the sunk cost effect. However, our results still begged the question of whether our findings were robust, or perhaps unique to some specific conditions that our stimuli invoked. Under what situations might we expect this weakening to *not* happen?

2. The Moderating Role of Similarity in the Effect of Windfall Gains on the Sunk-Cost Effect

In the preceding section, we argued that windfall gains have the potential to create flexibility in mental accounts because they are unbudgeted. This is contrary to economic

theory, according to which the presence of additional income should only result in an overall income effect. Rather than resulting in flexibility, this should only result in an increase in the size of all mental budgets. In this section, we identify conditions under which windfall gains can result in flexible mental accounts and hence weaken the sunk-cost effect.

When faced with a windfall gain and a sunk cost that the consumer would like to ignore, the principle of hedonic editing (Thaler and Johnson 1990) suggests that the consumer would like to integrate the sunk cost with the windfall. However, prior research shows that not any gain will be integrated with any loss (Thaler and Johnson 1990). Specifically, prior research shows that the formation of mental accounts, the integration of costs and benefits and their effects on spending decisions are all influenced by principles of categorization and similarity assessments (Henderson and Peterson 1992). For example, Heath and Soll (1996) show that past expenses will influence future spending, but only in product categories that are perceived to be similar to the past expenses.

Prior research has also shown that the source of funds influences the nature of the expenses from it and that any particular type of funds will not be used to finance certain types of expenses (e.g. assets will not be used for frivolous expenses, Shefrin and Thaler 1988; Thaler 1999). Extending an example from Thaler (1999), consumers might find it inappropriate to use a windfall gain in a college fund or retirement fund to finance the purchase of a stereo system. Conversely, windfall gains earned from frivolous sources (e.g. tips, bonuses) are typically considered more appropriate to finance frivolous rather than serious expenses.

In order for windfall gains to weaken the sunk-cost effect, it is imperative that consumers feel comfortable assigning the income to the same mental account as the sunk-cost. If consumers do not integrate the windfall into the mental account, the past cost cannot be written off and the sunk-cost effect should persist even in the face of a windfall gain. This suggests that the perceived similarity between the nature of the windfall gain and the nature of the sunk cost will influence the success of the integration attempt and hence moderate the attenuation of the sunk-cost effect.

The schematic diagram in Figure 1 illustrates our specific predictions. Panel A in the diagram shows an example of a rigidly defined mental account in which the pending benefit is tightly linked with the (prepaid) cost and must be consumed to satisfactorily close the account. In Panel B, a windfall gain that is perceived to be similar in nature to the cost is present. The consumer attempts to integrate this windfall gain with the extant mental account and is successful in doing so due to similarity. The resulting flexibility allows the consumer to write off the sunk cost against the windfall and there is no pressure to consume the pending benefit. In Panel C, the windfall is dissimilar and the consumer's attempt at integration fails. This results in a behavioral effect identical to the rigid mental account condition (Panel A). The presence of windfall gains will cause flexibility in mental accounts and hence weaken the sunk-cost effect if the two are perceived to be similar, but not if they are dissimilar. We test this prediction in the following experiments.

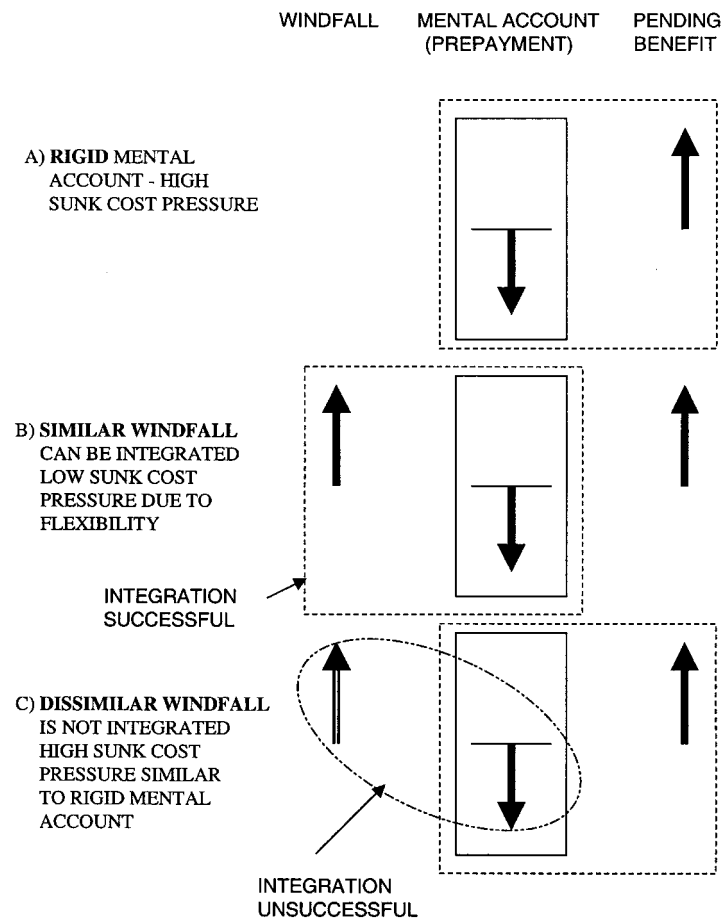


Figure 1. Schematic summary of predictions

2.1. Experiment 4, Music Gala or Job Fair

This experiment used a 3 (Windfall) \times 2 (Conflict Event) design and 320 students served as subjects. They were told that they had volunteered their time to help the student advising center and the theater club in their college. They were also told that they had filled in for a sick friend and worked as a doctor's assistant. Three separate windfall conditions were used; one condition in which there was no windfall gain ["no-windfall"] and two conditions in which a windfall gain originated from a different source ["windfall-student advising" and "windfall-theater"]. Subjects in the "no-windfall" condition were told that they earned \$100 from the doctor, while those in the "windfall-student advising" ["windfall-theater"] condition were told they had earned \$50 from the doctor and "to your surprise, the student advising office [theater club] also paid you \$50 as a token of appreciation for your help in the recent past."

All subjects then read that “. . . you learnt about two separate events that you went and purchased tickets for. Each ticket cost \$50. These events will be held on successive weekends. The first event is a “music gala” featuring a concert by two of your favorite rock bands. The second event is a career fair in which potential recruiters present information about their company and participate in informal discussions with students. While the first event would be highly entertaining, the second will be extremely educative and very important as you start a job search. You were, therefore, eagerly anticipating both events.”

We then created a situation in which subjects were, called upon to possibly forego one of these two events. Subjects were told: “After you had purchased these tickets, a friend called to invite you to an all-expense-paid ski weekend getaway at your favorite ski resort. While this sounds like a terrific opportunity, the weekend coincides with the music gala [career fair]. If you went for the ski getaway, you would have to skip the music gala [career fair] and let your ticket go to waste. Unfortunately, the ticket is non-refundable and not transferable, so you cannot resell it.” Subjects were then asked to rate their preference (PREF) for “sticking to the original plan of going to the career fair [music gala] and foregoing the ski trip”. Responses were measured on a 9-point scale, with higher values reflecting greater attention to the sunk cost.

The mean PREF scores in each of the experimental conditions are shown in Figure 2. An ANOVA with PREF as the dependent variable revealed no significant main effects ($p > 0.11$), but revealed a significant *Windfall* \times *Conflict Event* interaction ($F_{2,314} = 8.07$, $p < 0.005$). To better understand this pattern of data and relate it to our predictions, we recoded our data as illustrated in Figure 2. First, we collectively looked at the two “no-windfall” conditions as *no-windfall*. Second, we had two conditions in which the nature of the sunk cost that needed to be foregone was similar to the nature of the windfall gain, for example when the windfall gain came from the theater club and the subject was considering foregoing the music gala.¹ We collectively refer to these as *windfall-similar*. Third, we had two conditions in which the nature of the sunk cost that needed to be foregone was *dissimilar* to the nature of the windfall gain (referred to as *windfall-dissimilar*), for example when the windfall gain came from the student advising office and the subject was considering foregoing the music gala. In comparison to *no-windfall*, we expected PREF to be lower (i.e. expected the sunk-cost effect to be weaker) in the *windfall-similar* condition but not in the *windfall-dissimilar* condition. Results revealed that overall, the sunk-cost effect was weaker for the windfall conditions ($X = 5.06$) as compared to the *no windfall* conditions ($X = 5.68$, $t_{318} = 2.08$, $p < 0.05$). The PREF score in the *windfall-dissimilar* condition ($X = 5.75$) is not significantly different from the *no-windfall* conditions ($t_{211} = 0.21$, $p = 0.84$) while PREF in *windfall-similar* is significantly lower ($X = 4.36$, $t_{211} = 3.80$, $p < 0.001$) than in *no-windfall*.

Results from this experiment confirmed our prediction about the moderating role of similarity on the weakening of the sunk-cost effect. However, the dependent measure did not allow us to assess whether the sunk-cost effect disappeared, reversed direction or merely weakened. In order to test this, we needed to ask subjects to make choices between two options both of which involved different amounts of sunk costs and allow subjects to be indifferent (see for example Arkes and Blumer 1985). We did this in the following experiment in which subjects chose between two R&D investment opportunities.

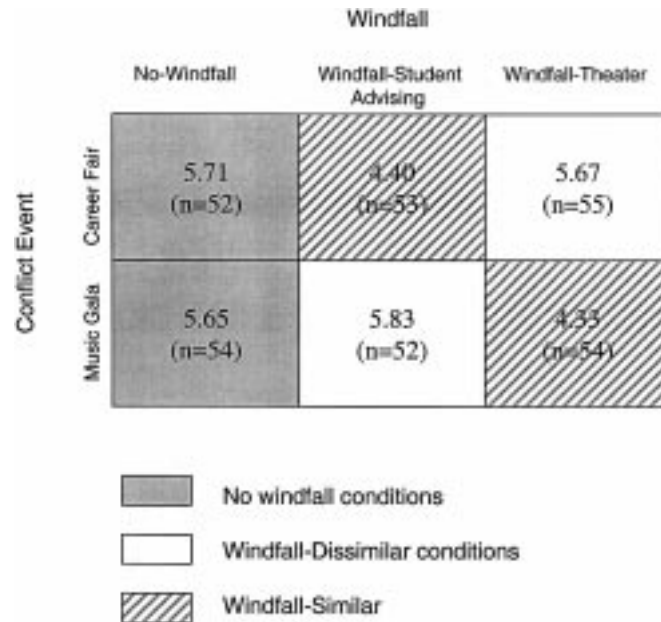


Figure 2. Experimental design, mean preference for the high sunk cost option and coding scheme: Experiment 4.

2.2. Experiment 5, Investing in R&D

Subjects in this experiment were 120 business students. They were presented with a scenario in which there were “two promising products currently under development at your company,” one in which \$10 000 had been invested to date (high sunk-cost project) and the other in which \$2000 had been invested (low sunk-cost project). “Both projects are promising, and are at almost the same levels of progress. Both require an additional investment of \$4000 (and substantial time commitments) and have a reasonable chance of success. Due to *time* constraints, you can unfortunately continue to work on only one of these two R&D projects. You are currently faced with a decision of which product to invest in further towards completion of the project.” Further, they read “While you are deliberating over this decision, your accountant calls to inform you that due to an oversight, the earnings of [one of the company’s divisions] had been underreported. He informs you that the division actually made \$8000 more than previously reported.”

Within this basic scenario, the experiment employed a 2 (High Sunk Cost Type) \times 2 (Windfall Type) manipulation. First, the high sunk-cost project was either from the Software Division, or the Hi-Tech Division (with the low sunk-cost project being from the other division). Second, the division making the windfall gain of \$8000 was either the Software or the Hi-Tech division. Subjects were finally asked which of the two projects they would invest in, and they indicated their choice on a 9-point scale with 5 indicating indifference. For ease of interpretation, we reverse scaled some of the responses into a

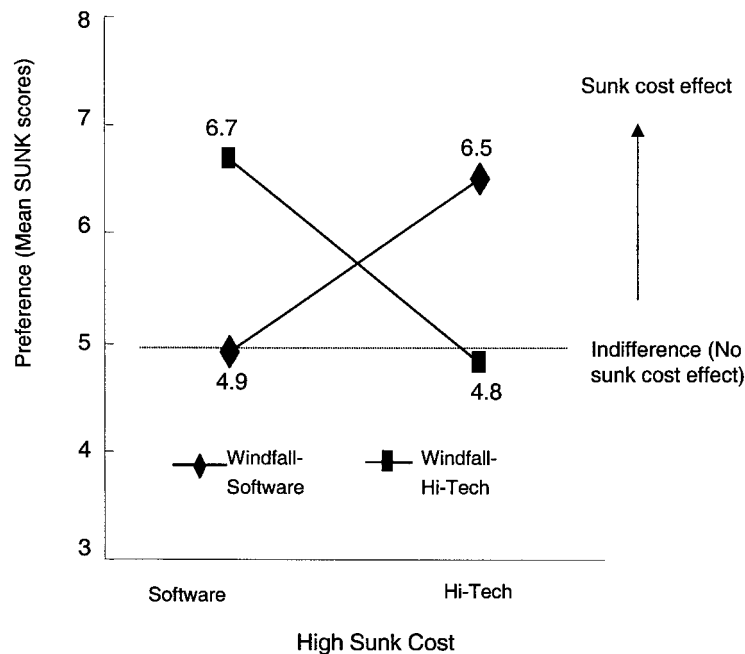


Figure 3. Moderating effect of similarity of windfall on the sunk cost effect: Experiment 5.

SUNK score (1 = Choice opposite to the sunk cost prediction, 5 = No effect, 9 = Choice consistent with sunk-cost effect).

An ANOVA with SUNK as the dependent variable revealed no main effects (p 's > 0.65), but revealed a significant *High Sunk Cost Type* \times *Windfall Type* interaction ($F_{1,116} = 21.94$, $p < 0.001$, see Figure 3 for means). When the windfall gain occurred in the same division as the high sunk cost, SUNK scores are not significantly different from indifference ($X = 4.85$, $p > 0.55$); i.e. there was no evidence for the sunk-cost effect. However, when the windfall gain was in a different division than the high sunk cost, there was strong support for the sunk cost effect; the mean SUNK score was significantly greater than indifference ($X = 6.65$, $p < 0.001$).

In both experiments 4 and 5, when the sunk cost and windfall gains are perceived to be similar to each other, consumers can successfully integrate the two (Figure 1B) resulting in a weakening of the sunk-cost effect.

3. Discussion and Conclusions

Research reported in this paper showed that windfall gains experienced by consumers around the time of making a decision can weaken or eliminate the sunk-cost effect, but only when the nature of the windfall gain is similar to the nature of the sunk cost. In the mental accounting framework proposed by Thaler (1980), the presence of a similar

windfall gain seems to allow consumers to “write off” their past non-recoverable costs that would otherwise have been treated as waste.

3.1. Limitations

The present research was not without limitations. The first limitation is the impoverished nature of the stimuli. While the sunk cost and escalation literature is based almost entirely on scenario based experiments, it might be argued that the sources of the sunk cost and windfall gains were artificially salient to our subjects as compared to the real world. While our objective was to test theory, future research should attempt to replicate our findings in a “real world” setting to ensure their generalizability.

Second, we documented the effect of flexibility in mental accounts on the strength of the sunk-cost effect. Specifically, we showed that some windfall gains are also used more “generously” to write off previous losses than others. However, the flexibility in mental accounts can have other consequences. For example, a budget imposed on certain types of spending may be relaxed in the face of a windfall gain and may lead to increased spending. Future research could investigate effects of the flexibility in mental accounts on spending and saving decisions.

3.2. Contributions and Directions for Future Research

The research tradition in mental accounting has typically assumed the existence of well defined, rigid and concrete accounts (Thaler and Johnson 1990) and has focussed on studying the impact of these accounts on behaviors such as purchasing, consumption, financing and investing. Little research has investigated the nature of mental accounts and studied their structure. Recent research suggests that the principles of categorization and similarity determine the membership of expenses and benefits into separate accounts (Henderson and Peterson 1992). Our results further highlight the importance of similarity and categorization in mental accounting processes.

The primary contribution of the present research is to show that rather than being rigid and concrete as implied by previous research, mental accounts can be flexible and the consumer can have substantial discretion in assigning costs and benefits to different mental accounts. In this paper, we introduced flexibility by introducing an unbudgeted windfall gain. However, other factors could generate flexibility – e.g. price bundling (Soman and Gourville 1998), unexpected discounts due to sales promotions (Soman and Cheema 2000), temporal separation between costs and benefits (Gourville and Soman 1998) or ambiguous bracketing of consumption and payment bundles (Prelec and Loewenstein 1998). Future research should identify the role of such factors in generating flexibility, and consequently their impact on the predictions of the mental accounting model.

The present research also echoes a recent finding in the literature that the “mental accounting process can be a pliable, self-serving psychological process” (Soman and Gourville 1998, p. 29). In our experiments, subjects were willing (within reasonable

bounds) to take an income that should have belonged to a separate mental account and credit it to an extant mental account that they would otherwise have had to “close in the red”. Our subjects thus seemed to be willing to allocate monies across mental accounting boundaries in order to overcome the pain associated with wasting a sunk cost. We speculate that when there is flexibility in mental accounts (as created by the presence of windfall gains), people “manipulate” accounts in order to justify any desired course of action (e.g. foregoing a paid-for event in favor of an attractive alternative event, avoiding a purchase for self-control reasons). An interesting avenue for future research would be to explore the role of motivation in this “writing off” process.

Notes

1. In both Experiments 4 and 5, the “similar” and “dissimilar” expenses and gains were selected on the basis of a pretest, and the similarity and dissimilarity were confirmed in a separate pretest.

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