Chapter 10

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The Role of Mental Accounting in Everyday Economic Decision Making

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How people make economic decisions with the aim of managing scarce resources, primarily of money but also of time and effort, is an ecologically valid topic that has been a focus of economic psychology (Wärneryd, 1988), although largely neglected in psychological research on judgment and decision making. In fact, almost every day people face economic decisions concerning earning, spending, and saving money. A ubiquitous aspect of such decisions is that they entail choices between immediate and deferred consumption. Examples are ample: Should I spend money on a nice evening at a restaurant now, or should I save the money for my vacation next summer? Because I have the opportunity to buy an attractive CD player, should I buy it now even though it is likely that I will need the money in the future for repairing my aging washing machine? Apparently, choosing an immediate attractive outcome may be a threat to future well-being, or, to put it differently, not choosing an immediate outcome is a sacrifice that will pay off later.

When making choices between outcomes occurring at different points in time such as between immediate and deferred consumption, people must perform value comparisons taking into account at which time in the future the outcomes occur. Such comparisons are difficult, because people's cognitive capacity in evaluating future events may be limited. In a major conceptual analysis of decision making, risk taking, and psychological time, Björkman (1984) notes that although the concept of "expected utility" (implying a time interval between the choice of an alternative and the outcome of the choice)

has been central in decision making research, the time dimension has somewhat paradoxically not been extensively investigated.

Choices between outcomes at different points in time have often been referred to as intertemporal in the literature. A closely related issue is how people exert self-control. Exerting self-control may be necessary to overcome the benefits of an immediate outcome in favor of more farsighted preferences. Shefrin and Thaler (1988, 1992) proposed that the use of mental accounts is a strategy of self-control, applicable to choices between immediate and deferred consumption.

In this chapter we first briefly review previous research on intertemporal choice and self-control. Second, we introduce the concept of mental accounting and show how it may constitute a strategy of self-control. Third, we report an attempt to replicate the study by Shefrin and Thaler (1988) aimed at demonstrating how the process of decomposing wealth in mental accounts affects expected future consumption. Fourth, we outline how mental accounting theory and alternative theories may explain how temporary income changes influence specific buying decisions. Such decisions between immediate and deferred consumption highlights the role of mental accounting as a self-control strategy. Finally, we present the results of a study that tests predictions from the different theories.

INTERTEMPORAL CHOICE AND SELF-CONTROL

In most decisions, consequences or outcomes are not immediate but occur in the future. Therefore, decision makers frequently need to choose between alternatives with outcomes occurring at different points in time, thereby engaging themselves in intertemporal choice. In the middle of the last century economists like Rae, Senior, and Jevons addressed the question of why people discount the future, in order to understand relations between surplus product, capital, and interest (Loewenstein, 1992). In their analyses these early economists saw emotional factors as contributing to the discounting of the future: Rae and Senior mainly in terms of psychological discomfort of deferring consumption, and Jevons in terms of hedonic influence of the thought of future consumption diminishing with time. At the turn of the century, Böhm-Bawerk and Fischer conceptualized intertemporal choice in more motivational and cognitive terms. Thus, as Björkman (1984) did, they attributed discounting to people's lack of willingness and ability to imagine the future.

In the discounted utility model proposed by Samuelson (1937) and Koopmans (1960) psychological content disappeared or was disguised. The model has been the dominating account in economics of how intertemporal choices are made. According to this model, people compare present values of future outcomes by applying fixed discount rates. A basic assumption is that preferences for two alternatives only depend on the absolute time interval separating them (Koopmans, 1960; Loewenstein & Prelec, 1992), a property that is labeled stationarity. However, as first noted by Strotz (1956), people are often inconsistent and may reverse their preferences, although the absolute time difference between the occurrences of two outcomes are constant while both outcomes are postponed. For example, a person may prefer one apple today to two apples tomorrow but at the same time prefer two apples after 10 days to one apple after 9 days. Prelec and Loewenstein (1991) labeled this violation of the stationarity property the common difference effect. The effect has been demonstrated in several studies on human participants (Benzion, Rapoport, & Yagil, 1989; Thaler, 1981) as well as in animal studies (Ainslie, 1975).

Ainslie (1975) argued that assuming a reversal of preference is necessary to understand why people (and animals) may be both impulsive and exert impulse control. If not, people would be consistent in their preference for either the immediate or the distant outcome, and they would not need to exert self-control to overcome a preference for an immediate outcome. Ainslie (1975; Ainslie & Haslam, 1992a) and others (Chung & Herrnstein, 1967; Herrnstein, 1961; Loewenstein & Prelec, 1992) proposed a hyperbolic discount function to replace the exponential function in the discounted utility model. Such a more deeply curved function appears to account for a large body of empirical data in animal and human time-discounting. A suggested interpretation of the common difference effect is that a larger risk is associated with a larger delay (Benzion et al., 1989; Keren & Roelofsma, 1995). The risk and uncertainty associated with delayed outcomes is assumed to be an important factor determining the shape of the discount function. However, others (e.g., Rachlin & Siegel, 1994) have argued that discounting is the elementary process that underlies uncertainty. What may be concluded is that evidence suggests that time delay and uncertainty are related.

A different perspective on why people have time-inconsistent preferences is offered by Loewenstein (1996). He argues that the immediate experience of visceral factors, such as drive states, moods or emotions, and physical pain have disproportionately large effects on behavior and tend to dominate the importance of more farsighted goals or preferences. Moreover, people appear to be unable to anticipate the impact of visceral factors on future behavior.

In recent research on intertemporal choice, there are a number of findings in addition to the common difference effect that are inconsistent with the discounted utility model (Prelec & Loewenstein, 1991; Loewenstein & Prelec, 1992). Such reported inconsistencies are: less proportional discounting for large than for small dollar amounts (Thaler, 1980); asym-

metric preferences between delaying and speeding up rewards (or consumption) (Loewenstein, 1988; Loewenstein & Prelec, 1992); and asymmetries between the discounting of gains and losses (Benzion et al., 1989; Prelec & Loewenstein, 1991; Shelly, 1993, 1994; Thaler, 1980).

A vast majority of studies of intertemporal choice have investigated how single future outcomes are discounted. More recently the question has been raised concerning whether or not multiple outcomes are also subject to time discounting. In fact, a reported finding is that sequences of outcomes occurring in the future are not discounted (Loewenstein & Prelec, 1993; Stevenson, 1993). According to Loewenstein and Prelec (1993), people tend to prefer sequences of outcomes that improve over time and are also motivated by a desire to spread consumption evenly over time. An unresolved intriguing question that arises from the differences in discounting of single and sequences of outcomes is, When is an outcome considered to be single or included as part of a sequence?

A general conclusion is that in intertemporal choice people have time-inconsistent preferences. Such inconsistencies are not something that people necessarily are unaware of. Quite to the contrary, people often adopt different self-control strategies in order to counteract inconsistent preferences. Self-control typically involves efforts to resist temporary or shorter-term preferences in order to achieve longer-term preferences. Mischel and collaborators (Mischel, Cantor, & Feldman, 1997; Mischel, Shoda, & Rodriguez, 1992) have investigated individual differences and underlying psychological processes in delay of gratification in children. In a large number of studies in which children would receive a superior reward if they were able to wait, it was found that factors like attention to the reward, distractions, and cognitive representations of the reward (e.g., thinking of a chocolate-bar reward in terms of a good-tasting snack or a "brown rectangular box") affected the children's ability to delay gratification.

Ainslie and Haslam (1992b) distinguished between four basic ways of exercising self-control: extrapsychic mechanisms, control of attention, preparation of emotion, and formulating personal rules. Hoch and Loewenstein (1991) modeled self-control as a struggle between two psychological forces: desire and willpower. A shorter-term preference may by its proximity in time increase the desire relative to a longer-term preference. However, increased willpower works in the opposite direction by attempting to overcome such temporarily increased desires for a shorter-term preference. Two general classes of self-control strategies were proposed by Hoch and Loewenstein (1991): those that reduce desire and those that overcome desire through willpower. Examples of desire-reducing self-control strategies are avoidance of situations that are likely to increase desire, postponement of choice until some future date, and distraction (e.g., thinking about something else), which may both reduce desire for a shorter-term preference

and decrease frustration of waiting for a longer-term preference. Examples of self-control strategies induced by willpower are precommitments—for instance, imposing constraints on future behavior either through external means or internal means such as personal rules or economic cost assessment that make obvious the advantage of a longer-term preference. The classification of self-control strategies by Ainslie and Haslam (1992b) bears a close resemblance to the classification by Hoch and Loewenstein (1991). Control of attention and preparation of emotion may be subsumed under desire-reduction strategies, whereas extrapsychic mechanisms and personal rules may be subsumed under willpower strategies.

The evidence thus suggest that people have time-inconsistent preferences, and that they are both driven by the temptation to achieve immediate preferences and to exert self-control with the goal of achieving longer-term preferences. Both desire-reduction and willpower as strategies for self-control aim at overcoming the temptation of immediate consumption of a specific object or in a specific situation. The decomposition of wealth and the constraining of consumption through the use of mental accounts (Shefrin & Thaler, 1988, 1992) however, may serve as a self-control strategy at a more general level, as it is not formed in relation to a specific situation or object. Mental accounting may therefore be of particular interest to investigate.

MENTAL ACCOUNTING

How people cognitively describe decision outcomes is the focus of much judgment and decision-making research (Gärling, Karlsson, Romanus, & Selart, 1997). In this context mental accounting refers to a process of categorizing outcomes (Henderson & Peterson, 1992; Tversky & Kahneman, 1981). The concept of the mental account was introduced by Thaler (1980, 1985) and Tversky and Kahneman (1981; Kahneman & Tversky, 1984). Tversky and Kahneman (1981, p. 456) defined a mental account as "an outcome frame which specifies (i) the set of elementary outcomes that are evaluated jointly and the manner in which they are combined, and (ii) a reference outcome that is considered neutral or normal." As an empirical example, in presenting different scenarios to participants Tversky and Kahneman (1981) found that a larger percentage of participants would buy a new theater ticket if they had lost the equivalent amount of money as compared to the percentage of participants that would replace a lost theater ticket. As an explanation of these results, they suggested that participants evaluated the loss of the ticket and the price of a new ticket in the same mental account while the loss of money and the price of a ticket were evaluated separately.

In Tversky and Kahneman (1981) the coding of outcomes in mental accounts is specific to the decision to be made. It should be contrasted to

the mental accounts referred to by Shefrin and Thaler (1988, 1992) in their behavioral life-cycle theory, which instead are a priori held mental accounts that are part of people's financial knowledge and therefore presumably higher-order, more stable cognitive structures (Ranyard, 1995). Specifically, Shefrin and Thaler (1988, 1992) used mental accounting as a description of how people categorize and impose restrictions on monetary assets. According to this theory, people categorize monetary assets in three mental accounts: current income, current assets, and future income. Shefrin and Thaler did not argue that these three accounts are exhaustive, but that they are the most basic and general ones. The current asset account may, for instance, be divided into subaccounts, and different households may use different subaccounts. Such subaccounts may for instance be to have assets for special goals, as holiday money or money for clothings. In a study of Japanese housewives, Kojima and Hama (1982) found evidence for the decomposition of wealth in nine different mental accounts (or "psychological purses" as they were labeled).

The behavioral life-cycle theory was proposed as a psychologically more plausible alternative to Modigliani and Brumberg's Nobel-prizewinning life-cycle theory of saving behavior (1954) and the related permanent income hypothesis (Friedman, 1957). According to the life-cycle theory, people strive toward uniform consumption during the life cycle, which implies that they take loans when their income is low and expected to be higher in the future, and that they save when their income is higher than expected. Empirical observations have however indicated that current income may be a more important factor than the theory predicts, and that middle-age households have a higher degree of consumption than younger and older households (Courant, Gramlich, & Laitner, 1986).

Since current assets, current income, and future income in the behavioral life-cycle theory correspond to actual accounts, one may question what is gained by labeling them *mental* accounts. An important reason is the implication that mental accounts psychologically induce constraints on the use of money. Thus it is implied that mental accounts are self-control devices. Above we noted that desire-reduction and increasing willpower aim at overcoming the temptation of immediate consumption of a specific object or in a specific situation. The use of mental accounts (Shefrin & Thaler, 1988, 1992) is assumed to serve as a self-control strategy at a more general level by imposing constraints on money. Because it is not formed in relation to a specific situation or object, the use of mental accounts is particularly well suited to explain findings concerning patterns of consumption and saving across the life cycle.

Shefrin and Thaler (1988) referred to the internal conflict, within an individual, between short-term and long-term preferences as a conflict between a planner and a doer. The planner is assumed to be farsighted

and to strive toward maximization of life-long utility, while the coexisting doer is assumed to be myopic and impulsive, striving towards maximization of immediate utility. In order to satisfy long-term preferences, it is necessary to adopt self-control. Because pure willpower is seen as very costly, people are assumed to seek other strategies to achieve self-control. The decomposition of wealth in mental accounts may be one such strategy that work in the direction of achieving also long-term preferences. The marginal propensity to consume from the three different mental accounts is assumed to decrease from current income to current assets and from the latter to future income. That is, the temptation to spend money on consumption is expected to be greatest from the current income account, next greatest from the current assets account, and least from the future income account. It should be noted that this is in sharp contrast to the life-cycle theory (Modigliani & Brumberg, 1954), which assumes that money from different accounts (or in different asset positions) is completely exchangeable (termed the principle of fungibility of money). In fact, existing data (Courant, Gramlich, & Laitner, 1986) are more consistent with the alternative theory in showing that consumption is more dependent on current income than expected. Furthermore, there is a greater than expected resistance to spread out consumption evenly over the life cycle by borrowing and using savings. Both these observations are clearly predicted from the use of mental accounts.

The behavioral life-cycle theory and the concept of mental accounts bring new light on how people make intertemporal choices. It does not primarily explain why people show time-inconsistent preferences but highlights that they often do this in relation to how they view their economic situation. In the following we will empirically explore the assumption that people vary in how tempted they are to consume immediately rather than deferring consumption depending on in which mental account money is available.

FUTURE CONSUMPTION EXPECTATIONS: A PARTIAL REPLICATION

In lack of any direct test of the hypothesis that the propensity to consume differs across the three mental accounts current income, current assets, and future income, Shefrin and Thaler (1988) conducted a survey with MBA students as participants. All participants were asked to estimate how much they expected that their consumption would increase during the following year if they received a windfall of $2400. The questions differed with regard to when the windfall was received and how it was split. Shefrin and Thaler obtained support for their hypothesis in that the expectation to consume was greater when the windfall came in increments of $200 per month (current income) than when it came immediately as a lump sum (current

assets), and in that the expectation to consume was smallest when the windfall came as a lump sum in the future (future income). The median amounts participants expected to consume were $1200, $785, and $0, respectively. Recently, Selart, Karlsson, and Gärling (1997) attempted to replicate these results. Another objective of the study was to extend the findings to expected consumption in response to temporary income *decreases.*

As discussed above, a central assumption in the study of intertemporal choice is that when an outcome occurs is important for the decision. In the study by Shefrin and Thaler (1988), participants were asked to indicate changes in their expected future consumption during a year—that is, consumption spread out over a period of time. Furthermore, when receiving a windfall as increments per month or as a future lump sum, participants were asked to imagine and evaluate outcomes that occur in the future. Hence, drawing on empirical results on intertemporal choice (e.g., Loewenstein & Prelec, 1992), different predictions than those made by Shefrin and Thaler are possible to make. If people discount future benefits, they may expect to increase consumption more when an increase in income is received immediately as a lump sum than when it is received as increments per month. Likewise, they may expect to increase consumption more when receiving an income increase as increments per month than when receiving a lump sum in the more distant future.

A new feature of the Selart et al. (1997) study was that the questions asked by Shefrin and Thaler (1988) were repeated for income decreases. It is not clear which predictions the behavioral life-cycle theory would make in this case. However, in accordance with the results concerning how future outcomes are discounted (Loewenstein & Prelec, 1992), it was predicted that the expectation to cut down on consumption when facing an income decrease (monetary loss) should be less when it came in decrements per month than when it came immediately in a lump sum. Expected consumption was also predicted to be less when the monetary loss came as a future lump sum than when it came in decrements per month. Thus, participants were expected to adjust the least to future outcomes.

According to prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991), a general characteristic of how people evaluate outcomes is loss aversion; that is, losses loom larger than gains. It was therefore expected that people to a larger extent would adjust consumption to income decreases than to income increases. Several studies of intertemporal choice have reported asymmetries between the discounting of gains and losses (Benzion et al., 1989; Prelec & Loewenstein, 1991; Shelly, 1993, 1994; Thaler, 1980). However, because both heavier discounting of gains than losses and heavier discounting of losses than gains have been documented in different studies, it was difficult to make unambiguous predictions based on asymmetries between the discounting of losses and gains.

In summary, we wanted to further test the validity of the hypothesis that people, because they categorize wealth in mental accounts, expect to consume more after a wealth increase that come as increments per month than an increase that come immediately as a lump sum, and that they expect to consume less if the increase come as a lump sum in the future (Selart et al., 1997). Because outcomes occur at different points in time, alternative predictions are however possible to make based on the notion of discounting of future outcomes. These predictions are applicable to both wealth increases and decreases. It is predicted that people expect to adjust their consumption more if a wealth change come immediately as a lump sum than if it come as increments or decrements per month, and that they expect to adjust the least if it come in the more distant future.

Using the same question format as the survey of Shefrin and Thaler (1988), respondents were asked to estimate how much they expected to change their consumption if they received a temporary income change. In three account-specific versions of the question, the income change was framed as coming immediately as a lump sum, as increments (or decrements) per month during a year, or as a lump sum with interest in 12 months. For one group of participants the income change was framed as an income increase and for another group as an income decrease. The income increases (in Swedish krona) were either 12000 ($1700) or 6000 ($850), the income decreases either 6000 ($850) or 3000 ($425).

The data sets consisted of usable responses from 996 participants in a Swedish nationwide random sample (response rate close to 50%) and 277 participants (response rate 58%) in a random sample of students at Göteborg University. In particular in the nationwide sample, a large proportion of participants reported that they did not expect to change their consumption. Of those participants who did, without exceptions those asked to imagine that they had received income increases expected to increase consumption whereas those asked to imagine that they had received income decreases expected to decrease consumption. Because the distributions of the estimates were positively and negatively skewed respectively, the estimates were recoded as adjustments (increases or decreases) of consumption. The mean proportions are given in Table 10.1 for each income change condition and sample. As may be seen, in both samples the participants expected to make most adjustment when an income increase came immediately as a lump sum (current assets) and not in increments per month (current income). Furthermore, participants expected to make the least adjustments when the income increase came in a future lump sum (future income). These results are in line with the alternative predictions based on previous research on discounting of future outcomes. Thus, the results obtained by Shefrin and Thaler (1988) were not replicated. However, they were replicated for the median estimates made by

TABLE 10.1
Mean Proportions of Adjustment to Income Changes in the Nationwide and Student Sample Related to Income Change and Mental Account

	Income Increase						*Income Decrease*					
	$1,700/year			*$850/year*			*$850/year*			*$425/year*		
Sample	I	A	F	I	A	F	I	A	F	I	A	F
Nationwide	.46	.55	.13	.40	.53	.10	.64	.77	.72	.42	.68	.57
Student	.84	.82	.20	.61	.79	.15	.61	.76	.71	.63	.80	.75

Note. I denotes an income change coded as current income; A an income change coded as current assets; and F an income coded as future income

the student sample (note that Shefrin and Thaler only reported median estimates and collected data for students). The results were different for income decreases. In both samples participants expected to adjust consumption less when the income decrease came as decrements per month than when it came as an immediate and a future lump sum. These results are partially accounted for by the notion of discounting of future outcomes. As expected, in line with loss aversion, adjustments of consumption were larger for an income decrease than an income increase.

In conclusion, the results of our study failed to replicate the results of Shefrin and Thaler (1988). Additionally, we found that respondents had different expectations about future consumption when the questions were asked for income decreases. The questions in our study as well as in Shefrin and Thaler referred to outcomes occurring at different times in the future. A plausible reason for the lack of support for the use of mental accounts may therefore be that the willingness to consume from different mental accounts were confounded with the motivation to discount future outcomes. Supporting this, the results were in some respects better accounted for by theories of intertemporal choice (Loewenstein & Prelec, 1992).

EFFECTS OF INCOME CHANGES ON BUYING DECISIONS

Although ongoing mental accounts have attracted research interest (Heath, 1995; Hirst, Joyce, & Schadewald, 1994; Selart et al., 1997; Shefrin & Thaler, 1988, 1992; Thaler, 1990; Winett & Lewis, 1995), the impact they are

predicted to have on specific economic decisions such as buying rather than on general consumption expectations has not been investigated. Yet the decomposition of wealth by means of use of mental accounts should have such an impact. The use of mental accounts in specific buying decisions rather than in general expectations of future consumption may in fact make mental accounting more apparent as a strategy of self-control. That is, the internal conflict between immediate or deferred consumption may be more salient in a buying decision. The choice of immediate consumption may therefore be more likely when using current income after having experienced a temporary income increase than when having to use current assets after a temporary income decrease, although total assets are equal in the two cases. In this way the categorization of wealth in mental accounts may serve as an explanation of how and why temporary income changes influence buying decisions. There are however also other suggested explanations of how and why a prior outcome (such as an income change) may influence choices.

Despite that most research on decision making has focused on isolated decisions, there are several occasions in everyday life in which decisions or outcomes depend on each other. Such interrelated decisions may be labeled sequential. A number of findings have been reported on this topic, including effects of prior outcomes on subsequent choices, escalation, and sunk cost effects (see, e.g., Gärling et al., 1997, for a review).

An assumption made in prospect theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1991, 1992) is that prospects or options are edited, that is, they are organized and reformulated in order to simplify evaluation and choice. Such editing operations include integration or segregation of prior outcomes.

Thaler and Johnson (1990) proposed a hedonic editing model to account for and specify when outcomes are integrated or segregated. The basic assumption in this model is that people edit outcomes so as to maximize the quality of their hedonic experiences (i.e., to maximize value). The hedonic editing model is thus a normative theory and Thaler and Johnson (1990) note that it is therefore likely to fail since it does not consider cognitive constraints. They argue, however, that it provides a point of comparison for other models. Two events or outcomes (x and y) are said to be integrated if they are combined before being subjectively evaluated (i.e., $v(x, y) = v(x+y)$) and to be segregated if they are evaluated separately (i.e., $v(x, y) = v(x) + v(y)$) (Thaler, 1985). If we assume that outcomes are evaluated in accordance with prospect theory (Kahneman & Tversky, 1979), integration or segregation matters because different evaluations will result. Because the value function in prospect theory is nonlinear and steeper for losses than for gains, it will be generally true that $v(x + y) \neq v(x) + v(y)$. Given the value function in prospect theory,

people who maximize value are assumed to segregate gains, integrate losses, integrate smaller losses with larger gains, and segregate smaller gains from larger losses. In empirically testing the model by, for instance, asking participants how much a loss would hurt after that they had incurred another loss, Thaler and Johnson only found partial support for their predictions. In disagreement with the prediction, it was however shown that people preferred to segregate rather than integrate losses.

Linville and Fischer (1991) offered the renewable resources model as an alternative account of integration or segregation of outcomes. In addition to assuming that outcomes are evaluated in accordance with the value function in prospect theory, people are assumed to possess limited but renewable resources to cope with both positive and negative outcomes. According to the model, people are therefore expected to segregate two positive outcomes, segregate two negative outcomes, and integrate one positive and one negative outcome. By asking participants whether they preferred two emotionally significant events to occur on the same day (integration) or on different days (segregation), Linville and Fisher (1991) obtained support for their model. The same general pattern of results (segregation of two positive events and of two negative events, integration of one positive and one negative event) were found within three different domains: academic (successes or failures on exams), financial (monetary losses or gains), and social (positive or negative encounters with people).

Both the hedonic editing and the renewable resources model assume that people are integrating or segregating outcomes with the goal of maximizing value. A decision maker may, however, often be more concerned about avoiding negative outcomes than to attain positive ones (Larrick, 1993). It has also been found that anticipated negative events receive larger attention and are processed more comprehensively than positive ones (Peeters & Czapinski, 1990; Taylor, 1991). Drawing on these generalizations, Gärling and Romanus (1997) proposed an alternative account of when and why outcomes are integrated or segregated, called the loss-sensitivity principle. Assuming, as in the hedonic editing model and renewable resources model, that outcomes are evaluated in accordance with prospect theory, the main difference from these models stems from the notion of avoiding negative outcomes rather than attaining positive ones. This notion of motivational shift implies, according to the loss-sensitivity principle, that prior outcomes are only integrated with expected losses. In a series of experiments (Gärling & Romanus, 1997; Gärling, Romanus, & Selart, 1994; Romanus, Hassing, & Gärling, 1996; Romanus, Karlsson, & Gärling, 1997), the loss-sensitivity principle was tested by asking participants to indicate their satisfaction with the possible outcomes of a gamble after having experienced a prior loss, a prior gain, or no prior outcome. In line with the hypothesis, prior outcomes only influenced satisfaction with an expected loss, with increased satisfaction after a gain and decreased satisfaction after a loss compared to after no outcome.

CONFIRMING EVIDENCE

The primary aim of an experiment we have conducted was to investigate how temporary income increases and decreases affect choices between immediate and deferred consumption. Unless such temporary income changes modify wealth or total assets, it should not influence choice according to normative decision theory (von Neuman & Morgenstern, 1947; Savage, 1954). Although we failed to replicate the support Shefrin and Thaler (1988) obtained for the use of mental accounts in people's expectations of future consumption, the use of mental accounts may still be a valid component in their everyday economic decisions such as decisions to buy. A possible reason for the lack of support in the study of people's expectations of future consumption is that the money were available in the mental accounts at different points in time. Hence, the willingness to consume from different mental accounts were confounded with the discounting of future outcomes. This is not the case in specific buying decisions. In the experiment we therefore aimed at investigating the validity of the behavioral life-cycle theory (Shefrin & Thaler, 1988) as an explanation of how and why temporary income changes influence specific buying decisions. Predictions from the behavioral life-cycle theory were contrasted to predictions from the renewable resources model (Linville & Fischer, 1991) and the loss-sensitivity principle (Gärling & Romanus, 1997). In the two latter theories it is assumed that the buying decision depends on the context of the buying situation (i.e., whether buying is perceived as positive or negative).

According to Shefrin and Thaler (1988, 1992) people decompose wealth into different mental accounts (i.e., current income, current assets, and future income) for which the propensity to consume differs. A temporary income change may result in that money for consumption has to be taken from different mental accounts, and thus should have an influence on a buying decision. It is expected that the propensity to consume is greater from current income than from current assets. An income increase is therefore predicted to increase the likelihood of choosing to buy. The reverse is expected for an income decrease if it implies that saved money must be used. Whether buying is positive or negative should have no effect.

Unlike the prediction from the behavioral life-cycle theory, the buying situation is expected to be a determining factor in the renewable resources model. Buying may psychologically constitute a positive or negative event. For instance, buying a new attractive model of a consumer product may

be perceived to be positive, whereas replacing a broken product may be perceived to be negative or at least less positive than buying a new model. As noted above, Linville and Fisher (1991) received empirical support for the renewable resources model in showing that participants segregated two positive events (gain savoring), segregated two negative events (multiple loss aversion), and integrated a positive and a negative event (loss buffering). Hence, whether buying is perceived as positive or negative will, according to the renewable resources model, result in different effects of a temporary income increase (assumed to be positive) and a temporary income decrease (assumed to be negative) on the propensity to consume. If buying is perceived as positive, the renewable resources model predicts that participants will be more likely to defer consumption when receiving an income increase due to their preference to segregate two positive events. In contrast, participants are expected to be more likely to buy immediately when faced with an income decrease due to their preference to integrate a positive and a negative event. If buying is viewed as negative, the renewable resources model predicts the reverse: participants will be more likely to buy immediately when they receive an income increase and to defer consumption when faced with an income decrease.

An alternative explanation of integration and segregation of prior outcomes is the loss-sensitivity principle proposed by Gärling and Romanus (1997). According to this principle, a prior outcome is only integrated with expected losses. Hence, an income change will only be integrated and affect the choice to buy when buying is perceived as negative (i.e., as a loss). It is therefore expected that when buying is perceived to be negative it is more likely after an income increase and less likely after an income decrease. Income change is not expected to have an effect when buying is perceived as positive.

Forty-eight undergraduates at Göteborg University participated in the experiment. They were offered hypothetical choices between buying a durable good immediately or deferring consumption after having experienced a temporary income increase or decrease. Because participants in the income-decrease condition were asked to imagine that they had saved money, this condition was equivalent to the income-increase condition with respect to total assets.

Different groups of participants were asked to imagine positive or negative buying events. In the positive buying events, they were told that they owned a product that they had wanted for a long time and now considered replacing with a new and better model. In the negative buying event, they were told that a product they owned had broken down and that they considered replacing it.

For each hypothetical situation participants were first asked to make a choice to buy the product (either a CD player, a bookcase, a Walkman,

or a writing table) or deferring to buy it. Then they rated how likely they were to choose the way they did on a continuous scale from 0 to 100, where 0 was defined as not especially likely (i.e., that one is almost equally likely to choose the other alternative), 50 as rather likely, and 100 as very likely. Table 10.2 shows the means of the ratings of likelihood that were given a positive sign if participants chose to buy and a negative sign if they chose to wait (thus ranging from −100 to 100). Statistical analyses showed that the only reliable effect was obtained of income change (whether an increase or decrease). Although not statistically significant, the likelihood to buy was rated less for the positive than for the negative buying event. Thus, the framing of buying as positive and negative appeared to have been successful. Nevertheless, any interaction between consumption event and income change was absent.

Because participants in the income-decrease condition were more unwilling to use the money they had saved (current assets) as compared to participants in the income-increase condition where the equivalent amount of money was coded as current income, the results were clearly in line with the prediction from the behavioral life-cycle theory (Shefrin & Thaler, 1988, 1992) of how mental accounts are used. The decomposition of wealth in mental accounts violates the principle of fungibility in the life-cycle theory of saving behavior (Modigliani & Brumberg, 1954). It is also a violation of expected utility theory (von Neuman & Morgenstern, 1947; Savage, 1954) in which decisions are assumed to be made in relation to total assets or wealth. Hence, the use of mental accounts have important implications for how people make decisions.

The absence of an interaction between the framing of buying as positive or negative and temporary income change discredited the renewable resources model and the loss-sensitivity principle as explanations of the results. The question therefore arises why these explanations do not seem to be valid, although they accurately predicted the results in previous studies (Linville & Fischer, 1991; Thaler & Johnson, 1990; Gärling & Romanus, 1997; Gärling et al. 1994; Romanus et al., 1996; Romanus et al., 1997). In the studies supporting the loss-sensitivity principle, participants integrated a prior outcome only with a potential loss. The rationale is that they are concerned

TABLE 10.2
Means of Ratings of Likelihood to Consume for Different Consumption Events and Income-Change Conditions

Consumption Event	*Income Decrease*	*Income Increase*
Negative	-33.9	11.2
Positive	-54.6	-9.2

about negative outcomes. The results obtained by Linville and Fisher (1991) in support for the renewable resources model concerned preferences for emotional impactful events occurring on the same or on different days. Both the loss-sensitivity principle and the renewable resources model highlight affective control. However, because in the present experiment the choices were between immediate or deferred consumption, it is possible that issues about self-control, entailed in the use of mental accounts, is regarded as more important than affective control.

SUMMARY AND CONCLUSIONS

People are facing a variety of economic decisions every day. Several of these decisions are intertemporal choices in which outcomes that occur at different points in time have to be evaluated. Because future outcomes generally are discounted, it may sometimes be necessary to adopt strategies of self-control in order to overcome the temptation of obtaining immediate outcomes in favor of longer-term preferences. The categorization of wealth in mental accounts suggested by Shefrin and Thaler (1988, 1992) in their behavioral life-cycle theory may serve as a self-control strategy. In contrast to other strategies of self-control (Ainslie & Haslam, 1992b; Hoch & Loewenstein, 1991), the use of mental accounts is likely to work at a more general level, as it is not formed in relation to a specific situation or object.

In a questionnaire study of the effect of mental accounts on expectations of future consumption (Selart et al., 1997), we were however unable to replicate the results of Shefrin and Thaler (1988). It was suggested that, because the questions to participants included outcomes occurring at different points in time, the use of mental accounts may have been concealed by the motivation to discount future outcomes. In support of this interpretation, the results were instead better accounted for by theories of intertemporal choice (e.g., Loewenstein & Prelec, 1992).

Yet in another experiment we conducted, support was obtained for the use of mental accounts, predicted by the behavioral life-cycle theory, as an explanation of how a temporary income change influences specific buying decisions involving choices between immediate and deferred consumption. The renewable resources model (Linville & Fischer, 1991) and the loss-sensitivity principle (Gärling & Romanus, 1997) were discredited as explanations, because no interaction was found between whether the income change was a decrease or increase and whether buying was positive or negative.

The decomposition of wealth in mental accounts violates the principle of fungibility in the life-cycle theory of saving behavior (Modigliani & Brumberg, 1954) as well as expected utility theory (von Neuman & Morgenstern, 1947; Savage, 1954) in which decisions are assumed to be made taking total assets or wealth into account. Hence, the use of mental accounts have important implications for how people make decisions. It has also implications for the understanding of saving behavior, suggesting that current income may be a more important factor than predicted from the life-cycle theory (Modigliani & Brumberg, 1954).

One may ask to what extent the results from fictitious buying situations are possible to extend to real-life situations? On the one hand, one may expect participants to be more rational, in the sense of behaving in line with normative theory, when responding in situations with real outcomes. On the other hand, one may expect that people in real-life situations are influenced by other factors such as temptation and impulsiveness. Such factors could therefore decrease the effectiveness of mental accounts as a self-control device. Hence, the incentive to use mental accounts should be greater in real life but at the same time be less effective. It is reasonable to think that the pronounced use of mental accounts in the present studies also to some degree extend to real-life situations. Nevertheless, the important role of visceral factors (Loewenstein, 1996) may be downplayed. An important task for future research is therefore to investigate how mental accounts and visceral factors interact in self-control strategies.

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