

# Effects of Payment Mechanism on Spending Behavior: The Role of Rehearsal and Immediacy of Payments

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Past expenses have been shown to influence future spending behavior by depleting available budgets. However, a prerequisite for this relationship is the accurate recall of past payments and the experiencing of the full aversive impact associated with them. This article shows that the use of different payment mechanisms influences both these factors and hence moderates the effects of past payments on future spending. Specifically, past payments strongly reduce purchase intention when the payment mechanism requires the consumer to write down the amount paid (rehearsal) and when the consumer's wealth is depleted immediately rather than with a delay (immediacy). Two experiments show support for the proposed theoretical framework.

Consumers today have the opportunity to pay for purchases with an increasingly growing array of payment mechanisms. In addition to conventional methods like cash and checks, the past few years have seen the rapid proliferation of plastic payment mechanisms—credit cards, charge cards, and debit cards (Green 1997). Other mechanisms like traveler's checks, credit checks, bank drafts, and money orders are also common. Additionally, a whole new generation of payment mechanisms like smart cards, memory cards, and electronic payments is expected to grow and ultimately represent a significant proportion of all consumer transactions (Marlin 1998).

This proliferation of payment mechanisms has been accompanied by surprisingly little research on the effects of the payment mechanism on consumer behavior. However, some early research in this area presents intriguing findings. Hirschman (1979) and Feinberg (1986) used actual consumer transactions to compare the spending of consumers who paid by credit cards with those who used cash or checks, and they found that the former spend more in otherwise

identical purchasing situations. In order to control for the possibility that high spenders self-select into the credit-card category, Prelec and Simester (1998) conducted an auction in which subjects bid for tickets to a sporting event that were to be purchased by the winner on the following day by using either cash or credit card (random assignment). They replicated the basic finding that willingness-to-pay is significantly greater in the credit-card condition as compared with the cash condition, and they argued that liquidity constraints cannot completely explain these effects.

Recent research has also started identifying factors that underly consumer choice of payment mechanisms. Prelec and Loewenstein (1998) predicted that consumers are more likely to use credit cards to purchase durable products (e.g., a microwave oven) rather than short-lived products (e.g., a vacation) in order to maximize the perceived attractiveness of the transaction by matching payment and consumption streams. However, in addition to such strategic reasons, the choice of a payment mechanism is often accidental and driven by simpler considerations like convenience (e.g., a charge card is always in one's wallet), acceptability (e.g., certain retailers might not accept checks), accessibility (e.g., there is no convenient ATM to withdraw cash), and habit (e.g., rent is typically always paid by check). An interesting avenue of research, therefore, relates to the effect of the use of a particular payment mechanism on future spending behavior.

The payment mechanism has no role to play in a rational, economic evaluation of a purchase opportunity (and even in simpler heuristic based decisions). Yet there is substantial evidence to suggest that consumers who predominantly use credit cards overspend relative to those who do not (Cole

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1998; Tokunaga 1993). There is, however, little understanding of the specific role that the payment mechanism plays in influencing future spending behavior. The current research takes a first step by studying the effects of the past usage of a given payment mechanism on future spending.

Prior research in marketing has looked at the behavioral effects arising from the use of different payment mechanisms at the point of purchase (e.g., Feinberg 1986; Hirschman 1979). The approach in this article is different in that it focuses on the moderating effects of the historic usage of payment mechanisms on how past expenses influence pending purchase decisions. This article addresses the following specific questions:

1) *Do payment mechanisms influence spending behavior?* In two experiments, five different payment mechanisms are studied. Results show that the use of a particular payment mechanism does influence future spending behavior.

2) *What theoretical mechanism accounts for these differences?* Prior research suggests that past expenses influence pending purchase decisions by depleting the available budget for the purchase. This article shows that the payment mechanism used to incur past expenses changes the strength of the above relationship by influencing the recall and the aversive impact of past payments. Specifically, certain payment mechanisms lead consumers to underestimate past expenses and hence inflate the purchase intention for additional products.

The rest of this article is divided into three sections. First, relevant literature is reviewed, a behavioral framework is developed, and a hypothesis about how payment mechanisms moderate the effect of past payments on future purchases is proposed and tested. Second, the framework is extended to incorporate specific features of payment mechanisms, and additional hypotheses on how these features affect purchasing are proposed and tested. Third, limitations, implications, and directions for future research are discussed.

## THE ROLE OF PAST EXPENSES ON THE EVALUATION OF A TRANSACTION

A rational, economic evaluation of a purchase opportunity should depend on the sum of the utility offered by the product and the negative (dis)utility of the payment (Prelec and Loewenstein 1998; Soman 1998). In contemplating whether or not to make a purchase, consumers might use the valence of this "net transaction value" (Soman 1998) and purchase only if it is greater than or equal to zero. In other situations, a consumer may not rationally contemplate a purchase. For instance, she might be compelled to incur an expense (e.g., car repairs) or be tempted to make a purchase (e.g., for hedonic reasons). In these cases, the net transaction value could represent the degree to which the consumer feels that she has got a good deal or the degree to which she can exert

self-control in the face of temptation, respectively.<sup>1</sup> Note that consumers may not actually compute a net transaction value. However, considerable evidence shows that they do consider the utility of the product and disutility of the payment, and hence the net transaction value does well in representing the consumer's evaluation of a transaction, either while she contemplates the purchase or while she retrospectively evaluates the deal (Prelec and Loewenstein 1998; Thaler 1999).

Regardless of whether the purchase is rationally contemplated or made out of external compulsion or temptation, the evaluation of the utility of the benefit and the disutility of the cost should normatively depend only on the absolute values of the product attributes and the price. Specifically, there is no room for the payment mechanism to affect evaluation in this rational, normative world. However, research shows that the utility of the very same product could differ as a function of the context (cf. Huber, Payne, and Puto 1982) and of the manner in which information is structured (Russo 1977) and framed (Levin and Gaeth 1988). Similarly, factors other than the dollar value of the price might influence the disutility of payment. For instance, recent research shows that expenses could be seen as more or less palatable (and hence purchasing is more or less likely) depending on their temporal framing (Gourville 1998), their level of disaggregation (Morowitz, Greenleaf, and Johnson 1998), or the extent of budgeted resources available for spending (Heath and Soll 1996). The income effect from microeconomic theory predicts that a consumer will display an increasing likelihood of purchasing a discretionary product as her wealth increases (Ferber 1962, 1973). From a decision-making standpoint, this suggests that the total wealth of a consumer influences the disutility of the payment and consequently her willingness to purchase.<sup>2</sup>

Prior research has also shown, however, that the categorization of expenses (Heath and Soll 1996) and income (Shefrin and Thaler 1988) will result in deviations from the predictions of the income effect. Heath and Soll (1996) proposed that consumers mentally allocate (i.e., budget) their money to a number of spending categories (e.g., food, entertainment, and clothing). They track and record cumulative expenditures within each spending category, and their purchase behavior at any time is driven by the money available in each category (Heath 1995; Heath and Soll 1996). This budgeting effect can be labeled as the available income effect, in which the available budgeted resources that remain

<sup>1</sup>The theoretical framework in this article centers around the disutility of payment and the effect of the payment mechanism on this disutility. While the purchase intention has been used as a dependent variable, payment mechanisms could also have effects on the perception of how good the deal is and on the degree of self-control that the consumer can exert via the effects on disutility.

<sup>2</sup>Recent evidence suggests that the between-subjects predictions of the income effect are not supported in the real world. Wealthy people, for instance, can be more frugal than poor people. The theoretical development in this article is based on the within-subjects prediction of the income effect, i.e., that the willingness-to-spend of the same individual varies as a function of her total wealth.

in each spending category after accounting for past expenses (and not the total wealth) influences the disutility of the payment and spending behavior.

While the budgeting model is a good paramorphic representation of spending decisions (Heath and Soll 1996), it is not clear how well it represents the consumer's decision process. For past expenses to systematically influence future spending, the model requires a consumer to (a) proactively set budgets in different spending categories, (b) keep track of expenses and assign them to the relevant categories, and (c) maintain a running total of cumulative spending and hence available income in each category. Heath and Soll (1996) borrowed terminology from financial accounting to explain the cognitive processes involved. They argued that expenses must first be remembered and evaluated (i.e., booked), then be assigned to the appropriate mental account (i.e., posted; Heath and Soll 1996, p. 42). They demonstrated that the posting of a past expense to a given mental account (e.g., entertainment) reduces the likelihood of an additional purchase in that account, but their experiments did not study the role of booking.

While the memory of the past expense obviously influences booking and hence the impact of the expense on future spending, recent research suggests that the timing and the physical format of the transaction could also contribute to the influence of the expense on subsequent behavior. For instance, Gourville and Soman (1998) showed that for prepayment, the relevance of the past payment in the evaluation of the transaction gradually decreases as the temporal separation between payment and consumption increases (Gourville and Soman 1998). Similarly, ambiguity in the transaction format has been shown to reduce the impact of the payment (Soman and Gourville 2001). This stream of research suggests that even when consumers are able to recall past expenses, the aversive impact of these past expenses on future decisions could be weaker than anticipated.

In prior investigations on the role of past expenditures in future spending decisions (e.g., Arkes and Blumer 1985; Heath 1995; Heath and Soll 1996), subjects' behavior was typically fully influenced by the past expense because this information had been presented in a salient and unambiguous manner. The set up in these experiments facilitated both the accurate booking of past payments and their full aversive influence on decision making. In the real world, however, the cognitive demands associated with accurate booking may be high.

Do consumers accurately recall past expenses and experience their full aversive influence? Four streams of literature suggest that this is highly unlikely. First, a considerable body of evidence shows that while consumers might be able to recall items they recently purchased, many consumers are unable to correctly recall the price paid (e.g., Dickson and Sawyer 1990; Helgeson and Beatty 1987). Second, work in the area of family budgeting and finances (e.g., Pankow 1991; Zelizer 1994) suggests that a typical consumer has a clear idea of how much money she has in her bank accounts (as well as available resources for discre-

tionary spending) usually at only one time in the month, typically around payday. As she incurs a number of expenses over the coming days and uses a variety of payment mechanisms, it becomes relatively difficult for her to maintain an updated total of cumulative spending and available money. Third, some expenses might be small enough that the consumer does not even notice them and is simply not motivated to keep track of them (Gourville 1998; Thaler 1999). Fourth, research in the area of dynamic decision making shows that individuals are not very sensitive to changes in quantities unless those changes alter the level of some salient variable (Sterman 1989). In an inventory game experiment in which subjects made reordering decisions based on current inventory levels and past orders, Sterman (1989) showed that subjects are fairly insensitive to past orders that are being processed and have not yet been fulfilled but that they react significantly to changes in actual level of inventory. In the context of payments, this research suggests that past payments might influence future behavior if they result in the change of a salient variable (say, the bank-account level), rather than if these payments have not yet been completed. In this article, payments in which an expense has been incurred (e.g., a dinner charged to a credit card) but the consumer's wealth has yet to be depleted (e.g., the bill has not yet been paid) will be referred to as in-process payments. To the extent that the consumer has in-process payments, this implies that even though she might be able to recall past expenses, the consumer may not experience their full aversive impact. These diverse streams of literature, therefore, suggest that consumers might be deficient in accounting for past expenses and incorporating them in future spending decisions.

My alternate view of the decision-making process that maintains Heath and Soll's (1996) proposition that past expenses influence future spending behavior is a retrospective view. Specifically, when faced with a purchase opportunity, I suggest that consumers make a retrospective evaluation of their past expenses on similar items or items in the same spending category. This evaluation is a constructed judgment (Bettman, Luce, and Payne 1998) rather than a retrieved estimate of cumulative spending, and it is constructed specifically as input into the purchase decision. As discussed earlier, the retrospective evaluation of past expenses is a function of their recall as well as their aversive impact. This proposed process is similar to the budgeting model in that there is a negative correlation between the assessment of past expenses and the purchase intention for an additional similar product. However, the proposed process is different from the budgeting model in that the past expenses are retrospectively assessed rather than proactively computed on line and later retrieved at the time of making a purchase decision.

The first part of this article focuses on differences in the memory and aversive impact of past payments for two payment mechanisms, checks and credit cards. Consumers who use checks for making past payments are likely to better recall these expenses and to experience their full aversive

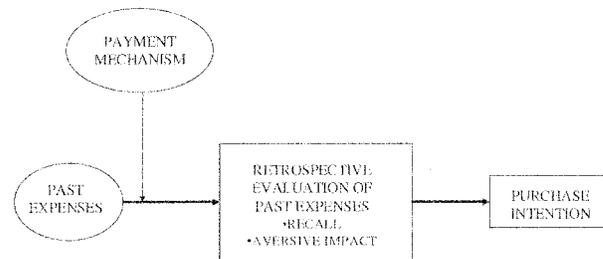
effect. Payment by check forces consumers to better remember the expense (since they write out the total amount in words and figures), and it also results in a tighter association of payments with individual transactions (Prelec and Loewenstein 1998). Payments by credit card, however, are lower in salience and vividness, and, hence, they might result in a weaker memory trace. In addition, payments by credit card result in the disassociation of payments from benefits (due to a month-long payment cycle), which results in a weaker aversive impact (Soman and Gourville 2001). Also they result in in-process payments. Because of the resulting underestimation of past expenses at the time of making a purchase decision, consumers may have a greater likelihood of making an additional purchase.

Figure 1 summarizes the theoretical relationships posited in this article. The retrospective evaluation of the past payments influences the purchase intention for similar products, while the payment mechanism influences the retrospective evaluation by influencing the strength of the memory trace of past expenses and by changing the temporal structure and form of outflows (and hence their aversive impact). Consequently, within a given payment cycle, certain payment mechanisms lead the consumer into underestimating past expenses (i.e., overestimating the available income), while other payment mechanisms might result in consumers being well calibrated concerning the extent of their past expenses.

Note that the use of credit cards could, more broadly, result in a temporal reallocation of the memory and aversive effect of payment. On receiving a credit-card statement, a consumer might vividly recall old expenses and experience their aversive impact, resulting in a temporary reluctance to spend. The current set of hypotheses and experiments focuses on purchasing decisions within one payment cycle. An extension of these results to multiple payment cycles and speculation on the results is discussed in the concluding section.

Two separate real-world studies were conducted to test the predictions about the memory for credit-cards payments. First, 41 students were intercepted immediately after making purchases at a campus bookstore. They were asked how they had paid for their purchases and to recall the exact amount they had spent. They were then asked to confirm this amount by looking at their receipts. Of the 18 respondents who had paid by cash, 12 (66.7 percent) accurately recalled the amount they had spent, and the remaining six were within \$3 of the true amount. Of the 23 respondents who had paid by credit card, only eight (34.8 percent,  $p < .05$ ) could recall the amount; the remaining 15 either reported an amount lower than the true amount or confessed that they had no idea. Second, 30 single-income-earning individuals who had only one credit card and who reported that they had no outstanding balances were asked to bring to the experimenter their unopened credit-card bill as soon as it arrived. They also were asked to save and bring receipts from all significant transactions (greater than \$20) during the same period, irrespective of which payment mechanism they had used. These individuals were asked first to recall

FIGURE 1  
THEORETICAL FRAMEWORK



NOTE.—Ovals represent factors exogenous to the theoretical model (factors held constant or manipulated), while rectangles represent consumer judgments (measured variables).

all of their expenses and then to open their statement and receipts and write down the itemized expenses. Based on this self-reported evidence, all 30 individuals had underestimated the number of credit-card expenses ( $n_{\text{recalled}} = 4.6$ ,  $n_{\text{actual}} = 7.7$ ,  $p_{\text{credit card}} = 59.74$  percent) to a greater extent than their cash and check expenses ( $n_{\text{recalled}} = 5.6$ ,  $n_{\text{actual}} = 6.3$ ,  $p_{\text{cash/check}} = 88.88$  percent,  $p < .01$ ).<sup>3</sup> In addition, all 30 had underestimated the total credit-card expense by an average of 29 percent (the range was 20–48 percent) but had underestimated their cash and check purchases by only 7 percent (the range was 0–18 percent,  $p < .01$ ). While both studies were not perfectly controlled experiments and the results may be open to alternate explanations, the two studies collectively seem to suggest that credit-card payments are relatively less salient and less memorable than cash or check payments.

In contrast to the available income effect, the proposed framework posits a perceived available income effect in which purchase decisions are made on the basis of a constructed perception of spending and a subsequent inference about available income rather than on a retrieved figure. Specifically, consumers who charge expenses to credit cards have a weaker retrospective evaluation and consequently an exaggerated perception of available income, which results in a greater likelihood of purchasing discretionary goods. These expectations are captured in the following hypothesis:

**H1:** Consumers who pay for past expenses by credit cards will be more likely to purchase an additional discretionary product as compared with consumers who pay for the same expenses by check, *ceteris paribus*.

<sup>3</sup>It is possible that consumers tend to use a particular payment mechanism for repetitive purchases (i.e., check for monthly rent and credit card for monthly internet access). In order to minimize the impact of such well-rehearsed expenses, participants were instructed to write down only expenses that were not frequent and repetitive. Rent, subscriptions, and other regular expenses were not considered in this analysis.

Next I describe an experiment designed to test this hypothesis.

### EXPERIMENT 1

In this experiment, Hypothesis 1 is tested by getting subjects to experience a simulated series of payments made predominantly by check or credit cards and then to indicate their purchase intention for an additional discretionary product.

#### Subjects, Design, and Procedure

Subjects were 160 students at a midwestern university who were recruited at several cafeterias across the campus. Subjects were given a two-page questionnaire and a stack of index cards, and they were compensated with a snack of their choice.

The cover page of the questionnaire asked subjects to imagine that they had graduated and had a job that paid \$3,000 a month. All subjects were told that they had savings and checking accounts (total balance = \$3,000) and a credit card with a specified limit (either \$3,000 or \$8,000). They were asked to imagine that they had recently finished paying off all of their college loans and now wanted to save money to buy a condominium. Next, subjects were asked to view the stack of 30 index cards one at a time; each card contained details of a particular expense that was incurred on a given day of the month. They could spend as much time considering each card as they liked, but they could not return to a card after they had completed viewing it. Of the 30 index cards, 12 contained test expenses (listed in Table 1) that subjects were instructed to make payments for before proceeding to the next card. Subjects in the credit-card condition paid by signing a credit-card receipt, while subjects in the check condition paid for the same 12 expenses by writing a check (see Fig. 2 for sample stimulus material). The appropriate payment mechanism was attached to the index card describing the test expense. Further, each index card for subjects in the feedback condition contained the cumulative spending to date at the bottom, while the cards for subjects in the no-feedback condition did not contain this information.

The experiment thus employed a 2 (Payment Mechanism: Credit Card vs. Check)  $\times$  2 (Feedback: Yes vs. No)  $\times$  2 (Credit Limit: \$3,000 vs. \$8,000) between-subjects design, which resulted in a total of eight experimental conditions. The feedback factor was used to test whether differences between the credit-card and check conditions could be explained by errors in the booking process and hence to test whether the difference would be reduced by providing feedback about total past expenses. The credit-limit factor was used because there is prior evidence to suggest that the size of the credit limit might influence spending behavior. Specifically, Soman and Cheema (1999) show that for credit-card debt, consumers use the credit limit as a signal of their future earnings potential and, hence, they are more willing to incur a debt as their credit limit increases. Thus, while

TABLE 1

LIST OF TEST EXPENSES USED: EXPERIMENT 1

Date	Type of expense	Amount (\$)
March 8	Rent	700.00
March 9	Phone bill	100.72
March 9	Grocery	53.23
March 10	Dinner at a restaurant	26.34
March 12	Tickets to a game	23.23
March 15	Car payment	370.00
March 18	Shopping at Wal-Mart (miscellaneous)	62.98
March 19	Grocery	47.98
March 22	Clothes at Marshall Field's	123.21
March 24	Professional and leisure books	72.02
March 25	Utilities	30.05
March 28	Grocery	48.06

NOTE.—In addition, subjects were instructed to imagine that they needed to spend an additional \$225 on daily expenses like lunch, coffee, bus fares, tolls, etc. These expenses were presented in a disaggregated manner over the duration of the month and not as a single amount.

prior research suggested a greater purchase intention when the credit limit is \$8,000 instead of \$3,000, my goal here was to ensure that the effects of feedback were not different at these two credit limits.

Note that all subjects were given identical financial profiles and were told to make decisions based on their bank accounts, income, expenses, and credit-card account. Subjects in the two payment mechanism conditions differed only in terms of whether they wrote 12 checks or signed 12 credit-card receipts during the experiment.

Finally, subjects were presented with a scenario in which they were asked to imagine that they are at a mall to make other purchases when they "notice a boxed set of CD's by an artist you like. It appears to be a good collection and is on sale for a price of \$50. You know you don't really crave for the CD's, but they will be a nice addition to your CD collection." They were asked to view an in-store advertisement (identical across all conditions) for the CDs and then to indicate their purchase intention for the boxed set (1 = definitely will not buy; 10 = definitely will buy).

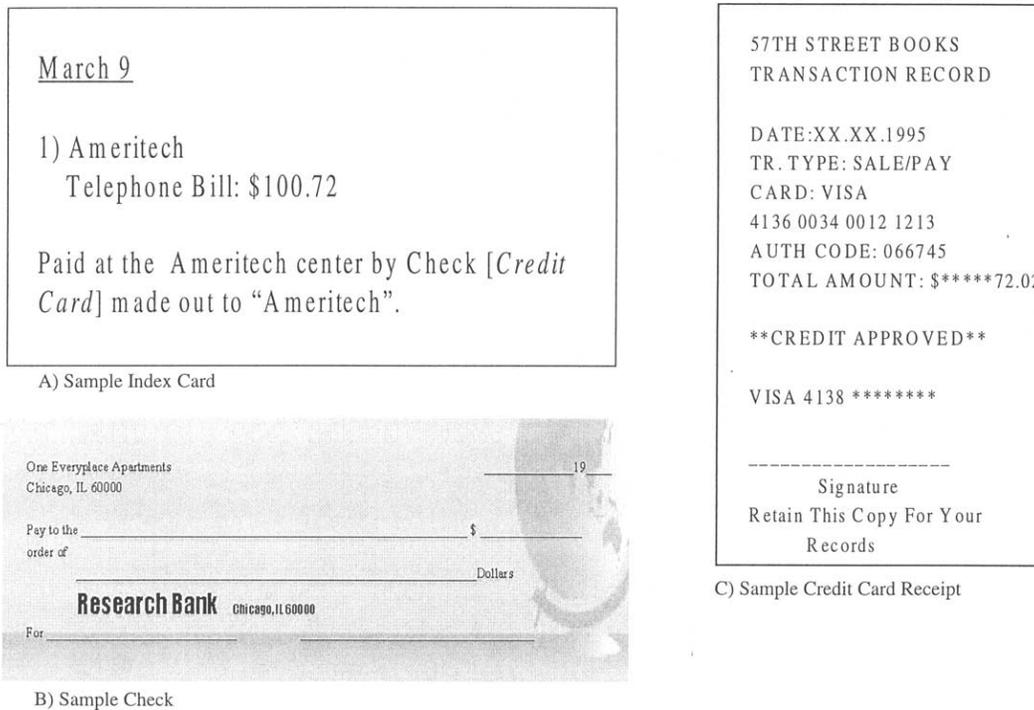
This experimental procedure was thus designed to study the effects of past payments by replicating the mechanics of the payment processes through the compression of a one-month time span into approximately 45 minutes in the laboratory. There is evidence to suggest that such time-compressed methodologies do a good job of tracing consumer decision processes (cf. Burke et al. 1992) even though they may heighten the overall accuracy of recall.

#### Manipulation Checks

Since most subjects were run in groups of one to four, the experimenter could ensure that the subjects actually underwent the payment experience and wrote out checks or signed receipts. Subjects were also asked to recall their credit

FIGURE 2

## SAMPLE STIMULUS MATERIAL: EXPERIMENT 1



limit. An ANOVA with Recalled Credit Limit as the dependent variable and the design factors as independent variables showed no significant effects ( $p > .50$ ) except for the main effect of Actual Credit Limit ( $p < .001$ ). Also, in both credit-limit conditions, the mean Recalled Credit Limit was not significantly different from the actual value ( $p > .80$ ) for both payment mechanisms.

### Analysis and Results

The mean likelihood of purchase in each experimental condition is plotted in Figure 3. The data were analyzed using an ANOVA with Purchase Intention as the dependent variable and Payment Mechanism, Feedback, and Credit Limit as the independent variables.

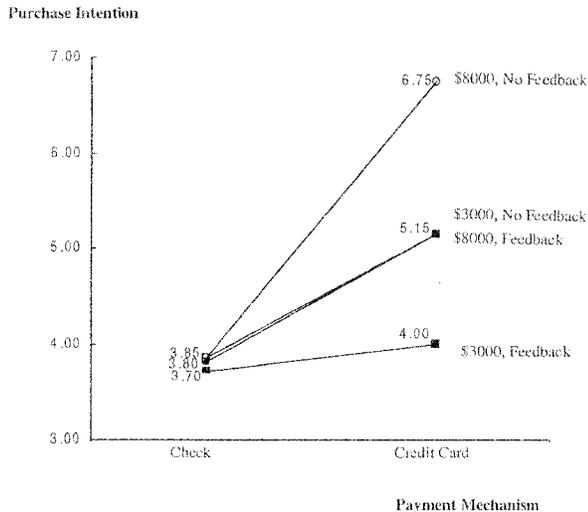
The ANOVA results reveal significant main effects of Payment Mechanism ( $F(1, 152) = 18.23, p < .001$ ), Feedback ( $F(1, 152) = 4.64, p < .05$ ), and Credit Limit ( $F(1, 152) = 4.33, p < .05$ ). The main effect of Payment Mechanism showed that purchase intention was greater in the credit-card condition ( $M = 5.26$ ) than in the check condition ( $M = 3.80$ ). A further analysis revealed that the main effect of Feedback is qualified by a marginally significant two-way interaction of Payment Mechanism with Feedback ( $F(1, 152) = 3.46, p = .06$ ) such that in the check condition,

the mean purchase intention for the no-feedback condition ( $M_{\text{no-feedback}} = 3.85$ ) is no different from that in the feedback condition ( $M_{\text{feedback}} = 3.75, p > .80$ ). However, in the credit-card conditions, the no-feedback condition resulted in a significantly greater purchase intention ( $M_{\text{no-feedback}} = 5.95$ ) than in the feedback condition ( $M_{\text{feedback}} = 4.58, p < .02$ ). For subjects who paid by credit card, the feedback reduced their purchase intention and hence seemed to provide some information to the decision process. However, when subjects paid by check, their purchase intention was not significantly influenced by the external feedback, which suggests that the externally provided information did not provide any additional input for the decision making.

The main effect of Credit Limit (and a marginally significant Credit Limit  $\times$  Payment Mechanism interaction,  $p = .055$ ) confirms other findings that the credit limit affects the purchase intention, especially when payments are made by credit card (Soman and Cheema 1999). Of importance to the current research, however, neither the two-way Feedback  $\times$  Credit Limit nor the three-way Payment Mechanism  $\times$  Feedback  $\times$  Credit Limit interactions approach significance ( $p$ 's  $> .68$ ). This confirms that the effect of feedback was not different under the two credit-limit conditions and that the Payment Mechanism  $\times$  Feedback interaction was not different for the two credit-limit conditions.

FIGURE 3

MEAN PURCHASE INTENTION AS A FUNCTION OF PAYMENT MECHANISM, CREDIT LIMIT, AND FEEDBACK: EXPERIMENT 1



## Discussion

This experiment demonstrated that subjects who paid for a series of past expenses by credit card were more likely to make an additional purchase than were subjects who paid for the same past expenses by check. Therefore, these results could provide an explanation for the findings of Feinberg (1986) and Hirschman (1979). Hirschman (1979) took a snapshot view of the stream of payments at the point of purchase and found that credit-card usage increases frequency and magnitude of spending. The current experiment replicates this result using a random allocation of subjects to payment mechanisms (hence eliminating self-selection).

While the results of experiment 1 support Hypothesis 1 and demonstrate differences in purchase intention for credit-card and check users, two questions remain. First, we have no understanding of the specific features of these mechanisms that drive the results, nor do we know how these results would generalize to other payment mechanisms. Second, there was no test for the effects of the payment mechanism on memory and on the aversive impact of past payments. Both of these limitations are addressed by the next experiment.

## THE EFFECTS OF THE PAYMENT MECHANISM ON BOOKING A PAST EXPENSE

Consumers make payments using a variety of mechanisms, for example, cash, checks, bankcards (credit, charge, or debit), and credit or charge checks (these are checks

issued by credit or charge cards). Expenses appear on the card's monthly statement. While each mechanism ultimately depletes the consumer's wealth, the mechanisms differ along two important characteristics that have relevance to the booking process and the retrospective evaluation of past payments.

1) *The learning and rehearsal of the price paid.* Payment mechanisms differ in terms of the opportunity they offer consumers to learn and remember the final price paid. While paying by check, consumers need to write down the total amount in words and figures. This repetition increases salience and leaves a relatively strong memory trace (Hawkins and Hoch 1992). However, while paying by charge or credit cards, consumers only need to sign a receipt on which the final price paid is printed numerically.<sup>4</sup> Hence, I propose that while retrospectively evaluating past expenses, consumers can more accurately recall past expenses when they have used payment mechanisms that require them to write down the final amount paid. Specifically, I hypothesize:

**H2:** Rehearsal of the final price will improve the memory for past expenses. Consequently, past expenses will play a greater role in influencing future purchase decisions when paid for by payment mechanisms that require consumers to write down (and rehearse) the final price paid.

2) *The immediacy with which wealth is depleted.* Payments by cash represent an instantaneous depletion of the consumer's wealth. Payments by check and by debit card typically involve a minor delay before the check or charge can be deposited and the consumer's account is depleted, but the depletion is relatively immediate. Charge cards, credit cards, and credit checks represent a large temporal delay. The merchant transmits the charge information to the credit-card company, which, in turn, bills the consumer, whose wealth finally gets depleted only after the check she writes to the credit-card company gets deposited. While an immediate depletion of wealth will strongly affect decision making, delayed depletion likely will result in a much smaller impact on retrospective evaluation for four reasons. First, the delayed payment could be temporally discounted (Loewenstein and Prelec 1992; Thaler 1980) and hence weigh less in decision making. Second, consumers may not experience the impact of a payment until their wealth has been depleted. Thus, payment by credit cards or charge cards might be viewed as only a commitment to pay rather than as an actual payment, and, consequently, it could have a smaller impact on decision making than does immediate

<sup>4</sup>There are certain situations in which credit-card payments involve rehearsal. For instance, paying a restaurant bill by credit (or debit) card requires the consumer to compute a tip and the total amount. The proposed framework would predict that in restaurant situations, the memory of the past expense will be greater (and purchase intention lower) when the consumer has to engage in such computations while using a debit card as compared with using a check. However, this difference would disappear when the tip and tax have already been added to the tab. In an experiment reported elsewhere, support for this prediction was found.

payment. Third, consumers may be more sensitive to salient changes in bank account levels than to payments that are still in process (Stermann 1989). Finally, the payment in the case of charge cards and credit cards, when made, will be bundled in with a number of other payments (Thaler 1999). Because of this lack of association between the price paid for each product and the benefit associated with that product, the aversive impact of the payment is diminished (Soman and Gourville 2001).

This discussion suggests that the past use of payment mechanisms that involve delayed depletion of wealth will result in a stream of payments with relatively low aversive impact, resulting in a weaker retrospective evaluation. Retrospective evaluation will be especially weak for payments that are incomplete and still in process. While this suggests that the aversive impact is greater for completed payments than for in-process payments, there is no evidence to suggest that completed payments will be better recalled. Hence, while it is argued that immediacy might have an impact on purchase decisions, there is no prediction about its effect on recall. Specifically, I hypothesize:

**H3:** Immediate depletion of wealth will increase the aversive impact of the past payments. Consequently, past expenses will play a greater role in influencing future purchase decisions when paid for by payment mechanisms in which wealth has been depleted immediately than for mechanisms in which wealth depletion has yet to occur.

Next I describe an experiment designed to test Hypotheses 2 and 3.

## EXPERIMENT 2

While this experiment used the same basic methodology as was used in experiment 1 (i.e., a simulated series of payments), it differed from the prior experiment in four ways. First, it used a broader set of payment mechanisms: checks, charge cards, debit cards, and charge checks. Second, none of these payment mechanisms allows consumers to incorporate an additional long-term source of funds (like a line of credit) into their decision making. Consequently, any effects due to the intertemporal reallocation of wealth (Soman and Cheema 1999) were eliminated as a potential explanation for the results. Third, it used a within-subject design in which each subject used one of the four payment mechanisms to pay for all expenses in each of four separate expense categories. Each subject also had to indicate purchase intention ratings for four products, one from each of the four categories. Thus, each subject performed an identical quantity of effort, experienced all four payment mechanisms, and rated a purchase intention for all four categories. This made the spending history more realistic and eliminated the possibility of the earlier results being driven by selective exposure to one particular payment mechanism. Fourth, in the purchasing scenarios that they faced, subjects were told that they would be paying for the additional discretionary

item by cash. Effects due to the point-of-purchase use of the payment mechanism (e.g., Feinberg 1986) were thus eliminated as a potential explanation of our results.

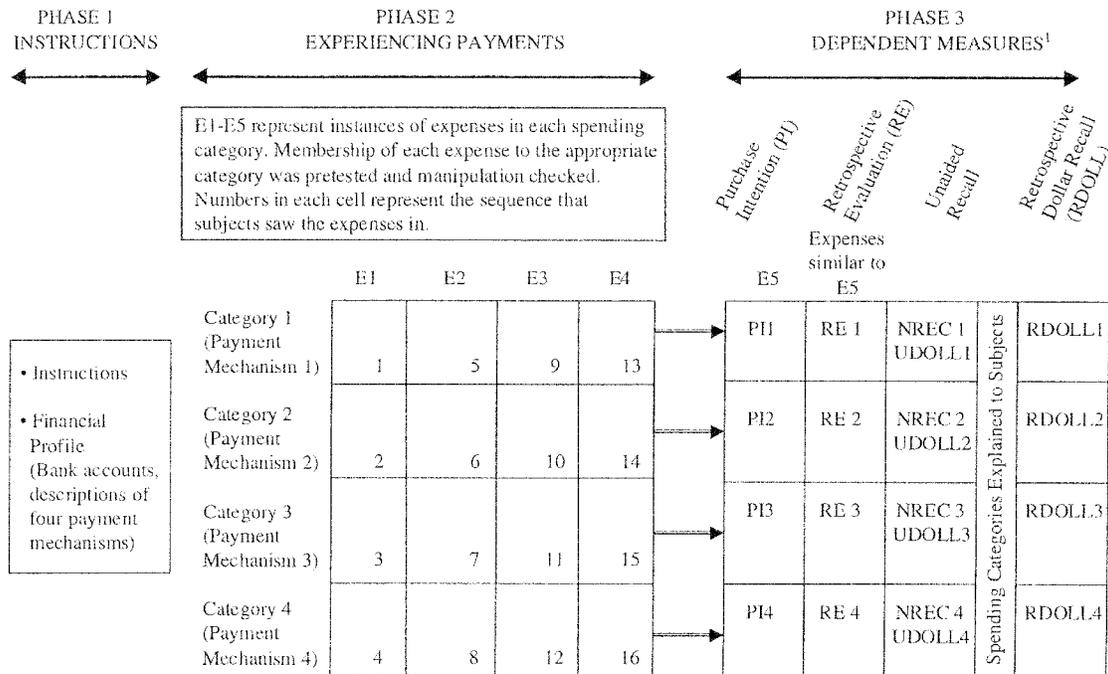
## Subjects, Design, and Procedure

Subjects were 119 undergraduate students at a large state university who received course credit for participation in the experiment. Figure 4 shows a schematic representation of the experimental procedure that was conducted in three phases, and Figure 5 shows the Graeco-Latin square design used in this experiment. In phase 1 (Fig. 4), subjects were told that the objective of the experiment was to understand consumer purchasing behavior, and they were asked to imagine that they had graduated and now earned \$3,000 per month. They were then given a complete financial profile. Specifically, they were told that they had checking and savings accounts, a debit card for the checking account with which they could make payments, and an American Express charge card that they needed to pay in full at the end of each month. They further were told that American Express also issued them charge checks that they could use to make payments that would appear on their monthly statement. Thus, subjects were told that they had access to four payment mechanisms generated by fully crossing two levels of the immediacy factor (immediate depletion of wealth, delayed depletion of wealth) with two levels of the rehearsal factor (whether final amount paid needs to be written or not).

In phase 2, subjects were presented with a booklet containing a series of payments over a typical month (see Fig. 6 for sample pages). The series included a nondiscretionary expense on the even days of the month and a discretionary expense on each of the 16 odd days of the month (presented on the bottom half of each page). The 16 discretionary test expenses were composed of four expenses in each of four spending categories. Extensive pretesting (card sorting, focus group, and typicality ratings) showed that the subject population had spending categories with the labels of Food (e.g., eating out, pizza delivery), Entertainment (e.g., movie tickets, rock concerts), Home Leisure (e.g., CDs, computer games), and Clothes and Accessories (e.g., sweatshirt, cap; this category is referred to as "Clothes"). The list of test expenses used in this experiment, along with the prices of the expenses, is shown in Table 2 in the order in which the expenses appear in some of the experimental booklets. These expenses are represented by the cells numbered 1–16 in Figure 4. Four orders in which the expenses appeared were used. In each order, the first four expenses had one expense from each of the spending categories, and this sequence was repeated thrice to generate the list of 16 expenses.

All expenses within each of the four spending categories were assigned to one of the four payment mechanisms described above (e.g., all expenses in category 1 assigned to Payment Mechanism 1 in Fig. 4). For example, one subject might pay for all food expenses with a charge card, all entertainment expenses with a check, all home leisure expenses with a charge check, and all clothes expenses with a debit card. Since spending categories had not yet been

**FIGURE 4**  
SCHEMATIC PROCEDURE: EXPERIMENT 2



NOTE.—Purchase intention was elicited for E5 in each category, retrospective evaluation for expenses similar to E5. NRE = Number of expenses recalled, UDOLL = their sum (unaided dollar expense). The expenses and dollar amounts listed in the unaided recall task were sorted into the appropriate categories to compute NREC and UDOLL. Retrospective dollar recall (RDOLL) was elicited after subjects were given the definition of the spending categories. Note that all measures are collected for each of the spending categories and hence for each payment mechanism.

defined for subjects, and no two expenses from the spending category occurred successively, the assignment of one payment mechanism to all expenses in a category was not transparent. This assignment of categories to spending mechanisms (the category manipulation) was perfectly confounded with the order manipulation. Also confounded with these two manipulations was the recency with which the last expense in each category was seen. Because of the different orders used, a particular payment mechanism (and category) was either the last expense seen (Recency = 3), the second from last (Recency = 2), the third from last (Recency = 1), or the fourth from last (Recency = 0). Subjects were instructed to go through the experimental booklet one page at a time and to make each of the discretionary payments using the appropriate payment mechanism before proceeding to the next expense.

In phase 3, subjects answered two separate questionnaires. In the first questionnaire, purchase intention was measured by asking, "Imagine that it is the last day of the month and you are in a nearby mall on an errand. You don't have your cards or checks with you, but have cash. You see a number

**FIGURE 5**  
EXPERIMENTAL DESIGN: EXPERIMENT 2

		← Within Subjects Manipulation →			
		Debit Card	Check	Charge Card	Charge Check
		No	Yes	No	Yes
		Immediate	Immediate	Delayed	Delayed
↑ Between Subjects Manipulation ↓	Rehearsal →				
	Immediacy →				
	Order 0 n = 30	Recency = 0 Category = 0	Recency = 1 Category = 1	Recency = 2 Category = 2	Recency = 3 Category = 3
	Order 1 n = 29	Recency = 1 Category = 2	Recency = 0 Category = 3	Recency = 3 Category = 0	Recency = 2 Category = 1
Order 2 n = 30	Recency = 2 Category = 3	Recency = 3 Category = 2	Recency = 0 Category = 1	Recency = 1 Category = 0	
Order 3 n = 29	Recency = 3 Category = 1	Recency = 2 Category = 0	Recency = 1 Category = 3	Recency = 0 Category = 2	

**FIGURE 6**  
SAMPLE PAGES FROM EXPERIMENTAL BOOKLET

<p style="text-align: center;"><b>March 10</b></p> <p style="text-align: center;">Expense: Car Oil Change and Gasoline \$24.85 Payment method: Cash</p> <p style="text-align: center;"><b>March 11</b></p> <p style="text-align: center;">Expense: Dinner at restaurant \$15.50 Payment method: Research bank debit card at Jax Fish House</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p style="text-align: center; font-size: small;">TRANSACTION RECORD</p> <p style="font-size: x-small;">DATE: XX.XX.1998 TRANS TYPE: SALE/PAY CARD: RESEARCH/DEBIT 10056-1001R AUTH CODE: RSCH0125 TOTAL AMOUNT:15.50 *****  **CHARGE APPROVED**  RSCH-VISA 100*** I authorize withdrawal of the above amount from my checking account</p> <p style="text-align: center; font-size: x-small;">_____ Signature</p> </div>	<p style="text-align: center;"><b>March 16</b></p> <p style="text-align: center;">Expense: Car Payment \$370 Payment method: Direct withdrawal from bank account</p> <p style="text-align: center;"><b>March 17</b></p> <p style="text-align: center;">Expense: Movie Videotape \$14.40 Payment method: Check made out to "Sam Goody"</p> <div style="border: 1px solid black; padding: 5px; margin-top: 10px; font-size: x-small;"> <p>CU Student One Evergreen Apartments Boulder, CO 80500</p> <p>Pay to the order of _____ \$ _____</p> <p style="text-align: right;">_____ Dollars</p> <p><b>Research Bank</b> NUMBER: 01234567</p> <p>For _____</p> </div>
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of items in the mall that you don't really need, but that you might be interested in purchasing. Given your expenditure this past month, please indicate how likely you are to spend on each of the following." Subjects then saw four expenses of \$15, that is, a double CD (Home Leisure), a shirt (Clothes), lunch at a favorite food-court restaurant (Food), and music show tickets (Entertainment), and they were to respond to each on a nine-point scale (1 = Definitely not spend; 9 = Definitely spend). The retrospective evaluation of past expenses was measured by asking, "For each of the items (listed above), how much money would you say you have already spent on similar items this past month." Subjects responded to each on a nine-point scale (1 = Not spent much; 9 = Spent a lot). Finally, subjects were asked to recall as many individual expenses as possible and to write down the corresponding amount. These unaided recalls were sorted into the four categories by the experimenter.

In the second questionnaire, subjects initially read a paragraph defining and explaining the four expense categories used in the experiment and were then asked to provide their best estimate of their total expenditure in each of the four categories during the past month. Several measures intended as manipulation checks (described later) were also collected.

Four measures of past expense that (based on pretests)

reflected different underlying judgments were collected. In the first questionnaire, unaided listings of recalled expenses were collected and later sorted by category. The number of recalled expenses within each category could range from zero to four. The total unaided dollar expense recalled represented the total of the amounts recalled within each category. As such, these two measures capture only the retrieved memory for past expenses. Two other variables were also measured. The first of these was the retrospective evaluation of past expenses, in which subjects indicated whether they felt that past expenses similar to the target product were disproportionately large or small (i.e., whether they had spent a lot or spent a little). The second was the retrospective dollar expense recalled, which was measured by items in the second questionnaire that provided subjects with the definitions of the four spending categories and asked them to construct an estimate of their past spending in each category (as opposed to unaided dollar expense, which was based on the sum of the recall of individual expenses). Since these two measures were based on constructed and retrospective judgments, they were expected to capture the average impact of past payments in addition to just the memory. Finally, for every subject, each dependent variable was

TABLE 2  
LIST OF EXPENSES USED: EXPERIMENT 2

	Expense	Category	Price (\$)	Typicality			
				Home leisure (HL)	Food (F)	Entertainment (E)	Clothes (CA)
1	Video game	HL	14.85	6.88	...	2.53	...
2	Beer and food at a bar	F	14.50	...	7.12	2.54	...
3	Football tickets	E	14.90	...	...	6.23	...
4	Scarf	CA	14.75	...	...	...	7.33
5	Double CD	HL	15.10	5.88	...	...	...
6	Dinner out	F	15.50	...	6.88	2.62	...
7	Rock concert tickets	E	15.10	...	...	7.22	...
8	College sweatshirt	CA	15.25	...	...	...	6.88
9	Movie videos	HL	14.40	6.96	...	...	...
10	Pizza delivery	F	14.30	...	7.14	...	...
11	Movie tickets	E	14.60	...	...	8.22	...
12	Cap	CA	14.50	...	...	...	7.00
13	Music audiotapes	HL	15.60	8.12	...	...	...
14	Chinese takeout	F	15.70	...	5.88	...	...
15	Theater ticket	E	15.40	...	...	5.66	...
16	Wallet	CA	15.50	...	...	...	7.12

NOTE.—This table is based on subject prototypicality ratings on a nine-point scale (9 = very typical). Only mean typicality ratings greater than 2.5 are shown. The results of this manipulation check are identical to those from a pretest. The clothes category includes clothes and accessories. The entertainment category includes only entertainment consumed outside of the home.

measured for each category and hence for each payment mechanism.

### Manipulation Checks

To confirm that subjects had experienced the payment mechanisms, the experimenter and a research assistant went through each expense history booklet to ensure that all checks had been written out and all receipts had been signed. Data from one subject who had left these tasks incomplete were eliminated, leaving data from 118 subjects for analysis. In the second questionnaire, subjects were also asked to rate each payment mechanism on how immediately they thought their bank account would get depleted (1 = Wealth depleted immediately, 9 = Wealth depleted after a long time). Mean immediacy ratings for debit cards ( $M = 2.64$ ) and checks ( $M = 2.88$ ) were significantly lower than those for charge cards ( $M = 5.32$ ) and charge checks ( $M = 5.48$ ,  $p < .01$ ). Subjects were also asked to rate how typical each of the test expenses were of each of the four spending categories (1 = Not at all typical, 9 = Very typical). The typicality rating of each of the test expenses is listed in Table 2 and confirms the validity of the categorization of expenses. Finally, subjects were asked to recall the monthly post-tax income. The mean response ( $M = \$3,008.65$ ) was not significantly different from the actual value ( $\$3,000$ ,  $p > .50$ ).

### Analysis and Results

The data were analyzed by using ANOVA models for each of the five dependent variables. For the purpose of analysis, the design is effectively a 4 (Order)  $\times$  2 (Immediacy)  $\times$  2 (Rehearsal) mixed design with subjects nested in Order and crossed with Immediacy  $\times$  Recency. The com-

plete ANOVA tables for all the dependent variables are shown in Table 3. For all the dependent variables, the between-subjects factor Order was not significant (all  $p$ 's  $> .20$ ).

*a) Purchase Intention.* Results indicated significant main effects of Rehearsal and Immediacy, as well as a small (but significant) interaction effect of Immediacy with Order. This interaction did not qualify any of the main effects and was orthogonal to the effects of interest; hence, it is not discussed further. As Table 4 shows, the mean purchase intention scores for an additional purchase in a given category was higher if previous expenses in that category were paid for by a mechanism that did not allow rehearsal and when payments were still in process (by virtue of delayed depletion of wealth).

*b) Retrospective Evaluation of Past Expenses.* Results also showed main effects of Rehearsal and Immediacy, as well as a small (but significant) interaction effect of Immediacy with Order. This interaction did not qualify the main effects and was orthogonal to the effects of interest. The direction of these main effects was opposite to that for the Purchase Intention variable. Specifically, the mean Retrospective Evaluation scores for an additional purchase in a given category was higher if previous expenses in that category were paid for by a mechanism that involved rehearsal and when wealth was depleted immediately.

*c) Number of Expenses Recalled and Total Dollar Expenses Recalled—Unaided.* Both of these variables showed an identical pattern of results, specifically a significant main effect of Rehearsal. Both variables were higher when the payment involved rehearsal.

*d) Retrospective Dollar Expense Recalled.* Results indicated significant main effects of rehearsal and immediacy. Retrospective dollar evaluation was higher when past ex-

TABLE 3  
ANOVA RESULTS: EXPERIMENT 2

Source	df	Purchase intention		Retrospective evaluation		Number of expenses recalled		Total dollar expense—unaided		Retrospective dollar expense	
		F-value	p-value	F-value	p-value	F-value	p-value	F-value	p-value	F-value	p-value
Between subjects:											
Order	3	.45	.7168	.33	.8002	1.43	.2365	1.24	.2985	.53	.6634
Error	114										
Within subjects:											
Rehearsal	1	151.21*	.0001*	87.84*	.0001*	29.33*	.0001*	34.91*	.0001*	202.22*	.0001*
Rehearsal × Order	3	1.73	.1654	.50	.6809	.88	.4547	.95	.4193	.90	.4420
Error (Rehearsal)	114										
Immediacy	1	44.33*	.0001*	50.29*	.0001*	.42	.5200	.09	.7601	17.21*	.0001*
Immediacy × Order	3	3.33*	.0221*	2.87*	.0395*	1.01	.3590	.78	.5075	1.88	.1365
Error (Immediacy)	114										
Rehearsal × Immediacy	1	1.73	.1909	.55	.4616	1.05	.3065	.56	.4562	2.97	.0875
Rehearsal × Immediacy × Order	3	1.04	.3775	.46	.7133	.53	.6624	.61	.6070	.54	.6531
Error (Rehearsal × Immediacy)	114										

\* $p \leq .05$ .

penses had been paid for by mechanisms that allowed rehearsal and when wealth was depleted immediately.

Collectively, this indicates a pattern of results that support the proposed hypotheses. First, consider the effects of rehearsal. Results show that categories in which past payments had been made by mechanisms that involve rehearsal have a low purchase intention for an additional purchase. Also, in these categories, subjects can recall a greater number of past expenses, believe that they have spent a disproportionately large amount on the category, are relatively more accurate in the unaided recall of expenses, and are more accurate in their retrospective recall of category level dollar expenses. These results support Hypothesis 2.

Next, consider the effects of immediacy. In situations where past payments in a category have been made by mechanisms involving immediate depletion, results show that the purchase intention for an additional purchase in that category is relatively lower, while the belief of having spent a large amount on that category and the retrospective recall of category level dollar expenses are higher. These results support Hypothesis 3.

Note that the immediacy factor had no effect on the number of expenses recalled or on the total unaided dollar expense recalled. This is not surprising since immediacy was expected to have an effect only on the aversive impact and not necessarily on memory. Apparently, past payments might have little effect on pending purchase decisions even in situations where the memory of the past expense is good. For instance, while planning a dinner out, a consumer might recall that she spent \$50 on a fancy French dinner charged to her credit card, but she may not feel the pinch since she has not actually paid yet.

## Discussion

Experiment 2 allowed for the simultaneous testing of the impact of payment mechanism on subsequent spending as well as on memory and retrospective evaluation of past expenses. All subjects experienced four payment mechanisms and incurred expenses in four spending categories. Results showed that in those categories where past expenses involved rehearsal and immediacy, subjects reported a lower likelihood of making another category purchase and also reported a lower aversive impact of the past payments.

While experiment 2 efficiently tested Hypotheses 2 and 3, it had one potential weakness. Due to the large number of variables that were manipulated, the final design was fractionated. Specifically, only 16 cells out of the possible  $4$  (Order)  $\times$   $4$  (Rehearsal  $\times$  Immediacy)  $\times$   $4$  (Recency)  $\times$   $4$  (Spending Category) full factorial design were tested. In such a design, the primary effects of Immediacy and Rehearsal and their interactions (i.e., the factors of interest) are orthogonal to the main effects of Recency and Spending Category (the background variables) but not to the interactions involving these background variables (either with each other or with the factors of interest). The effects of interest are estimated by assuming that such interactions are not significant because any statistical test of these interactions will be confounded with 14 other effects. This assumption creates the potential for an error in interpreting the results of a Graeco-Latin design.

The trade-off between errors in interpretation due to the fractionated design as compared with practical considerations like the availability of subjects, time, and budget constraints drove the design considerations in the current ex-

**TABLE 4**  
RETROSPECTIVE EVALUATION AND RECALL OF PAST EXPENSES: EXPERIMENT 2

	No rehearsal		Rehearsal	
	Delayed depletion	Immediate depletion	Delayed depletion	Immediate depletion
Purchase intention	6.75	5.94	5.03	3.78
Retrospective evaluation of past expenses	3.11	4.27	4.56	6.00
Number of expenses recalled—unaided	1.18	1.14	1.54	1.68
Total dollar expense recalled—unaided	17.69	17.00	24.10	25.52
Retrospective dollar expense recalled	32.91	36.59	50.57	59.42

periment. However, a cleaner (but costlier) test would call for a full factorial design.

## GENERAL DISCUSSION AND CONCLUSIONS

### Summary of Research

Research reported in this article shows that the mechanism used to make past payments influences spending behavior. Specifically, payment mechanisms were shown to influence the memory for and the aversive impact of past expenses, and hence moderate the effect of these past expenses on spending behavior. Support for the proposed framework (Fig. 1) was provided in two separate experiments. Experiment 1 showed that consumers who made past payments by credit card (vs. check) were more likely to purchase an additional discretionary product. Experiment 2 manipulated two features of the payment mechanism (rehearsal and immediacy of wealth depletion) and showed that they moderate the effect of past payments on future spending. The results supported the proposed framework via two separate experimental methods. In the first experiment, external information was provided to reduce the effect of payment mechanisms, and in the second experiment recall and retrospective evaluation of payments were measured simultaneously with the purchase intention.

### Contributions and Discussion

Research reported in this article is the first demonstration that the past usage of payment mechanisms influences future spending behavior by causing differences in the retrospective evaluation of past payments. Prior research on payment mechanisms has focused on their point-of-purchase effects (e.g., Feinberg 1986; Prelec and Simester 1998) and has used actual transactions data (e.g., Hirschman 1979) that could be muddied due to the self-selection of heavy spenders into the credit-card category. The methodology reported here is a credible behavioral simulation of payment mechanisms over time that can move the arena of research from the field

to controlled laboratory experiments with random assignment of subjects.

This research adds to two streams of literature in decision making that study the impact of past expenses on pending decisions: the literatures on the sunk cost effect (e.g., Arkes and Blumer 1985; Thaler 1980) and on consumer budgeting (e.g., Heath and Soll 1996). However, experiments in both these streams have typically provided subjects with unambiguous and vivid descriptions of past expenses and hence have eliminated any effects due to imperfect memory or dampening of the aversive impact of the past expenses. The current research is the first study to incorporate these factors and hence study the evolution of mental accounts over time. The two factors, rehearsal and immediacy, not only influence spending decisions but also may have broader implications for decision making. For instance, the current research would suggest that some payment mechanisms could attenuate the strength of the sunk cost effect (Arkes and Blumer 1985).

These results extend the literature on mental accounting and budgeting in two specific ways. First, I argue that the role of budgeting on consumer spending decisions is driven by a retrospective construction of past expenses rather than a proactive, on-line computation, as was previously believed (Heath and Soll 1996). Consumers may not always follow the forward-looking prospective accounting system (Prelec and Loewenstein 1998) for routine purchases and may rely more on a global retrospective evaluation as an input into pending spending decisions. However, in other situations (e.g., a consumer saving up to purchase a big-screen TV), prospective accounting may come into play. Is prospective accounting more common than retrospective evaluations in making purchasing decisions? While this question was beyond the scope of the current research, the framework presented here introduces the need to study retrospective evaluations in understanding mental accounting processes. Second, previous research had talked about a singular effect of past expenses on future spending. The current research decomposes this into two distinct effects—one caused by differences in memory and the other caused by differences in aversive impact (independent of memory). This distinc-

tion will likely lead to a richer understanding of dynamic mental accounting processes.

### Limitations and Future Extensions

While the current experiments represent a significant first step in understanding the effect of payment mechanisms on spending behavior, promising avenues for future research await investigation and are discussed below. First, both experiments reported in this article simulated one payment cycle (i.e., one month) in which consumers who paid by credit (charge) card had not yet completed their payments for the expenses they saw. While these in-process payments had low retrospective evaluations, a natural question is to wonder what happens when the consumer receives a charge-card bill. One possibility is that the aversive impact experienced then is not as intense as what it would have originally because it is delayed (Gourville and Soman 1998) and bundled in with a number of other items (Thaler 1999). However, an alternate possibility is that the consumer relives the aversive impact of the past payment and hence experiences a temporary reluctance to spend. In this case, the use of credit cards or charge cards may merely cause a temporal reallocation of the memory and aversive impact of past payments. While the current experiments do not address this issue, an extension in which subjects experience a series of expenses over several payment cycles (months) could allow for the comparison of the impact of immediate feedback (e.g., a check payment) with feedback received at the end of the month (e.g., a credit-card statement).

Second, the goal of the current research was to validate a behavioral framework based on judgments of retrospective evaluations and purchase decisions, not to identify the psychological antecedents behind this framework. Two possible antecedents could be speculated on, one affective and the other cognitive. It is possible that when past payments have been completed and are particularly salient, they may feel painful (Prelec and Loewenstein 1998) and hence cause negative emotions that heighten retrospective evaluation and dampen purchase intention. Alternately, an accurate recall of past payments may foster responsible spending behavior and hence dampen purchase intention because of the accompanying sense of stewardship.<sup>5</sup> Future research should address which of these two (or possibly more) explanations drive the observed behavior.

Third, a number of ecological practices were not accounted for in the reported experiments. For example, all subjects came into the experiment with a clean slate, that is, they had no outstanding balances. Also, unlike the stimuli used here, some card-payment situations (e.g., restaurants) require consumers to write a tip and the total amount paid (see n. 4 above). Finally, unlike the experimental stimuli, consumers in the real world make payments of different dollar amounts. Would the same effects hold for small payments and for large payments? A promising avenue for fu-

ture research is to account for these real-world practices in an experimental setting.

Fourth, the current article has implications for public policy and consumer education that future research could address. Results reported here show that past payments that are low in salience will result in an overestimation of available wealth. The advent of new technology and payment mechanisms (Marlin 1998) allows consumers to make payments with minimal effort without even having to look at their checkbooks or credit cards. One popular internet retailer offers "one click shopping," in which the consumer sets up an account in advance and merely clicks on a button to purchase a product. And in some countries (e.g., Hong Kong), payment of bills by automatic bank-account deductions is a routine practice. This will further reduce the salience and aversive impact associated with payments. How can consumers safeguard against the resulting overestimation of wealth and better manage their money? Results from the current article suggest that consumers should be encouraged to complete transactions early, keep records, and psychologically earmark incomes toward unpaid bills.

Credit-card spending has fueled consumerism and has recently taken holiday spending to record highs (see, e.g., *Wall Street Journal* 1999). Simultaneously, growing credit-card debt and an accompanying increase in the rise of credit-card-related bankruptcies has heightened the need for such research to address consumer education and credit-card regulation issues that will allow consumers to better manage their finances (Cole 1998). While the current research offers some public policy implications, future research should investigate these issues in more detail.

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<sup>5</sup>I thank a reviewer for suggesting this explanation.

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