EFFECTS OF PAYMENT MECHANISM ON SPENDING BEHAVIOR: THE ILLUSION OF LIQUIDITY

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Past expenses have been shown to influence future spending behavior by depleting available budgets. However, we argue that an important prerequisite for this relationship is the accurate recall of past payments and the experiencing of the full hedonic impact (pain) associated with these past payments. The use of different payment mechanisms influences both these factors. Specifically, we show that past payments strongly reduce purchase intention when the associated payment mechanism requires the consumer to write down the amount paid ("rehearsal"), when the consumer's wealth is depleted immediately rather than at a later point in time ("immediacy") and when the past payment has occurred in the significant past (low "recency"). Conversely, payment mechanisms that involve no rehearsal and which deplete wealth with a temporal delay create an illusion of liquidity which result in inflated purchase intention for additional products. In two experiments, we study five different payment mechanisms and find support for our hypothesized effects of rehearsal, immediacy and recency on perceptions of liquidity and purchase intentions. We discuss theoretical and public policy implications of our research.

Consumers today have the opportunity to pay for transactions with an increasingly growing array of payment mechanisms (Marlin 1998). 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). It is estimated that approximately 90% of Americans use credit cards while 24% use debit cards (Dean and Morris 1997, Scherer 1997). Additionally, consumers are also familiar with payment mechanisms like traveler's checks, credit checks and money orders. Over the coning years, 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 effect of payment mechanisms on consumer behavior. However, some early research in this area presents intriguing findings. Hirschman (1979) and Feinberg (1986) use real consumer transactions to compare the spending of consumers who pay by credit cards with those who pay by cash or checks and find that the former spend more than the latter in similar situations. In order to consider the possibility of the self-selection of high spenders into the credit card category, Prelec and Simester (1998) conducted an experiment with random assignment of subjects to payment mechanisms and using real money transactions. They replicate the basic finding that willingness-to-pay is significantly greater when consumers use a credit card rather than pay by cash.

Recent research has also started identifying factors underlying consumer choice of payment mechanisms. Prelec and Loewenstein (1998) argue that consumers are more likely to use credit cards for durable products (e.g. a microwave oven) than for a short-lived product (e.g. a vacation) in order to maximize the overall hedonic impact of the transaction. 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) and accessibility (e.g. there is no convenient ATM to withdraw and pay by

cash). An interesting avenue of research, therefore, relates to the effect of the use of a particular payment mechanism on future spending.

Building on the growing stream of research in the area of payment mechanisms, this paper studies the effects of the *past* usage of a given payment mechanism on future spending. For instance, there is compelling evidence to suggest that consumers who predominantly use credit cards 'overspend' relative to those who don't. (Cole 1998, Lea, Webley and Levine 1993, Tokunaga 1993). However, there is little evidence of the specific role that payment mechanisms play in influencing a consumer's evaluation of a pending transaction and consequently her intention to purchase or willingness-to-pay. This paper addresses the following specific questions:

1) *Does the use of different payment mechanisms influence spending behavior?* In two laboratory experiments, we study five different payment mechanisms and find that their use results in different likelihood of purchasing an additional product.

2) *What is the theoretical mechanism that accounts for these differences?* Prior research suggests that past payments influence pending purchase decisions by depleting the available budget for that product category. Our results show that the use of different payment mechanisms changes the strength of the above relationship by influencing the recall and the retrospective pain associated with past payments, and hence influences pending purchase decisions. We propose that certain payment mechanisms create an illusion of liquidity that inflates the purchase intention for additional products.

3) *What are the implications of these findings for consumer budgeting and public policy?* Our results point to the need for an elaborate record keeping system and timely payments to eliminate the possibility of a biased estimate of available budgets and hence overspending.

The rest of this paper is divided into three sections. First, we review relevant literature in marketing and mental accounting and propose a framework to understand how payment mechanisms can influence the effect of past payments on future purchase intention. We propose and test a hypothesis about differences between two payment mechanisms, credit cards and checks. Second, we extend the framework to incorporate specific features of payment mechanisms and propose and test hypotheses on how these

features affect purchase intention. Third, we discuss theoretical, managerial and public policy implications of our research.

THE ROLE OF PAST EXPENSES ON CONSUMER EVALUATION OF A TRANSACTION: AN INTEGRATIVE FRAMEWORK

How do consumers evaluate the attractiveness of a transaction? Prior research suggests that a purchase may occur when the utility offered by the product equals or exceeds the negative utility or hedonic impact (or *pain*, Prelec, Loewenstein and Zellemayer 1997) associated with making the payment (Gourville and Soman 1998, Prelec and Loewenstein 1998). However, such an evaluation requires that the consumer be able to track and assign expenses to the relevant product. Thaler (1980, 1985) proposes that individuals track expenses by following a cognitive form of bookkeeping, a process referred to as mental accounting. Consider an individual contemplating going out for dinner to an expensive French restaurant. In making this decision, s/he might first evaluate the value of the dinner to her, and then ask herself whether the price is worth paying for the value. In mental accounting terms, s/he is evaluating the utilities of the benefit and the cost, and comparing the magnitudes of the two in order to determine if the transaction is a good one.

Normatively, the evaluation of the utility of the benefit and the negative utility of the cost should depend only on the absolute values of the attributes of the product and the amount of the payment. However, research shows that attribute based evaluation of the very same product could differ as a function of the context (cf. Huber, Payne and Puto 1982, Simonson and Tversky 1992), of the manner in which information was structured (Russo 1977) and framed (Levin and Gaeth 1988); and of the response mode (Tversky, Sattath and Slovic 1988).

Just as context and other environmental factors influence the evaluation of the attributes of a product and consequently its utility, factors other than the dollar value of the price might influence the assessment of the disutility and consequently the net transaction value. In prior research in the domain of marketing, Hirschman (1979) showed that the average transaction using a bank card or a store issued credit card is higher than the average cash transaction. Similarly, Feinberg (1986) showed that credit card stimuli directed spending such that the probability, speed or magnitude of spending was enhanced in the

presence of credit card stimuli. To overcome the potential problem of self selection[i], Prelec and Simester (1998) randomly assigned subjects to payment conditions and showed that individuals bid larger amounts to purchase a ticket to a sporting event in an auction when they were expecting to pay with a credit card rather than by cash or check. While the effect of payment mechanisms of spending has been documented in a number of domains and in laboratory as well as field settings, there is no research that speaks to the process by which payment mechanism influences purchase decisions, as well as to the public policy implications.

A recent stream of literature in mental accounting has begun to identify factors beyond the monetary value of the price that influence the evaluation of the transaction. For instance, Gourville and Soman (1998) show that as time passes from the time of making a payment, the relevance of the past payment in the evaluation of the transaction gradually decreases. Hence, a smaller benefit is required to offset a payment made in the distant past because the hedonic impact of that payment has reduced with time (Gourville and Soman 1998). Similarly, research suggests that the physical format of a transaction can influence the strength of association (or *coupling*) between a payment and benefit (Prelec and Loewenstein 1998, Soman and Gourville 1998), and consequently the hedonic impact of the payment in a decoupled transaction is reduced (Soman and Gourville 1998). This stream of research suggests that the residual hedonic impact of the payment, rather than the dollar amount influences the evaluation of the transaction.

Mental accounts can be set up for each individual purchase (Prelec and Loewenstein 1998) or for a broader category of purchases (Heath and Soll 1996, Read and Loewenstein 1997). In their study of consumer budgeting, Heath and Soll (1996) demonstrate that consumers mentally allocate their monetary resources to a number of spending categories (like food, entertainment, clothing). They argue that consumers track and record cumulative spending within each given category and that purchase behavior at any time is driven by the resources available in each category (Heath and Soll 1996, Heath 1995).

Extending Heath and Soll's (1996) argument to a broader mental account that includes all expenses, consumers would be more likely to purchase a particular product if more resources are available to them. This observation is consistent with the simple

psychophysics intuition that the pain associated with a specified payment would be lesser for a wealthy individual as compared to another with lesser wealth but with identical utility functions. This increased likelihood of purchasing a discretionary product as the wealth increases is referred to in microeconomic theory as an *Income Effect.* From a decision-making standpoint, this suggests that the total disposable wealth of a consumer influences the pain of the payment and consequently the willingness to purchase. The budgeting effect demonstrated by Heath (1995) and Heath and Soll (1996) can be thought of as an *Available Income Effect* in which the available budgeted resource that remains in each spending category after accounting for past expenses influences the pain of payment and the willingness to purchase.

The process of evaluating available resources at any given time is a dynamic one. As expenses in a certain category are incurred, the available resources for that category get depleted and as incomes are received, they get replenished. However, in order for past expenses to influence future purchase decision, these past expenses must be tracked and assigned to the relevant mental accounts. Heath and Soll (1996) borrow terminology from financial accounting to explain the cognitive processes involved. They argue that expenses must first be noticed (i.e. *booked*) and then assigned to the appropriate mental account (i.e. *posted*, Heath and Soll 1996, p. 42). They demonstrate that the posting of past expenses to a given mental account (e.g. entertainment) reduces the likelihood of an additional purchase in that account. However, in their experiments as well as in prior studies of budgeting and the role of past expenditures in future spending decisions (e.g. Arkes and Blumer 1985, Heath 1995), subjects' behavior was typically impacted by the full hedonic impact of the past expenses because this information had been presented in a salient and unambiguous manner. The set-up in these experimental provided subjects with an accurate booking of past payments and also allowed the full hedonic impact of past payments to impact consumers. In the real world, however, the cognitive demands associated with accurate booking may be high.

Consider a typical consumer, Susan, who balances her checkbook and her personal accounts at the beginning of each month shortly after receiving her paycheck. At this point in time, she has a clear idea of how much money she has in her bank accounts, as well as

some estimate of her forthcoming spending on non-discretionary items and available resources for discretionary spending. However, as the days pass and she incurs a number of expenses and pays for them using a variety of payment mechanisms (e.g. cash, check, charge and credit cards etc.), it becomes relatively difficult for her to maintain an updated total of cumulative spending and hence available resources (see Pankow 1991). A number of factors might contribute to inaccurate booking. First, it may be difficult to accurately recall some payments that were not salient or in which case the dollar amount was not learnt well at the time of purchase. For instance, Gourville (1998) and Thaler (1998) suggest that certain small expenses (like coffee, bus fares) may be below an accounting threshold and are not even noticed. Second, the pain associated with the payment might be reduced due to the temporal separation of the payment (Gourville and Soman 1998) or the decoupling of the payment with the benefit (Soman and Gourville 1998). Third, research in the area of dynamic decision making shows that individuals underestimate "flow variables" (like in-process payments[ii]) but react to changes in "stock variables" (like actual changes in savings accounts, Sterman 1989). In a simulated inventory decision making game, Sterman (1989) showed that subjects tended to underestimate the extent of work in process and goods in transit in making inventory decisions.

In the first part of this paper, we focus on the differences in the booking process and the pain of past payments for two types of 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 hedonic impact. Payment by check results in a tighter coupling of each individual transaction (Prelec and Loewenstein 1998), and also forces consumers to better remember the expense and keep track of their spending (by virtue of having them write out the total amount and, in some cases, to balance their checkbook). Payments by credit card, on the other hand, are less salient and vivid and hence might result in a weaker memory trace. Additionally, they result in the decoupling of payments from benefits resulting in a weaker hedonic impact (Soman and Gourville 1998). Finally, they also result in in-process payments. Because of the resulting underestimation of past expenses, consumers may perceive themselves as having a greater degree of unused resources in a given mental account.

We conducted two separate real-world tests to support this line of reasoning. First, 41 students were intercepted immediately as they left a campus bookstore after making purchases and were asked what payment mechanism they used and to recall the exact amount they had just spent. They were then asked to confirm this amount by looking at their receipts. 12 out of the 18 (66.7%) respondents paying by cash accurately recalled the amount they had spent, the remaining 6 were within $3 of the true amount with 3 people overestimating and 3 underestimating. In the case of respondents paying by credit card, only 8 out of the 23 (34.8%, $p<0.05$) could recall the amount; the remaining 15 either reported an amount lower than the true amount or confessed that they had no idea and were randomly guessing. Second, 10 single-income earning volunteers who had only one credit card and who reported that they had no outstanding balances were asked to recall all the expenses that they expected to appear on their next statement, and hence the total on their credit card statement right before they opened it. They were then asked to open their statement and to write down the actual total as well as the itemized charges. Based on this self-reported evidence, all 10 participants had written down only a subset (M=4.1) of the total charges (M=6.2). In addition, all 10 participants underestimated the total expenses by an average of 22%, with the predicted totals ranging from 60% to 92% of the actual totals. These two pieces of evidence strongly supported the notion that credit card payments are relatively less salient, less memorable and relatively painless.

This would result in an increase in the *perceived available income* for consumers who regularly use credit cards, resulting in a greater likelihood of purchasing discretionary goods. In other words, the predominant use of credit cards creates an illusion of liquidity, leading consumers to believe they have more liquidity than they actually do. Our expectations are captured in the following hypothesis:

> H1: Consumers who generally pay by credit cards will be more likely to purchase an additional discretionary product as compared to consumers who pay by check. The increased likelihood will be mediated by the perception of available income and wealth.

We next describe an experiment conducted to test this hypothesis.

EXPERIMENT 1

In this experiment, we test hypothesis 1 by using a methodology that compares the behavior of subjects who have just experienced a simulated spending history in which payments have been made predominantly by checks or by credit cards. In particular, after experiencing a series of payments by check or credit cards, subjects are asked to indicate their purchase intention (referred to as PI) for an additional discretionary product. Based on H1, we predicted that subjects who had experienced credit card payments in the past would be more willing to purchase (i.e. have a greater PI) than subjects who had experienced check payments, and that this difference is mediated by the perceived available wealth, i.e. the illusion of liquidity. Further, since we argue that these differences occur due to biases in accurately assessing the impact of past payments, we expect that the provision of accurate feedback about past spending will reduce (or eliminate) this difference.

Subjects, Design and Procedure: Subjects were 160 students and staff members at a mid-western University. They were approached at several cafeterias across the campus and asked if they were willing to participate in an academic study. Those who agreed were given a two-page survey and a set of index cards, as well as a cup of coffee and a snack of their choice.

The design employed in this experiment is a 2 (Method of Payment) x 2 (Feedback) x 2 (Credit Limit) full factorial design resulting in a total of 8 experimental conditions. The "Method of Payment" factor had two levels. In the *credit card* condition, subjects used a credit card for all their purchases. In the *check* condition, subjects wrote checks for their purchases. The second factor, "Feedback" referred to whether subjects were periodically provided with their cumulative expenditure to date. This manipulation was used to test our argument that differences between subjects in the credit card and check conditions could be explained by biases in the booking process. We also manipulated the "credit limit" (either *$3000* or *$8000)* that subjects ostensibly had on their credit cards. This manipulation was used because there is some evidence to suggest that the size of the credit limit might influence spending behavior (cf. Norton 1993, Tobin 1972). While we anticipated a greater PI when the credit limit is $8000 instead of $3000, we wanted to ensure that the effects of feedback are not different for these

two credit limits. The next paragraphs describe how these manipulations were implemented in the experiment.

The cover page of the questionnaire informed subjects to imagine that they had graduated from college and were now had a job that paid $3000 a month. They were told that they had savings and checking accounts and that their balances in these accounts totaled $3000. Further, they were told that they had a credit card with a limit of either $3000 or $8000, depending on the experimental condition they were in[iii]. They were to imagine that they had just recently finished paying off all their college loans and now wanted to save money to buy a new condominium. Next, subjects were handed a series of index cards, each of which contained details of a particular expense they might incur in a prototypical month (see Table 1). Subjects in the credit card condition were told that they had charged most of these purchases to a credit card while subjects in the check condition were told that they had written a check for each of the purchases. In order to mimic the mechanics of payment in the laboratory, subjects were asked to either sign a credit card receipt or to write a check as they viewed each purchase (see Figure 1 for sample stimuli). After viewing each card, subjects in the *feedback* condition were told their cumulative spending to date in the month. Subjects in the *no feedback* condition simply went on to the next index card.

Insert Table 1 and Figure 1 here

After reviewing the cards and completing the associated material, subjects answered a few distracter questions meant to disguise the real purpose of the study. Embedded in these distracter questions were two questions of interest to us. First, on the basis of the spending history they had just experienced subjects were asked to rate their overall perceived *wealth* as compared to other people with similar incomes and in similar stages of their careers (0=Much lower than average, 5=Average, 10=Much higher than average). Second, subjects were asked to evaluate their perceived *savings* (i.e. unspent income) on the same scale.

Finally, subjects were presented with a scenario in which they asked to imagine that they were at a mall to make some planned 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 for the CD's. The advertisement in the credit card and check conditions was identical to each other. Subjects were finally asked to indicate on a 10 point scale their purchase intention (PI) for the boxed set (1=Definitely will not buy, 10=Definitely will buy).

We note that the experimental procedure was designed to mimic the payment process by compressing a time span of one month to approximately 30-40 minutes in the laboratory. This allowed us to maintain the basic features of the *mechanics* of the payment process and to study its effect on future spending decisions. There is considerable evidence to suggest that such time compressed methodologies do a good job of tracing consumer decision processes (cf. Burke, Harlam, Kahn and Lodish 1992) even though they may heighten overall accuracy. In our experiment, this might suggest that while the overall estimates of available wealth (and its effect on PI) might be more accurate as compared to the real world, the differences between the experimental treatments would represent the real world well (Burke et al.1992).

Manipulation Checks: Since most subjects were run in small groups of 1-4, the experimenter could ensure that they actually underwent the "payment experience" and wrote out checks or signed receipts as the experimental task demanded. Subjects were also asked to recall the credit limit. The recalled credit limit was used as a dependent variable in an ANOVA model with actual credit limit, method of payment and feedback as independent variables. Results showed no significant effects ($p>0.50$) except the main effect of actual credit limit ($p<0.001$). Also, in both credit limit conditions, the mean recalled credit limit was not significantly different from the actual value ($p>0.80$). This indicated that subjects accurately recalled the credit limit and that the recall did not differ across conditions.

Analysis and Results: Table 2 shows the mean likelihood of purchase in each of the experimental conditions. The data were first analyzed using an ANOVA with the likelihood of purchase as the dependent variable, and the "method of payment", "feedback" and "credit limit" as the independent variables.

Insert Table 2 and Figure 2 here

The ANOVA results reveal significant two way interaction effects of the "method of payment" with "feedback" ($F_{1,152}$=3.46, p=0.06) and of the "method of payment" with the "credit limit" ($F_{1,152}$=3.74, p<.10); as well as significant main effects of the "method of payment" ($F_{1,152}$=18.23, p<.001), "feedback" ($F_{1,152}$=4.64, p<.05) and the "credit limit" ($F_{1,152}$=4.33, p<.05). These interactions are plotted in Figure 2. A further analysis revealed that the main effect of the feedback is qualified by the "method of payment * feedback" interaction, such that in the *check* payment condition, the mean purchase intention for the no feedback condition ($X_{no\text{-}feedback}$=3.85) is no different from that in the feedback condition ($X_{feedback}$=3.75, p>.80). However, in the *credit card* conditions, the no-feedback conditions result in a significantly greater purchase intention ($X_{no\text{-}feedback}$=5.95) than in the feedback condition ($X_{feedback}$=4.58, p<.02). This suggests that feedback about cumulative spending provides some additional input into the judgment of purchase intention when payments are made by credit card but not when payments are made by check.

Similarly, the main effect of the credit limit is qualified by the "credit limit * method of payment" interaction, such that in the *check* payment conditions, the mean purchase intention for the $3000 condition ($X_{\$3000}$=3.78) is no different from that in the $8000 limit condition ($X_{\$8000}$=3.83, p>.80). However, in the *credit card* conditions, the low limit conditions result in a significantly greater purchase intention ($X_{\$3000}$=4.58) than in the feedback condition ($X_{\$8000}$=5.95, p<.01). This confirms previous suggestions that the credit limit seems to influence purchase intention when payments are made by credit card (Norton 1993). However,

of particular importance to this experiment, we note that neither the two-way "feedback * credit limit", not the three way "method of payment * feedback * credit limit" interactions approach significance (p's > 0.68) . This confirms that the effect of feedback was not different under the two credit limitation conditions, and that the "method of payment * feedback" interaction occurred for both credit limits separately.

The main effect of the method of payment was supported by a series of contrasts between the purchase intention under the credit card condition and the purchase intention under the check conditions for all combinations of feedback and credit limits. In three of the four contrasts, the purchase intention in the credit card condition was significantly greater than that in the check conditions ($p<.05$). In the low credit limit condition when feedback was provided, this difference was in the same direction but was not statistically significant ($F_{1,152}=0.19$, $p>.50$). This seemed to suggest that when the credit limit is sufficiently low, providing feedback about the cumulative spending (and consequently facilitating a relatively accurate assessment of one's current wealth status) resulted in no effect of the payment mechanism on the purchase intention. Conversely, the discrepancy between the purchase intention measure for the credit card subjects and the check subjects is greatest in the high credit limit situation where no feedback was provided.

In a second set of analyses, individual level data were used in regression models to test for the mediating effect of perceived wealth status on purchase intention (see Figure 3). A regression model with *perceived wealth* as the dependent variable revealed coefficients that were significantly different from zero for "method of payment" ($\alpha=1.05$, $p<0.05$) and the "method of payment" * "credit limit" interaction ($\alpha=0.95$, $p=0.08$). A multiple regression with purchase intention as the dependent variable revealed coefficients that were significantly different from zero for the "method of payment" ($\alpha=1.44$, $p<0.02$), the "method of payment" * "feedback" interaction ($\alpha=-1.28$, $p=0.06$) and the "method of payment" * "credit limit" interaction ($\alpha=1.33$, $p<0.05$). However, when perceived *wealth* was included in a multiple regression model as a covariate, the coefficients for the "method of payment" ($\alpha=0.54$,

p>0.20), the "method of payment" * "feedback" interaction (α=-.85, p>0.10) and the "method of payment" * "credit limit" interaction (α=.51, p>.30) were not significantly different from zero while the coefficient for the *wealth* covariate was (α=.85, p<.01). A similar pattern of results was obtained when *saving* was used as a covariate in a multiple regression model instead of *wealth*. This analysis suggests that the perceived wealth status and saving are mediating the purchase intention, lending support for the contention that the use of credit cards causes consumers to get an exaggerated estimate of their wealth resulting in greater purchase intention.

Insert Figure 3 here

Discussion: Results from this experiment demonstrated that subjects who paid by checks seemed to be better calibrated about their cumulative spending and available income than subjects who paid by credit cards. Further, results suggested that the provision of accurate feedback about past spending reduces the differences between PI in the check and credit card conditions. While the results of Experiment 1 provide support to H1, they also raise several issues. First, while we were able to demonstrate differences in PI for two payment mechanisms, 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, it could be argued that subjects in the credit card conditions were entitled to believe that they were wealthier because they did indeed have greater spending power and hence were drawing upon a second source of funds (their credit line) while evaluating PI. We tried to minimize this possibility in two ways. The cover story instructed subjects that they planned to pay their credit card bills in full by the end of the month. More importantly, subjects in the check cash conditions were also told that they had access to a credit card with a limit of either $3000 or $8000. Additionally, the increased PI due to consumers incorporating their credit line as a source of funds should not explain the "method of payment" * "feedback" interaction. However, we recognize that a cleaner test of our framework should isolate any effects of credit as a

long-term source of funds. Third, while we asked subjects to rate their perceived wealth and savings, we did not get a direct measure of their recall of past expenses. Fourth, it could be argued that subjects who were in the *credit card* condition were in a better mood that those in the *check* condition since the latter had to expend greater effort during the experiment[iv], and consequently the credit card subjects expressed a greater PI for the CD's. While we did not sense any differences in mood while conducting the experiment, we acknowledge the possibility that mood might have contributed to the results of Experiment 1.

To address the four issues raised above, we next develop a more general argument build around factors that influence the accuracy of the booking process, and hence the relevance of past expenses to PI. Two of these factors are characteristics of payment mechanisms. We propose additional hypotheses and describe an experiment designed to test these hypotheses.

THE EFFECTS OF PAYMENT MECHANISM ON BOOKING PAST EXPENSES

Consumers might make payments using a variety of mechanisms, e.g. cash, checks, credit and charge cards, debit cards, credit check[v] etc. While each of these mechanisms ultimately depletes the consumer's wealth, they differ along two important characteristics that have relevance to the booking process and the hedonic impact of the current and past payments.

1) *The learning and rehearsal of the price paid*. Payment mechanisms differ in terms of the opportunities they offer consumers to learn and remember the final price paid. While paying by check, consumers have to write down the total amount in words and figures. This repetition increases salience and will leave a relatively strong memory trace (Hawkins and Hoch 1992). On the other hand, while paying by charge or credit cards, consumers only need to sign a receipt on which the final price paid is printed numerically[vi]. Hence, we argue that while assessing their available income, consumers can more accurately book past expenses when they have used payment mechanisms that require them to write down the final amount paid. Specifically, we hypothesize:

H2: Past expenses will play a greater role in influencing future purchase decisions for payment mechanisms that require consumers to write down (and rehearse) the final price paid. Writing down the final price will improve the accuracy of booking past expenses.

2) *The immediacy with which monetary resources are depleted*. Payment by cash represents an instantaneous depletion of monetary resources. Payment by checks and debit cards, on the other hand, typical involve a minor delay before which the check or charge can be deposited and the consumers account depleted. Charge cards, credit cards and credit checks represent the largest temporal delay. The merchant transmits the charge information to the credit card company, who in turn bills the consumer whose resources finally get depleted after the check she writes gets deposited. While an immediate depletion of resources will cause significant pain, the delayed depletion is likely to result in a much lesser impact for three reasons. One, the delayed payment could be discounted (Loewenstein and Prelec 1992, Thaler 1980) and hence actually weighs less in decision making. Second, consumers may not "experience" a payment until money has actually left their bank accounts. Thus, payment by credit or charge cards might be viewed upon as only a commitment to pay rather than an actual payment, and consequently have a smaller impact on decision making. Finally, the payment in the case of charge and credit cards, when made, will be bundled in with a number of other payments and hence will be *decoupled* (Prelec and Loewenstein 1998, Soman and Gourville 1998). Because of this lack of association between the price paid for each product and the benefit associated with that product, the hedonic impact of each of the payment is diminished (Soman and Gourville 1998).

The above discussion has two potential consequences for the effect of payment mechanisms on purchase decisions. First, it suggests that irrespective of prior usage of specific payment mechanisms, payments by a mechanism that involves a temporal distance from the actual depletion of wealth are less painful and hence will result in greater purchase intention. Second, and of greater relevance to this paper, it suggests that the prior use of such payment mechanisms will generate a stream of relatively painless payments, resulting in a weaker memory and hence inaccurate booking. This is consistent with prior research suggesting that painful experiences influence retrospective judgment

and decision making to a greater degree (Ariely 1998, Prelec, Loewenstein and Zellemayer 1997, Prelec and Loewenstein 1998). This is especially true for in-process payments. While this suggests that the retrospective hedonic impact of completed payments is greater than in-process payments, there is no direct evidence to suggest that completed payments are better recalled. Hence, while we argue that the immediacy might have an impact on purchase decisions, we offer no prediction about its effect on accuracy on booking. Specifically, we hypothesize:

> **H3**: Past expenses will play a greater role in influencing future purchase decisions for payment mechanisms in which resources have been depleted immediately than for mechanisms in which resource depletion has yet to occur.

The Effect of Recency of the Past Expense on Booking: In addition to the effects of the payment mechanism on the booking process, accurate booking may also be difficult for expenses that have been incurred in the distant past as opposed to those in the recent past due to increased likelihood of forgetting and the gradual reduction in the hedonic impact of the earlier payment (Gourville and Soman 1998). Hence we hypothesize

> **H4**: Past expenses will play a greater role in influencing future purchase decisions when they are incurred recently rather than in the distant past. The accuracy of recall of past expenses will be better when expenses have been incurred recently rather than in the distant past.

In summary, we suggest that the effect of past expenses on pending purchase decisions (cf. Heath and Soll 1996) is a function of the characteristics of the payment mechanism (rehearsal, immediacy) and the recency of the past payment. These factors result in a reduction in the accuracy of booking and the hedonic impact of past payments. On one extreme, past expenses will strongly reduce PI when they have been incurred recently, and when the payment mechanism involves writing down the final amount paid and has resulted in the immediate depletion of resources. On the other extreme, past payments will result in a strong illusion of liquidity and will have no effect on PI when they have been incurred significantly in the past, and when the payment mechanism does not allow for rehearsal of the final amount paid and payments are still “in-process”.

We next describe a laboratory experiments designed to test these hypotheses.

EXPERIMENT 2

While Experiment 2 used the same basic methodology as Experiment 1 (i.e. the simulated experience of a history of spending), it differs in a number of significant ways. First, it uses a broader set of payment mechanisms, specifically it uses checks, charge cards, debit cards and charge checks. Second, none of these payment mechanisms allows for consumers to incorporate an additional long-term source of funds (like a line of credit) into their decision making. Checks and debit cards draw upon the consumer's bank account, while charge card and charge check bills have to be paid off by the end of the month. Third, we used a within subject design in which each subject used one of the four payment mechanisms to pay for expenses in each of four separate expense categories. Each subject also had to indicate PI 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 gave PI ratings for all four categories. This eliminates the possibility of mood effects influencing the results and also makes the spending history more realistic. Fourth, in the PI scenarios that subjects faced, they were told that they would be paying for the additional discretionary item by cash. This allows us to isolate the effects of past expenses on current purchase decisions by eliminating effects due to the point-of-purchase use of the payment mechanism (e.g. Feinberg 1986, Prelec and Simester 1998).

Subjects, Design and Procedure: Subjects were 119 undergraduate students at a large state university who received course credit for participation. Subjects were told that the objective of the experiment was to understand consumer purchasing behavior and asked to imagine that they had graduated and now had a job that paid $3000 per month (after taxes). They were told that "while you have a number of essential expenses, your new found financial freedom allows you to spend on entertainment, food, home leisure and clothing and accessories." 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 were further told that American Express also issued them "charge checks" that they could use to make payments that would appear on their monthly statements. Subjects were thus told that they had access to

four payment mechanisms. As Figure 4 shows, these four payment mechanisms are generated by fully crossing two levels of the "immediacy" factor (immediate depletion of resources, delayed depletion of resources) with two levels of the "rehearsal" factor (whether final amount paid needs to be written or not).

Insert Figure 4 here

Subjects were next presented with a booklet that contained a spending history for the previous month. The 32 day history was presented on 16 separate pages, starting with February 28 ("Received Salary: $3000 by Direct Deposit) on the top half of the first page and ending with March 31 on the bottom half of the last page. The history described a non-discretionary expense (or no expense) on the even days of the month, and a discretionary expense on each of the 16 odd days of the month. The 16 discretionary test expenses comprised 4 expenses in each of 4 spending categories. A series of extensive pretests (card sorting, focus group and typicality ratings) showed that our subjects had mental accounts with the labels of Food (e.g. eating out, pizza delivery), Entertainment (e.g. movie tickets, rock concerts), Home Leisure (e.g. CD's, computer games) and Clothes and Accessories (e.g. sweatshirt, cap; we refer to this category as "Clothes")[vii]. The list of test expenses used in this experiment, along with their price and typicality ratings are shown in Table 3 in the order in which they appear in some of the experimental conditions. All expenses within each of the four categories were assigned to one of the four payment mechanisms described above. As in the previous experiment, subjects were instructed to go through the booklet one page at a time and to "make" each of the discretionary payments using the appropriate payment mechanism described in the booklet.

Insert Table 3 here

For the purposes of discussion, the list of expenses in Table 3 is divided into four equal blocks. In Table 3, the order of expenses within each block is Home Leisure, Food,

Entertainment and Clothes. While the actual expenses within each block remained the same for all subjects, four orders of expenses were created within each block (see table 4). Because of this manipulation, every category of expense last appeared either on the final day of the month viz. March 31 (Recency=4), March 29 (Recency=3), March 27 (Recency=2) or March 25 (Recency=1).

Insert Table 4 here

In order to eliminate any effects due to the memorability or preference for the spending category itself, the assignment of payment mechanisms to categories was counterbalanced across subjects. In preliminary data analysis, we found neither a main effect nor any interaction effect involving the assignment of spending category. Hence, for ease of exposition, we eliminate references to the spending categories while presenting results and instead link individual payments only to the payment mechanism and the order manipulations. This experiment thus involved a 2 (Immediacy) x 2 (Rehearsal) x 4 (Recency) full factorial design, with the first two factors as within subjects and the third factor as a consequence of a between subjects assignment.

After completing the spending history task, subjects answered two separate questionnaires. The first questionnaire asked a few distracter questions, and then collected PI measures as well as recall for past spending. First, subjects were asked "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 of items in the mall that you don't really need, but that you might be interested in purchasing. Given your expenditures this past month, please indicate how likely you are to spend on each of the following." Subjects then saw four expenses of $15, a double-CD (Home Leisure), a shirt (Clothes), lunch at a favorite food-court restaurant (Food), music show tickets (Entertainment) and responded to each on a 9 point scale (1=Definitely Not Spend, 9=Definitely Spend). Second, subjects were asked "For each of the items (listed above), how much money would you say you have already spent on ***similar*** items this past month" and responded on to each on 9 point scales (1=Not Spent Much, 9=Spent a Lot). We refer

to this variable as the *perceived past expense* (PPE). Finally, subjects were asked to recall as many individual expenses as possible and to write down the corresponding amount.

In the second questionnaire, subjects initially read a paragraph describing the four discretionary expense categories used in the experiment and were then asked to provide a retrospective best estimate of their total expenditure in each of the four categories during the past month. As manipulation checks, they were also asked for typicality ratings of all the expenses as well as tested to ensure that they recognized the differences between the payment mechanisms along the "immediacy" dimension.

At this stage, we would like to emphasize that we had four different measures of recall of past expenses. Based on pretesting (focus groups, surveys and interviews), we believe that these measures capture different aspects of the recall. In the first questionnaire, we collected unaided listings of recalled expenses and their amounts. The number of recalled expenses within each category (NREC) could range from 0 to 4. The total unaided dollar expense recalled (UDOLL) represented the total of the amounts recalled within each category. As such, these two measures capture only the memory for past expenses. We also measured two other variables – first, we measured the perceived past expenses (PPE) 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). Second, we measured the retrospective recall of dollar expense (RDOLL) in the second questionnaire, when subjects were provided with the definition of the four spending categories and asked to reconstruct an estimate of their past spending in each. Since these two variables were based on subjective assessments and reconstruction from memory, we expected them to capture the *pain* of past payments rather than just the memory.

Manipulation Checks: Since subjects were run in groups of 5-20, we wanted to confirm that they had completed the experimental procedure and 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 was eliminated, leaving data from 118 subjects for analysis. In the second questionnaire, we had also asked

subjects 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 different from those for charge cards (M=5.32) and charge checks (M=5.48, $p < 0.01$). The typicality ratings of each of the test and PI expenses are listed in Table 3 and confirm the validity of our categorization. Finally, subjects were asked to recall their monthly post-tax income. The mean response (M=$3008.65) was not significantly different from the actual value ($p>0.50$).

Analysis and Results The data were analyzed by using a MANOVA with the purchase intention (PI), perceived past expense (PPE), number of expenses recalled (NREC), total unaided dollar expense recalled (UDOLL) and retrospective dollar expenses recalled (RDOLL) as the dependent variables, and the "rehearsal", "immediacy" and "recency" as the independent variables with the subject number used as a covariate. The pattern of MANOVA results was different for each of the independent variables and hence they are discussed separately below.

a) *Purchase Intention (PI):* Results indicate significant main effects of "rehearsal" ($F_{1,455} = 142.54$, $p<0.001$), "immediacy" ($F_{1,455} = 39.60$, $p<0.001$) and "recency" ($F_{3,455} = 24.17$, $p<0.005$). No two or three-way interaction effects were significant. As table 5 shows, the mean PI 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, when payments that were still in-process (by virtue of delayed depletion of resources) and when the past payments in that category had been incurred in the distant past rather than recently.

Insert Table 5 here

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b) *Perceived Past Expenses (PPE):* PPE results also showed main effects of "rehearsal" ($F_{1,455} = 78.35$, $p<0.001$), "immediacy" ($F_{1,455} = 50.83$, $p<0.001$) and

"recency" ($F_{3,455}$ = 2.76, p<0.05), with no interaction effects approaching significance. As table 5 shows, however, the direction of these main effects was opposite to that for the PI variable. Specifically, the mean PPE 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, when resources were depleted immediately and when the past payments in that category had been incurred only recently.

c) *Number of Expenses Recalled (NREC) and Total Dollar Expenses Recalled – Unaided (UDOLL):* Both these variables showed an identical pattern of results, specifically a significant main effect of "rehearsal" ($F_{1,455}$ = 29.35, p<0.001 for NREC, $F_{1,455}$ = 33.51, p<0.001 for UDOLL). No other main or interaction effect approached significance. As table 6 shows, NREC and UDOLL were higher for expenses that had been paid for by a mechanism that involved rehearsal of the final price paid. Interestingly, while NREC and UDOLL both increased with the "recency" in the expected direction, the results barely approached significance (p=0.12 for NREC, p=0.09 for UDOLL).

Insert Table 6 here

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d) *Retrospective Dollar Expense Recalled (RDOLL):* Results indicated significant main effects of "rehearsal" ($F_{1,455}$ = 179.23, p<0.001) and "immediacy" ($F_{1,455}$ = 17.10, p<0.001). No other main or interaction effects were significant. As table 6 shows, RDOLL was higher when past expenses had been paid for by mechanisms that allowed rehearsal, and when the resources had been depleted immediately rather than being in-progress.

Collectively, this indicates an interesting pattern of results that support our hypothesis. First, consider the effects of "rehearsal". Results from this experiment suggest that when past payments have been made by mechanisms in which the consumer needs to write down the final amount paid (i.e. mechanisms that involve rehearsal), the PI for an additional purchase in that category is low. Also, subjects can recall a greater number of past expenses (NREC), believe that they have spend a disproportionately large amount on the category (PPE), are relatively more accurate in the unaided recall of expenses

(UDOLL) and are more accurate in their retrospective recall of category level dollar expenses (RDOLL). This supports H2.

Next, we consider the effects of "immediacy". Consider situations in which past payments in a category have been made by mechanisms in which monetary resources have been depleted immediately (rather than being in-process). In such situations, we find that PI for an additional purchase in that category is relatively lower, while the belief of having spend a disproportionately large amount on that category (PPE) as well as the retrospective recall of category level dollar expenses (RDOLL) are higher. These findings support H3.

We note, however, that the immediacy factor had no effect on NREC and UDOLL. Apparently, while the memory of past payments is not diminished even if payments are still in-process, the retrospective pain associated with such payments is not as great as the pain associated with completed payments. This suggests that past payments might have an effect on pending purchase decisions even in situations where the memory of the past expense is good. Consumers might recall that they spent $50 on an expensive French dinner charged to a card, but might only feel the "pinch" after the bill arrives several days later.

Finally, we consider the effects of "recency". We find that the PI for an additional purchase in a category is low when past expenses in the category have been incurred recently. Also, the perceived past expense (PPE) is high for recent expenses. Interestingly, we did not find significant effects of the "recency" variable on NREC, UDOLL and RDOLL. Thus, the recall of past expenses did not seem to be influenced by their recency. This indicated partial support for H4. As discussed later, we believe that this null result might have occurred due to the very subtle manipulation of recency, and the small temporal separation between purchase occasions in our time-compressed experiment.

In a second set of analysis, individual level data were used in regression models to test for the mediating effect of perceived past expenses (PPE) on purchase intention (see table 7). A regression model with PPE as the dependent variable revealed coefficients that were significantly different from zero for "rehearsal" (α=1.596, $p<0.001$), "immediacy" (α=1.286, $p<0.001$) and "recency" (α=0.214, $p<0.01$). A multiple regression with purchase intention as

the dependent variable revealed coefficients that were significantly different from zero for "rehearsal" (α= -1.935, $p<0.001$), the "immediacy" (α= -1.019, $p<0.001$) and the "recency" (α= -0.236, $p<0.005$). However, when perceived *wealth* was included in a multiple regression model as a covariate, the coefficients for "immediacy" (α=.-0.165) and "recency" (α= -0.094) were not significantly different from zero. The coefficient for the PPE covariate (α= -0.665, $p<.0.001$) as well as the coefficient for "rehearsal" (α= -0.874, $p<0.001$) were significantly different from zero. These results suggested that the perceived past expenses seemed to be partially mediating the effect of payment mechanisms on purchase intention. We note that while the coefficient for "rehearsal" reduced in absolute value significantly (from –1.935 to – 0.874, $p<0.02$), it still remained significant. Hence, in addition to the effect of PPE, there was also a residual effect of rehearsal on purchase intention.

Insert Table 7 here

Discussion: Results from Experiment 2 allowed us to test three hypotheses relating to the role of the rehearsal in the payment mechanism, immediacy of resource depletion and the recency of the past payment on the effect of past expenses on pending purchase decisions. We were able to show that the use of a specific payment mechanism influences the memory for past expenses, as well as the retrospective pain from these past expenses resulting in differences in the purchase intention for an additional product. Experiment 2 also overcame some of the limitations associated with Experiment 1. Specifically, subjects in all experimental conditions in this experiment made purchasing decisions on the basis of the same source of income (their current wealth) and all subjects faced an identical amount of effort. Additionally, we were able to demonstrate differences in memory and retrospective pain associated with past payments as a function of payment mechanism in a *within subjects* setting, thereby increasing the validity of our conclusions and the robustness of our framework. Finally, we were able to demonstrate that the pain of past payment atleast partially mediates the effect of payment mechanism on purchase intention.

In addition to this mediating effect, we also found a residual effect of the rehearsal. While we had not predicted this residual effect, we believe that this might arise due to additional salience caused by the rehearsal process. We speculate that in addition to increasing the pain of past payment, the act of rehearsal (i.e. writing down the final amount paid) also increases the vividness of the past experience and hence creates an additional deterrence to making a further purchase in the category.

While we found strong support for H2 and H3, we only found partial support for H4. Specifically, while we expected the recency factor to have an effect on the PI, the memory for past expenses (NREC and UDOLL) and the retrospective pain of past payments (PPE and RDOLL), we only found support for the first and third of these effects but not for the second. Specifically, while the memory for past payments was the greatest for the most recent payments and decreased for more distant payments, this decrease was very small and statistically insignificant. In order to explore the success of our recency manipulation, we looked at a variable called FRAC-*i*, the fraction of subjects who recalled an expense that appeared in the *i*-th position in each category. We found a significant increase in FRAC-*i* as *i* increased. Specifically, the recall for purchases that appeared in the first position in each category was 15%, recall for purchases in the second position was 26%, recall for purchases in the third position was 37% and recall for purchases in the fourth position was 60% ($p<0.02$). This seemed to strongly suggest that past expenses were indeed poorly recalled.

We believe that the lack of significance in our results is due to the manner of operationalization of the recency manipulation in two ways. First, we maintained the four separate blocks of expenses as shown in table 2 and only varied the order of expenses within each block. Thus, the largest temporal separation between an expense in a particular category and the administration of the questionnaire was four “days”. In our time-compressed experiment, this might have translated into a temporal separation of a few minutes. Second, the four categories of expenses were repeated in the same order. Consequently, even though there was a true recency effect as described in the previous paragraph (i.e. expenses incurred in the early part of the month were not recalled), it would have weakened at the category level since expenses in each category were spread

over the month. In retrospect, we believe that a stronger manipulation of recency would have resulted in significant effects.

In this experiment, we manipulated "immediacy" by creating situations in which the past expense had either been incurred and resources had been depleted immediately, or in which the past expense had been incurred but not been paid for, i.e. the payment was still in-process. In these latter cases, a natural corollary is to wonder what happens when the consumer receives a charge card bill. One possibility is that the consumer relives the pain of the past payment while paying the charge card bill and hence experiences a delayed phase where his PI is low. On the other hand, it is possible that this relived pain is not as intense as what it would have originally been for a number of reasons – the fact that it is delayed (Gourville and Soman 1998), the fact that it is bundled in with a number of other items (Thaler 1998) and the fact that it may be decoupled from the purchase (Soman and Gourville 1998) especially if the item had been purchased in previous months and does not even appear on the current statement. While these are both interesting possibilities, we acknowledge that a thorough investigation along these lines is beyond the scope of this paper and should be addressed by further research.

GENERAL DISCUSSION AND CONCLUSIONS

Summary of Research and Discussion

Research reported in this paper shows that the payment mechanism used to make past payments influences pending purchase decisions. Specifically, we showed that payment mechanisms can influence the memory for and the retrospective pain associated with past expenses, and hence influence the effect of these past expenses on spending behavior. We provided support for this framework in two separate experiments. In Experiment 1, we showed that consumers who made past payments by checks were less likely to purchase an additional discretionary product as compared to consumers who made payments by credit card. We further showed that this difference occurred because credit cards created an illusion of liquidity and was eliminated when consumers were provided with accurate feedback about their cumulative past spending. In Experiment 2, we looked at a broader range of payment mechanisms, and showed in a within subject setting that two features of the payment mechanism (whether the consumer needs to write

down the final price paid, and the immediacy with which resources are depleted) as well as the recency of the past payment moderate the effect of these past payments on future spending. Specifically, we showed that past expenses create an illusion of liquidity when they are paid for by a mechanism that does not involve rehearsal, when the payments are still in-process and when the expense has been incurred in the significant past. The two experiments supported our basic framework using two separate mechanisms – in the first experiment, we used an external manipulation (feedback) to eliminate the effect of payment mechanism, in the second experiment we measured the moderating variables (recall and retrospective pain of payments) to support our framework. In addition to the two experiments, we also presented some quasi-experimental data from real consumers about actual expenses they had incurred.

Several discussion points are in order here. First, we would like to highlight the difference between our approach and that of prior research in the area of payment mechanisms on spending (e.g. Hirschman 1979, Feinberg 1086, Prelec and Simester 1998). While prior research has typically compared and contrasted two payment mechanisms (e.g. credit cards and cash, Prelec and Simester 1998), our approach has been broader and our goal has been to identify underlying variables that drive differences between several payment mechanisms. Additionally, previous research has tended to focus on the effect of the use of a particular payment mechanism at the point of purchase. In contrast, our objective is to research the effect of the continued use of various payment mechanisms on spending behavior. For instance, we would argue that consumers who generally use credit cards are more likely to purchase an additional discretionary product irrespective of whatever payment mechanism they use to make this purchase. We feel that our approach provides a rich understanding of consumer budgeting and the dynamic aspects of mental accounting as they relate to purchasing decisions. Our approach also helps understand the consumer level mechanisms that drive aggregate spending patterns as a function of payment mechanism used (cf. Cole 1998).

Second, we note that our objective was to isolate the moderating effects of payment mechanism on influencing the effect of past payments on purchasing decisions. Several other factors also need investigation in order to completely understand the effects

of payment mechanism. For instance, we studied the use of credit cards in Experiment 1, but acknowledge that consumers who use credit cards could be drawing upon a second source of wealth (e.g. long term debt) in making purchase decisions. In a separate paper, we show that consumers tend to confuse the notion of spending power with wealth and discuss its mental accounting and public policy implications.

Third, we would like to discuss the use of our time-compressed methodology in which subjects went through the experience of making a series of payments over time. We acknowledge that our experiments used student subjects and did not involve real expenses. However, given our basic objective in this paper (testing theory and studying process of evaluating transactions) we are comfortable with the use of the time-compressed methodology (see also Burke et al. 1992). Additionally, we note that our methodology would have biased results against our hypotheses and weakened our results since the salience and memory over a shorter timespan would have been greater. Given that we still found significant effects in the laboratory, we are confident about the validity and robustness of the framework we propose.

Theoretical Implications

Our research contributes to the literature on mental accounting and budgeting by investigating the role of booking of past payments and the pain associated with these past payments in influencing future decisions. Two streams of literature in decision making are based upon the impact of past expenses on pending decisions. First, the literature on the sunk cost effect (e.g. Arkes and Blumer 1985, Thaler 1980) and escalation to commitment (e.g. Staw 1976) argues that past expenses invested in a given endeavor tend to increase future expenses towards the same endeavor. Second, research on consumer budgeting (e.g. Heath and Soll 1996) suggests that past expenses influence pending purchase decisions by consuming a portion of the allocated budget. However, experimental research in both these streams has typically provided subjects with an unambiguous and vivid description of the past expenses, and hence eliminated any effects due to errors in booking or dampening of the pain (hedonic impact) associated with past expenses. Our research is the first study to incorporate these factors in a study of mental accounting and also the first study to take a dynamic view of the mental accounting process. The three factors we

identify, rehearsal, immediacy and recency are applicable not only in a study about payment mechanisms, but are general variables that impact the strength of the past payment. For instance, we would predict that the sunk cost effect would get attenuated if the past payments were made in the distant past and if they had been made via, say payroll deduction as opposed to a check.

Public Policy Implications

Growing credit card debt and an accompanying increase in the rise of credit card related bankruptcies has heightened the need to address consumer education and credit card regulation issues that will allow consumers to better manage their money (Cole 1998). We have demonstrated that the act of rehearsing the final price paid (by writing down the amount) and the completing of the transaction (by depleting resources immediately rather than leaving many in-process payments) results in greater accuracy of recalled payments and consequently a lower PI for discretionary products. The advent of new technology and payment mechanisms (Marlin
1998) like the use of secure payment mechanisms on the Internet allows consumers to make payments with minimal effort (clicking of a button) without even having to look at their checkbooks or credit cards. This will further reduce the salience and pain associated with payments.

How can consumers safeguard against the illusion of liquidity and better manage their money? Our results show that a useful first step would be to keep track of past expenses and to endeavor to complete transactions at the earliest available opportunity. The use of registers and workbooks will allow consumers to not only keep track of past spending in various categories but will also help them relive the retrospective pain associated with that payment. Some recent family budgeting guidebooks have also started advocating the use of registers to note down expenses in order to keep track of easily-forgotten expenses like credit card charges and miscellaneous cash expenses (e.g. see Burkett 1993, Dean and Morris 1997). Our research would strongly endorse recommendations for better bookkeeping. Similarly, our research would also suggest completing all transaction at the earliest opportunity. Our advise to consumers would be to pay off credit and charge card bills as promptly as possible, and to psychologically

"earmark" a portion of her savings account to each purchase till it has been paid off. For instance, a friend generally uses a credit card for convenience, but also keeps a box on his desk with all his credit card counterfoils with the total amount paid written in bold lettering to symbolize his outflows.

In the real world there is no direct equivalent to the "feedback" manipulation used in Experiment 1. However, credit card issuers can indirectly manipulate the level of feedback by making it easier or harder for consumers to get an updated status of their accounts. Further, credit card billing cycles often do not coincide with household budget cycles and items purchased on a credit card often appear in statements after a substantial temporal delay. The temporal delay might result in the decoupling of the payment from the purchase (Prelec and Loewenstein 1998) and further increase the difficulty of keeping track of past expenses.

While new technology might create payment mechanisms that are even less salient than credit cards, it also promises some solutions. For example, emerging payment mechanisms like smart cards and memory cards can store purchase histories and keep updated spending and saving balances (Newing 1998). Encouraging consumers to use such cards instead of credit cards will provide them with all the information needed to reduce the illusion of liquidity.

Managerial Implications

We demonstrated that consumers who shop using certain payment mechanisms are likely to spend more that other payment mechanisms. From a retailer's perspective, a consumer who uses a credit card is thus likely to be a more profitable consumer than one who uses cash. This would give credit card companies a justification for charging retailers a fee for accepting cards. Similarly, this would suggest that retailers provide incentives to consumers for using credit cards rather than cash or checks. Of further interest is the question of appropriate pricing strategies to encourage greater card use. Clearly one of the factors that influence credit card adoption is the pricing or cards in terms of the annual fees and the APR (Ausubel 1991). High credit card pricing will result in a small size of the card users segment and hence not many profitable consumers. On the other hand, while very low prices will increase the size of the card

users segment, it will also result in lower profits for each consumer and additionally increase the probability of defaults. This suggests an inverted U shaped profit-price relationship with an intermediate optimum pricing level and the level of profits dropping off at higher or lower prices.

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TABLE 1
LIST OF EXPENSES USED: EXPERIMENT 1

Date	Type of Expense	Amount
03-8	Rent	$700
03-9	Phone Bill	$100.72
03-9	Grocery	$53.23
03-10	Dinner at a Restaurant	$26.34
03-12	Tickets to a Game	$23.23
03-15	Car Payment	$370.00
03-18	Shopping at WalMart (Misc.)	$62.98
03-19	Grocery	$47.98
03-22	Clothes at Marshall Fields	$123.21
03-24	Professional and Leisure Books	$72.02
03-25	Utilities	$30.05
03-28	Grocery	$48.06

Notes: 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.

TABLE 2

MEAN PURCHASE INTENTION: EXPERIMENT 1

	Payment Method	
	Check	*Credit Card*
Credit Limit=$3000		
No *Feedback*	3.85	5.15
Feedback	3.70	4.00
Credit Limit=$8000		
No Feedback	3.85	6.75
Feedback	3.80	5.15

n=20 in all *Check* and *Credit Card* conditions

TABLE 3
LIST OF EXPENSES USED: EXPERIMENT 2

	Expense	Category	Price	Typicality Ratings: Home Leisure (HL)	Food (F)	Entertai-nment (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

Notes: 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 home. Broken lines indicate the four blocks of expenses within which four different orders were created in order to manipulate recency.

TABLE 4
ORDER OF EXPENSES USED TO MANIPULATE RECENCY: EXPERIMENT 2

	First Expense Recency=4	Second Expense Recency=3	Third Expense Recency=2	Fourth Expense Recency=1
Order 1	Home Leisure	Food	Entertainment	Clothes
Order 2	Clothes	Entertainment	Food	Home Leisure
Order 3	Food	Home Leisure	Clothes	Entertainment
Order 4	Entertainment	Clothes	Home Leisure	Food

TABLE 5
PURCHASE INTENTION AND PERCEIVED PAST EXPENSES: EXPERIMENT 2

	No Rehearsal		Rehearsal	
	Delayed Depletion	Immediate Depletion	Delayed Depletion	Immediate Depletion
a) Purchase Intention (PI)				
Recency = 1	7.26	6.25	5.32	4.10
Recency = 2	7.00	5.97	4.89	4.23
Recency = 3	6.52	5.97	5.24	3.48
Recency = 4	6.20	5.58	4.68	3.25
b) Perceived Past Expense (PPE)				
Recency = 1	2.90	3.96	4.32	5.66
Recency = 2	3.06	4.14	4.63	5.71
Recency = 3	3.00	4.33	4.34	6.09
Recency = 4	3.48	4.61	4.97	6.59

TABLE 6
RECALL OF PRIOR EXPENSES: EXPERIMENT 2

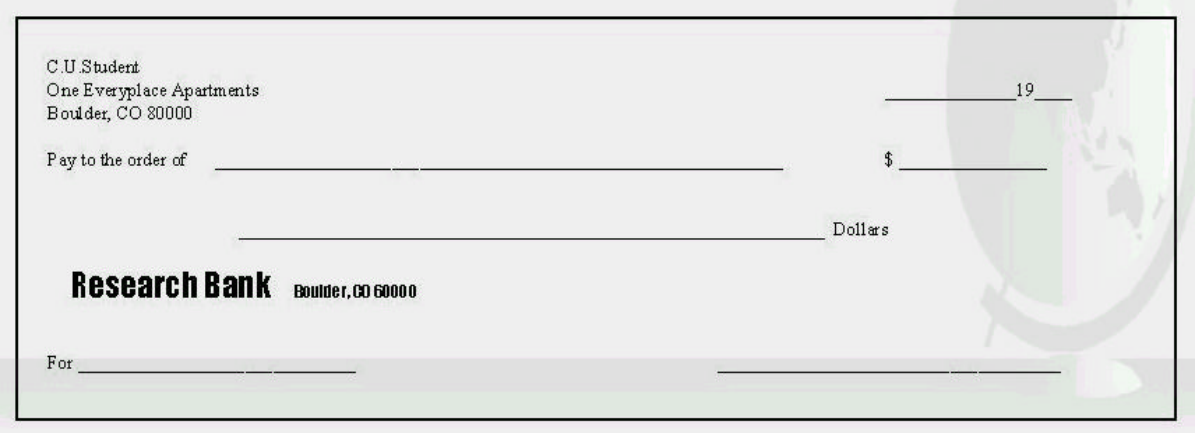
	No Rehearsal		Rehearsal	
	Delayed Depletion	Immediate Depletion	Delayed Depletion	Immediate Depletion
Number of Expenses Recalled – Unaided (NREC)	1.18	1.14	1.54	1.68
Total Dollar Expense Recalled – Unaided (UDOLL)	$17.69	$17.00	$24.10	$25.52
Retrospective Dollar Expense Recalled (RDOLL)	$32.91	$36.59	$50.57	$59.42

TABLE 7
THE MEDIATING EFFECT OF PERCEIVED PRIOR EXPENSES: EXPERIMENT 3

Dependent Variables	Model 1 Perceived Past Expense (PPE)		Model 2 Purchase Intention (PI)		Model 3 Purchase Intention (PI)		Model 4 Purchase Intention (PI)	
	$R^2 = 0.22$		$R^2 = 0.29$		$R^2 = 0.63$		**$R^2 = 0.67$**	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Independent Variables								
Intercept	2.311	7.84 [2]	7.729	28.99 [1]	8.893	55.19 [1]	9.266	48.12 [1]
Subject No.	0.003	1.29 [4]	-0.005	-2.06 [3]	-0.002	-1.42 [4]	-0.002	-1.64 [4]
PPE					-0.753	-28.55 [1]	-0.665	-23.39 [1]
Rehearsal	1.596	8.91 [1]	-1.935	-11.94 [1]			-0.874	-7.35 [1]
Immediacy	1.286	7.18 [1]	-1.019	-6.29 [1]			-0.165	-1.32 [4]
Recency	0.214	2.67 [2]	-0.236	-3.26 [1]			-0.094	-1.89 [4]

[1] Significant at p<.001 [2] Significant at p<0.01 [3] Significant at p<0.05 [4] Not significant

FIGURE 1
SAMPLE STIMULUS MATERIAL USED IN EXPERIMENTS 1 AND 2



TRANSACTION RECORD

DATE: XX.XX.1998
TRANS TYPE: SALE/PAY
CARD: RESEARCH/DEBIT
10056-1001R
AUTH CODE: RSCH0125
TOTAL AMOUNT: $14.50
$*****

a) Sample check.

b) Sample debit card receipt

FIGURE 2
EFFECT OF FEEDBACK AND CREDIT LIMIT ON PURCHASE INTENTION UNDER CREDIT CARD AND CHECK CONDITIONS: EXPERIMENT 1

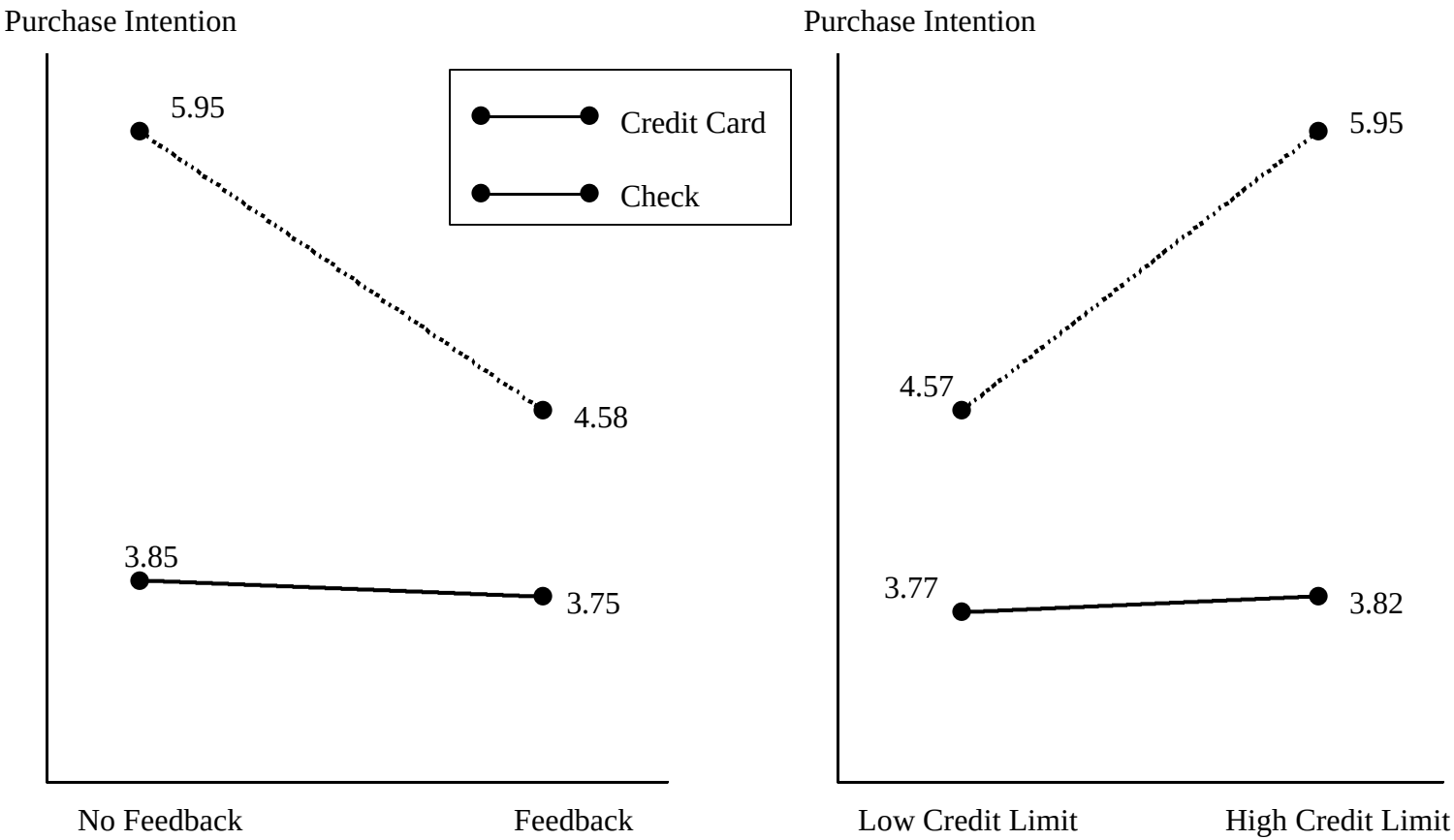
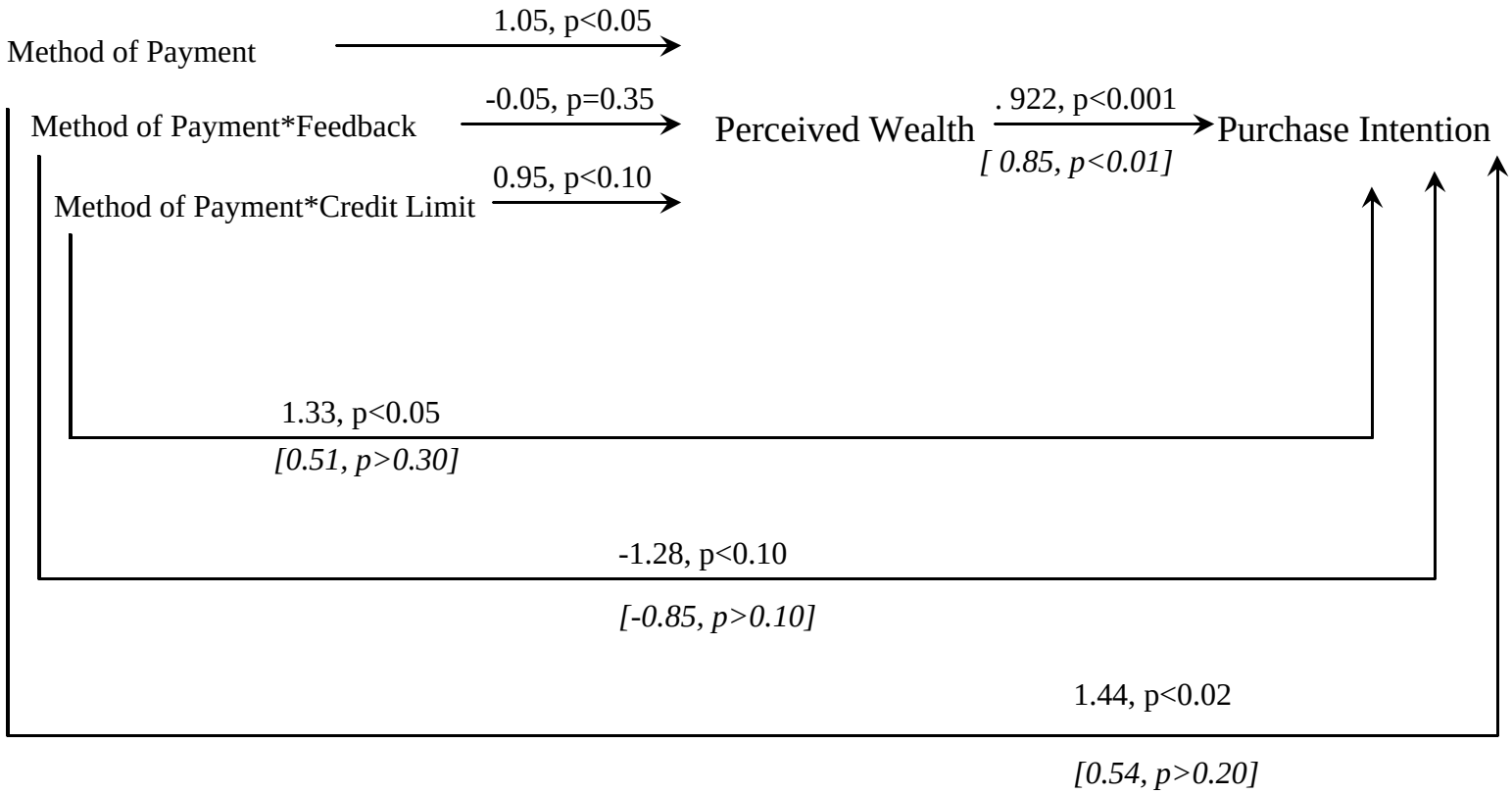
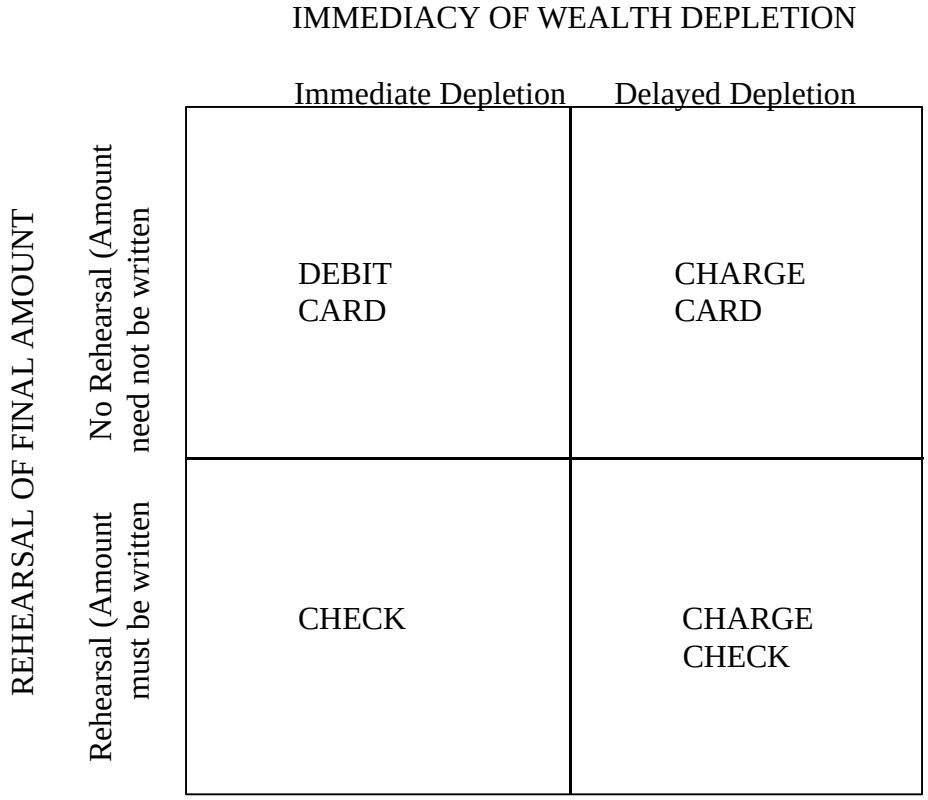


FIGURE 3
MEDIATING EFFECT OF PERCEIVED WEALTH: EXPERIMENT 1



NOTE: Only factors with significant coefficients shown. Numbers above the lines indicate regression coefficients and p-values for those variables directly connected by the arrows, numbers below the arrows are results when wealth is used as a covariate in a regression of purchase intention against the independent variables.

FIGURE 4
MANIPULATION OF REHEARSAL AND IMMEDIACY BY THE USE OF FOUR PAYMENT MECHANISMS: EXPERIMENT 2



[i] In the real world, it is likely that heavy spenders prefer to use credit cards for purchases.

[ii] We use the term in-process payments to refer to situations in which an expense has been incurred (e.g. a dinner charged to a credit card) but has not yet been paid for and the consumer's resources not yet depleted (e.g. the credit card bill is yet unpaid).

[iii] They were further told that since they were trying to pay off all debts, they normally paid off all their credit card bills (if any) by the end of the respective month.

[iv] Subjects in the check condition had to write down the amount in words and numbers while subjects in the credit card condition merely had to sign the receipt.

[v] Credit checks (or charge checks) are issued by credit (charge) cards and can be used like ordinary checking account checks. The expenses are typically charged to the cash-advance portion of the credit limit and appear on the monthly statements.

[vi] In a related vein, it could be argued that since in-store labels generally indicate the pre-tax price, a consumer is more likely to learn the pretax price while using credit or charge cards since the payment process does not provide them a chance to learn and update to the post tax price. In the research reported in this article, we control for any such tax effects by presenting prices in a post-tax format, however we do recognize that presenting pricing information in a pretax format is likely to effect the booking process to a greater degree for card purchases than for check and cash purchases.

[vii] We note that Heath and Soll (1996) used three mental accounts in their experiments. We found a significant distinction by our subjects between entertainment consumed outside home and expenses that provided leisure at home. The use of four categories of mental accounts also allowed us to do a one-to-one match between payment mechanism and category. We further note that the setting up of categories is not a crucial component of our research. We use the four categories merely as executions of a within subject design and are primarily interested in studying the effects of the payment mechanism.