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IMPACT OF FEEDBACK AND USABILITY OF ONLINE PAYMENT PROCESSES ON CONSUMER DECISION MAKING

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Abstract

Online retail sites vary in terms of payment processes that consumers encounter. Little is known about how different implementations of payment processes affect consumers. Through the lens of mental accounting research, we theorize and empirically find that implementation characteristics of usability, feedback, and rehearsal affect consumer recall of past expenses and future impulse purchase decisions. The results have implications in terms of the design of new payment systems, especially with regard to the interface that a consumer encounters in online shopping. The study, by highlighting the influence of online payment processes on consumer behavior, also raises the possibility of using payment systems as strategic differentiators in a competitive environment.

Keywords: Online payment processes, payment technologies, decision making, electronic commerce, online shopping, usability, feedback agent

Introduction

Online consumer retail sites vary in the implementations of their payment processes. We define the payment process to be everything that a consumer does or experiences after the decision to purchase has been made. Online retail sites vary in the number of steps consumers need to complete, the type of payment-related information the consumers have to provide, and the type of information they require from the consumers to verify and confirm purchases. For example, Amazon.com provides a one-click shopping environment that eliminates the cumbersome steps of authorizing payments. But one-click shopping systems also minimize customer verification and feedback of purchases which, in turn, makes it hard for the consumer to remember the amount spent at a later time. Recalling the exact amounts paid is a challenge that the modern consumer faces today both online and offline. Online payment systems can be designed to either facilitate or impede recall of payments made for different purchases.

Little is known in terms of how different implementations of online payment processes affect consumers. From a firm’s perspective, different payment processes provide added convenience to consumers which increase the chances of a purchase being made. From a consumer’s perspective different payment processes provide choice, but they may also affect accumulation of debt. A payment process affects the way consumers spend (Feinberg 1986; Soman 2001). Mental accounting research attempts to understand decision processes used by individuals to organize, evaluate, and keep track of their financial activities (Thaler 1999). When an individual makes a payment (e.g., writes a check), the cognitive processes of attention, memory, categorization, and judgment shape subsequent buying behavior (Heath and Soll 1996). This paper examines how implementation characteristics of online payment processes affect consumer recall of past expenses and, through recall, how they affect future purchase intentions.
We examine three implementation characteristics of the payment process: (1) usability of the process, (2) feedback that a consumer receives during the process, and (3) rehearsal that is induced through the process. Usability of payment process can be increased by eliminating a number of steps in the process. Elimination of steps provides added convenience to the consumer but may also reduce recall of past payments and contribute to an accumulation of consumer debt. Information systems can be designed to provide real-time feedback of past payments. Such feedback may help the consumer to reconcile payments across different purchases and aid recall of past expenses. Online payment systems can be designed to induce a rehearsal process. An individual experiences rehearsal when the amount being spent toward a given expenditure is written or typed during the payment process.

We report on an experiment in which we find both usability and feedback to have significant main and interaction effects (with rehearsal) on purchase recall. In addition, there are significant interaction effects between usability and rehearsal on impulse buying. The results indicate that when payment processes minimize effort through usability and do not require users’ to rehearse, buyers tend to indulge more on impulse purchases. Thus, an important contribution of the paper is the establishment of the link between implementation characteristics of online payment systems and buyer behavior.

Theoretical Foundations

Consumers’ Willingness to Buy Online

Previous research in IS and marketing postulates that, along with factors like trust (e.g., Stewart 2002) and certain consumer characteristics (e.g., lifestyle, Kim et al. 2000), a consumer’s positive shopping experience can significantly increase the likelihood to purchase online (Alwitt and Hamer 2000). Novak et al. (2000) find that a compelling online experience is positively correlated with recreational and experiential uses of the Web and the amount of time consumers spend online. In another exploratory study, Koufaris et al. (2001) reveal that positively challenging experiences increase consumers’ online shopping enjoyment and such enjoyable shopping increases consumers’ intentions to return to the same store.

There are at least two interdependent factors that lead to a more pleasurable online shopping experience. The first one is convenience (Bhatnagar 2000; Rust and Lemon 2001): a consumer has a more positive online shopping experience if the store is perceived to be convenient to use. The second factor is effort: a consumer tends to like the online shopping experience more if less cognitive effort is expended. Häubl and Trifts (2000) find that interactive decision aids in online stores reduce consumers’ cognitive effort, thereby increasing the quality of the consideration set. All these studies on online shopping investigate convenience and effort but do not separate the purchasing process from the payment process.

Effects of Payment Processes on Buying Behavior

Past studies in offline environments have shown that the choice of a payment system (i.e., check, credit card) has an effect on the purchase intentions and buying behavior (Soman 2001). Consumers are more likely to buy and pay more for certain products when they use a credit card. This is not only because credit cards are seen as a convenient and painless way of spending (Feinberg 1986), but also because the payment process affects recall of past expenses (Soman 2001). Certain payment processes result in consumers’ underestimating past expenditures, thereby inflating their sense of personal liquidity. As a result of this perception, consumers can end up purchasing more, particularly do more impulse buying, than what they would have done otherwise. Soman (2001) attributes this effect to the rehearsal process.

Mental Budgeting and Payment Processes

Theoretical arguments supporting the impact of payment processes on buying behavior come from the psychology of mental budgeting. Literature on mental budgeting deals with how individuals assign various transaction activities to specific mental accounts and how they monitor spending in these accounts against predetermined mental budgets (Thaler 1999). Prior studies in this field indicate that individuals track their expenses against mental budgets (Heath 1995). Transaction records can be reconstructed when the situation demands (Payne et al. 1992) or constantly updated (Heath and Soll 1996). Like financial accounting practices, the mental tracking process has two parts: (1) booking, the expenses are first noticed or recalled (reconstruction
(2) posting, booked expenses are assigned to their proper mental accounts, involving cognitive processes of similarity judgments and categorization.

In a series of experiments, Heath and his colleagues showed that posting of past expenses to mental accounts does reduce the likelihood of additional purchases in the same accounts (Heath 1995; Heath and Soll 1996). If an expense gets posted to a mental account, then future buying on the same account should go down since available funds for spending in the given mental account are now lower due to this expense. In these experiments, the concern was mainly with posting; highly salient payment processes ensured that there was always accurate booking of past payments. In the real world, however, cognitive demands associated with accurate booking can be high and may depend on the payment processes experienced by consumers. Soman (2001) argues that when rehearsal is present in a payment process, impulse buying is less since writing down the amount leaves a deeper memory trace and improves recall. In line with his findings, we hypothesize that similar results will hold in the online retail environment.

Hypotheses 1: Rehearsal in payment processes should lead to (A) greater recall of past expenses and (B) lesser impulse buying.

In the next section, we discuss how IT-enabled characteristics of payment processes can impact the cognitive processes related to recall of expenses and subsequently affect consumer impulse buying.

IT-Enabled Implementation Characteristics in Payment Processes

Feedback

In this research, we define feedback as a personalized intervention that informs the consumer about current spending as well as past expenses. Feedback is like a memory aid augmenting limited human cognitive resources. In a more technologically advanced scenario, feedback can be envisaged as a personal agent (independent of the payment process) that keeps track of all the expenses made by the consumer. Our definition of feedback is adapted from literature in behavioral decision theory, which interprets it as a means to reinforce learning by focusing on an individual’s attention to pertinent information (Einhorn 1980) and then, through learning, improve recall of an individual’s past decisions (Jones et al. 1997).

In online retail sites, as the customer proceeds to the checkout stage, several types of information are made available. With feedback (e.g., showing the amount being spent during the entire buying process), the consumer is given a chance to mentally register the amount being paid. Thus, feedback in the payment process not only improves the payment experience of the consumer by giving a convenient support function, but also allows more efficient tracking of expenses against mental budgets (thereby generating more value for the consumer).

Impulse buying is expected to go down when there is a feedback in the payment process. Feedback increases the probability of a given expense being efficiently recalled by the consumer. Although recall and posting are guided by different cognitive processes, efficient recall of past expenses improves the chances of these expenses being posted to different mental accounts. Past literature has empirically shown that there is less impulse buying when expenses are posted to mental accounts (Heath 1995). The following hypotheses follow from these observations.

Hypotheses 2: Feedback in payment processes should lead to (A) greater recall of past expenses and (B) lesser impulse buying.

Usability

Another key characteristic of payment processes is usability (Agarwal and Venkatesh 2002). In this paper, the usability of payment process refers to the number of steps in the payment process. Although usability may be defined in other ways (e.g., reduction in amount of information provided), we assume that an online payment process is more usable to a consumer when the number of steps are fewer. In a typical online shopping example, a consumer may go through a number of steps such as entering credit card details, item delivery details, personal information, and confirmation of amount to be paid. The consumer expends cognitive effort progressing through these steps. To increase usability, many Websites have eliminated these steps. An example is the one-click buying process at Amazon.com.
Fewer steps can create problems with respect to mental budgeting. When the consumer goes through the various steps, a consumer’s attention is focused on the payment and the expenditure becomes more salient. Recalling an expense involves cognitive processes of attention and memory and, when the payment process is cumbersome, the consumer pays more attention to the expenditure (Fiske et al. 1982). Some mental accounting literature has stressed that making a payment is analogous to experiencing a loss; thus the consumer may feel a pain of loss when making a payment (Prelec and Lowenstein 1998). A more cumbersome process makes the consumer pay more attention to payment (Borgida and Howard-Pitney 1983), thereby making the pain experienced more apparent and unpleasant. In contrast, if the payment process has fewer steps, the consumer can be expected to attend to the payment less and, thereby, recall less when reconstructing past expenses. As the expenses are not efficiently recalled, the chance of these expenses being posted to any mental account is also less since there cannot be any posting without the consumer first recalling (or booking) the expenses (Heath 1995). Thus, when payment processes are more usable, there should be lower recall and more impulse buying.

**Hypotheses 3:** Higher usability of payment processes should lead to (A) lower recall of past expenses and (B) greater impulse buying.

The overall model showing the relationship between the independent variables, feedback, rehearsal, and usability, and dependent variables, purchase recall, and impulse buying, is depicted in Figure 1.

![Figure 1. Theoretical Model](image)

* Affecting cognitive processes of attention
+ Affecting cognitive processes of memory
** Judgment and Categorization, not included in empirical design

**Interactions between Feedback, Usability, and Rehearsal**

Past literature in cognitive psychology has indicated that the cognitive processes behind feedback, usability, and rehearsal might be interlinked (Mitchell and Hunt 1989) and, hence, it is plausible that they will interfere with one another. Feedback relies on attention, learning, and working memory; usability on attention and effort; rehearsal relies on working memory. In our theory, memory of past expenses plays a crucial role in future consumer behavior. Since, individuals have limited cognitive capacity of memory (Baddeley 1986), it is quite likely that when more than one of these characteristics are present, individuals will have cognitive overload and they might ultimately recall, in extreme circumstances, less than they would have otherwise. In particular, when both feedback and rehearsal are present, cognitive overload is expected as they both load on to the limited working memory of an individual. So, instead of seeing a cumulative impact of rehearsal and feedback (thereby resulting in higher levels of recall and lower levels of impulse buying), we expect to see interfering effects due to cognitive overload.

**Hypotheses 4:** When both Feedback and Rehearsal are present in the payment process, there should be (A) lower recall of past expenses and (B) higher levels of impulse buying.
We expect cognitive overload when the payment process has rehearsal coupled with low usability (e.g., multiple steps in the payment process). Both rehearsal and low usability should improve recall of past expenses. But when both are present, a consumer expends too much effort to execute one single payment (i.e., not only going through multiple steps but also having to write or type the amount being paid). In such a situation, we expect interference between the cognitive processes of rehearsal and usability, resulting in cognitive overload.

**Hypotheses 5A:** When the payment process has rehearsal and low usability, recall of past expenses should not be significantly different than when there is only rehearsal or only low usability

**Hypotheses 5B:** Rehearsal and usability should have interfering effects on levels of impulse buying.

**Experiment**

**Overview**

A controlled experiment with student subjects was conducted to test the hypotheses about the effects of online payment processes on consumer recall and impulse buying. The student subject pool represents part of our targeted population of online shoppers: 95.5 percent of our student subjects had Internet experience of 5 years or more and 92.9 percent had prior online shopping experience. The main task consisted of shopping and making six purchases from an online store that sold CDs, DVDs, and books.

**Method**

**Subjects**

A total of 172 undergraduate business and economics students from a large urban university in the southwestern United States participated in the experiment. Approximately half of the subjects were males. The subjects were recruited from different classes through their professors and were awarded partial course credits as an incentive for participation. The experiment was conducted over two semesters and used students from six different classes. Of the subjects, 156 were included in the final analyses. Others were eliminated for three main reasons: (1) they gave incomplete responses, (2) they made more than six purchases, or (3) they were outliers.

**Design**

A 2×2×2 full-factorial experimental design was used. The manipulated factors were usability (many steps, one step), feedback (present, absent), and rehearsal (present, absent). The respondents were randomly assigned to one of the eight treatment conditions of the design. To keep the number of subjects roughly the same across the eight treatment groups, proportional allotment was used when allotments were made to different classes.

A fictitious online store was created for the experiment. The store was named Barnes and Nobles Jr. to avoid trust issues with respect to unknown online stores (Stewart 2002). The store sold three main categories of items: books, music CDs, and DVDs and movies. There were three subcategories within each category. There were 9 to 12 items within each of these subcategories. In total, there were 90 items—29 books, 29 music CDs, and 32 DVDs—being sold in the online store. Each subcategory was a page on the Website with items listed in random order. The item information included title, name of the author or artist depending on whether it was a book or music CD (DVDs did not have this information), picture of the cover, price, and a brief description of the item. The choice of subcategories was driven by current demographic profiles of undergraduate students in the university although no separate pilot was conducted to measure the suitability of these choices. However, to keep the list of items relevant and interesting to student subjects in general, the items within each subcategory were carefully selected from two specific lists on the Barnes and Nobles Website: “Best of 2002” and “Editor’s Picks.” The prices of items within each category were normalized around a mean to control for any price effects on dependent variables.

Eight different store fronts were built, with each version operationalizing one of the eight combinations of treatments. Usability had two levels: high and low. The level of usability was operationalized through the number of clicks needed to complete a purchase. Each click represented a step in the payment process. High usability treatment needed just one step or click to complete
a purchase. Low usability treatment had three steps to complete the purchase: (1) subjects provided a preliminary confirmation of the purchase, (2) subjects provided shipping and credit card information, and (3) subjects gave their final confirmation. Feedback and rehearsal treatments were based on Soman (2001). Feedback had two levels: present or absent. When feedback was present, the subject was reminded after each purchase the exact amount spent as well as the running total of all purchases. Rehearsal treatment also had two levels: present and absent. When rehearsal was present, the subjects were asked to type the amount they were spending to complete the purchase.

**Task and Procedure**

The experiment was administered online. The subjects had 7 to 10 days to complete the experiment. All treatments started with the same instructions. Instructions were repeated when the subjects entered the online store. The instructions asked the subjects to imagine the following hypothetical scenario (adapted from Soman 2001): they had just graduated from college and currently had a job in a renowned firm paying them $3,500 as salary per month which gave them sufficient financial ability to spend on entertainment, food, gifts, home leisure, clothing, and accessories. They not only had active bank accounts but also possessed a couple of credit cards that extended them a credit limit of $4,000 with no outstanding balances on those cards. Finally they were told that although they were quite well-off, currently they were saving money to buy a new car.

Upon asking them to imagine being in the above situation, the subjects were taken to the online store and asked to go through the contents of the store and purchase six items as holiday gifts for their near and dear ones (like their parents, siblings, girlfriends, boyfriends, etc.). Once in the online store, the subjects were free to browse any category. To make a purchase, the subjects had to click the “buy” button that triggered the payment process. Each item had to be bought separately. Thus each subject experienced the payment process six times. At the end of the last purchase, the subject was directly taken to an exit survey where there were questions designed to measure recall and impulse buying levels.

In the exit survey, subjects were asked to report whether they had talked to any other student of the class about the experiment. There were no positive responses. The technical design of the experimental Website ensured that the subjects actually went through the different stages of the payment process in the low usability treatments. Similarly, the technical design ensured that the subjects could not complete a payment without first typing the amount they were spending. The exit survey also asked whether the experimental shopping experience was similar to what subjects might have actually experienced in real-life on the Internet. Approximately 53.21 percent of the respondents recorded their experiences to be typical. The surveys also provided data on other control variables. Individual differences in age, gender, attitude towards online shopping, attitude toward credit card usage, online shopping experience and experience in using credit cards were controlled statistically.

**Dependent Measures**

**Recall:** In the exit survey, the subjects were asked to recall all of the purchases they had made along with the amounts they had paid for those purchases. The measure for recall was amount deviation, which was the absolute difference between amounts recalled and amounts paid expressed as a percentage of total amount spent. Thus the higher the values of amount deviation were, the worse the degree of purchase recall.

**Impulse Buying:** Impulse buying behavior was measured as a multivariate statistic based on the responses from five questions adapted from Soman (2001). In the first four questions the subjects were asked to express their intentions to purchase a gift for themselves given the purchases they just made at the online store. The items (a double CD, a novel, a DVD, and ticket to a musical event) either belonged to or were related to the same categories as the gifts they had just bought from the online store. The obtained responses were controlled for subjects’ propensity to buy similar items. The fifth question asked the subjects to imagine that they were at a mall to make other purchases when they noticed a boxed set of CDs by an artist they like. “It appears to be a good collection and was on sale for a price of $40. You know you don’t really crave the CDs but feel that they will be a nice addition to your CD collection” (Soman 2001). Like the first four responses, the subjects were asked to indicate their intention to buy the boxed set in a scale of 1 to 7 which ranged from definitely will not buy (coded 1) to definitely buy (coded 7).
Results

Hypotheses Tests

We first used multiple analyses of covariance (MANCOVA) to test our overall theoretical model. Then post hoc analysis of covariance (ANCOVA) and MANCOVA were carried out to test our individual hypotheses. SPSS was used to conduct the analysis. The complex higher order experimental design and limited sample size prompted the use of MANCOVA rather than structural equation modeling techniques (Kline 1998). However, we do acknowledge that some SEM techniques like PLS could have been used for a small sample like ours. We ran ANCOVA and MANCOVA instead of simple analysis of variance (ANOVA) as we expected some extraneous factors like attitudinal differences to co-vary with our dependent variables.

Overall Effects of Feedback, Usability and Rehearsal: The overall theoretical model was tested using a MANCOVA design where amount deviation and five impulse buying variables were the dependent variables, the three manipulated factors were the independent variables, and the control variables were the covariates. The results indicated significant interaction effects between usability and rehearsal (Wilkes’ $\Lambda = 0.856$, $F_{6,126} = 3.532$, $p < 0.01$). Feedback was marginally significant ($Wilkes’ ~\Lambda = 0.916$, $F_{6,126} = 1.915$, $p = 0.083$), but the interaction between feedback and rehearsal was not (Wilkes’ $\Lambda = 0.916$, $F_{6,126} = 1.769$, $p = 0.111$). The correlations between the different dependent variables are shown in Table 2. Table 1 illustrates how the manipulated factors significantly impacted the dependent multivariate statistic in spite of the insignificant correlations between recall and impulse buying variables (Table 2).

Table 1. MANCOVA Results for Model (N=156)

<table>
<thead>
<tr>
<th>Source</th>
<th>Wilkes’ $\Lambda$</th>
<th>DF</th>
<th>F</th>
<th>p</th>
<th>Power #</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feedback</td>
<td>0.916</td>
<td>6, 126</td>
<td>1.915</td>
<td>0.083</td>
<td>0.690</td>
<td>2B</td>
</tr>
<tr>
<td>Rehearsal × Usability</td>
<td>0.856</td>
<td>6, 126</td>
<td>3.532</td>
<td>0.003**</td>
<td>0.942</td>
<td>5B</td>
</tr>
<tr>
<td>Feedback × Rehearsal</td>
<td>0.922</td>
<td>6, 126</td>
<td>1.769</td>
<td>0.111</td>
<td>0.649</td>
<td>4B</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01, #Based on output generated by SPSS using alpha = 0.05

Table 2. Correlations between Dependent Variables used in MANCOVA

<table>
<thead>
<tr>
<th></th>
<th>Amount Deviation</th>
<th>Impulse 1</th>
<th>Impulse 2</th>
<th>Impulse 3</th>
<th>Impulse 4</th>
<th>Impulse 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Deviation</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulse 1</td>
<td>-.147+</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulse 2</td>
<td>-.082</td>
<td>.031</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulse 3</td>
<td>.045</td>
<td>-.059</td>
<td>.302***</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impulse 4</td>
<td>-.012</td>
<td>-.003</td>
<td>.337***</td>
<td>.344***</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Impulse 5</td>
<td>-.027</td>
<td>.013</td>
<td>.277**</td>
<td>.335***</td>
<td>.318***</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*p < 0.1, *p < 0.05, **p < 0.01, ***p < 0.001

Effect of Feedback, Usability, and Rehearsal on Recall: Hypotheses 1A, 2A, 3A, 4A, and 5A were tested using an ANCOVA design with amount deviation as the dependent variable, and feedback, rehearsal, and usability as the independent variables. The control variables were used as covariates.
Table 3. ANCOVA Results: Factors Predicting Recall (N = 156)

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>F</th>
<th>p</th>
<th>Power#</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covariates: Attitude towards credit card usage</td>
<td>1</td>
<td>4.00</td>
<td>0.047*</td>
<td>0.511</td>
<td></td>
</tr>
<tr>
<td>Business Major</td>
<td>1</td>
<td>4.34</td>
<td>0.039*</td>
<td>0.543</td>
<td></td>
</tr>
<tr>
<td>Length of Internet experience</td>
<td>1</td>
<td>4.69</td>
<td>0.032*</td>
<td>0.575</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td>1</td>
<td>5.60</td>
<td>0.019*</td>
<td>0.652</td>
<td>2A</td>
</tr>
<tr>
<td>Usability</td>
<td>1</td>
<td>4.97</td>
<td>0.028*</td>
<td>0.600</td>
<td>3A</td>
</tr>
<tr>
<td>Rehearsal</td>
<td>1</td>
<td>1.52</td>
<td>0.220</td>
<td>0.231</td>
<td></td>
</tr>
<tr>
<td>Feedback × Rehearsal</td>
<td>1</td>
<td>6.74</td>
<td>0.011*</td>
<td>0.731</td>
<td>4A</td>
</tr>
<tr>
<td>Feedback × Usability</td>
<td>1</td>
<td>0.38</td>
<td>0.540</td>
<td>0.094</td>
<td></td>
</tr>
<tr>
<td>Rehearsal × Usability</td>
<td>1</td>
<td>1.79</td>
<td>0.183</td>
<td>0.264</td>
<td></td>
</tr>
<tr>
<td>Feedback × Rehearsal × Usability</td>
<td>1</td>
<td>5.28</td>
<td>0.023*</td>
<td>0.626</td>
<td>5A (partial)</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td>133</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R squared (adjusted R squared)</td>
<td></td>
<td>0.264 (0.142)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01, #Based on output generated by SPSS using alpha = 0.05

The ANCOVA yielded significant main effects for feedback (F_{1,133} = 5.6, p < .05) and usability (F_{1,133} = 4.966, p < .05). Three of the 15 covariates—positive attitude toward using credit cards online, length of Web experience, and student major—were also found to be significant. The main effect of feedback showed that amount deviation was less in the feedback present condition (M = 22.81) than in the feedback absent condition (M = 30.42), thereby supporting Hypothesis 2A. The main effect of usability revealed that amount deviation was less when the payment process had higher clicks (M = 23.15) than when it was single click (M = 30.08), thereby supporting Hypothesis 3A. Results also revealed a significant two way interaction of rehearsal with feedback (F_{1,133} = 6.737, p < .05) and three way interactions between feedback, rehearsal, and usability (F_{1,133} = 5.281, p < .05).

To test Hypotheses 4A, Bonferroni post hoc analysis was conducted on the observed two-way interaction between rehearsal and feedback (Table 4). The results revealed that when rehearsal was absent, the amount of deviation in the feedback present condition was significantly less than in the feedback absent condition (difference = −15.813, p < .01). However, when rehearsal was present, feedback present was no different from feedback absent (difference = 2.458). Post hoc analysis also revealed that when feedback was absent, the amount of deviation in the rehearsal present condition was significantly less than in the rehearsal absent condition (difference = −14.644, p < .05) and this difference was not significant when feedback was present (difference = 3.627). Thus when both feedback and rehearsal were present, there were interfering effects on recall of past expenses, supporting Hypothesis 4A.

Table 4. Means of Amount Deviation Showing Feedback × Rehearsal Interaction

<table>
<thead>
<tr>
<th></th>
<th>Rehearsal</th>
<th>No Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Feedback</td>
<td>37.316</td>
<td>22.672</td>
</tr>
<tr>
<td>Feedback</td>
<td>21.503</td>
<td>25.131</td>
</tr>
</tbody>
</table>

Although we did not hypothesize any three-way interaction between feedback, usability, and rehearsal, Bonferroni post hoc analysis was carried out to indirectly test Hypotheses 5A (Figure 2). The results revealed that when feedback was absent and usability was high (low click), the amount of deviation in the rehearsal present condition was significantly less than in the rehearsal absent condition (difference = −25.03, p < .01). However, this significant difference disappeared when feedback was present (difference = 7.601) or usability was low (difference = −1.422) or both (difference = 1.164).

Effect of Feedback, Usability, and Rehearsal on Impulse Buying: Hypotheses 1B, 2B, 3B, 4B, and 5B were tested using a MANCOVA design in which the five impulse buying variables were entered as dependent variables, manipulated factors were entered as independent variables, and control variables were entered as covariates. The MANCOVA yielded no significant main effect. However, there was significant interaction between usability and rehearsal (Wilkes’ Λ = 0.874, F_{5,127} = 3.647, p < 0.01).
Further analysis of univariate means revealed that when there was no rehearsal, impulse buying was less in the low usability (high click) condition than in the high usability (low click) condition. However, when there was rehearsal, the results were reversed, indicating interference between usability and rehearsal, supporting Hypothesis 5B (Table 5).

Table 5. MANCOVA Results for Impulse Buying (N = 156)

<table>
<thead>
<tr>
<th>Source</th>
<th>Wilkes’ A</th>
<th>DF</th>
<th>F</th>
<th>p</th>
<th>Power#</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rehearsal × Usability</td>
<td>0.874</td>
<td>5, 127</td>
<td>3.647</td>
<td>0.004**</td>
<td>0.918</td>
<td>5B</td>
</tr>
</tbody>
</table>

*p < 0.05, **p < 0.01, #Based on output generated by SPSS using alpha = 0.05

Discussion and Limitations

The results provide support to the hypotheses on purchase recall in spite of the limited power of the tests (Hypotheses 2A and 3A). The impact of rehearsal on recall was manifested through its interactions with feedback and usability.

The results provide support on impulse buying (Hypotheses 5B). Higher usability of payment processes led to greater impulse buying when rehearsal was absent. Hypotheses 1B, 2B, 3B, and 4B gathered only partial support. Due to the strong interaction between usability and rehearsal, feedback was not found to have a significant effect on impulse buying. We attribute the lack of feedback effect on the reduced level of posting and, to a lesser extent, to the low power of our tests (see Tables 1, 3, and 5). Subjects’ postings of expenses to different mental accounts were not controlled in this experiment. Unless there is posting of expenses to mental accounts, there is no impact on future impulse buying (Heath 1995).

The results have significance for design of payment systems. A more usable payment process makes the consumer less aware about the current financial situation and leads to indulgence in greater levels of impulse buying. Presence of feedback counters some of these effects.

The limitations of this paper include the small sample size, the low power of hypotheses tests, and the use of student subjects. The lack of control over the time and space of completing the experiment is another limitation. Students were free to visit their assigned Website at a time of their own choosing. Finally, it is plausible that factors like levels of involvement (such as intensity of interest in a particular product), risks of purchase, amount spent toward each individual item, or novelty effect of our experimental setting may have influenced buying behavior in addition to the cognitive processes discussed in the study.
Implications and Future Research Directions

The results show that implementation characteristics of feedback, usability, and rehearsal impact consumers. Prior information systems literature has not isolated and analyzed the impact of implementation characteristics of payment processes. We provide a theoretical rationale for these effects. Our findings are relevant to the practice of designing and implementing payment systems. The research has special significance to the design of payment system interfaces that consumers encounter while shopping online. The results of our study also raise the possibility of using payment systems as strategic differentiators by firms. Future research directions include (1) theoretical extensions and confirmation and (2) researching other characteristics of online payment processes to understand their impact on consumer decision making.

References