Failure to replicate the credit card effect and failure to extend it to mobile payment

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Abstract: Prior research has shown that credit cards increase both the probability of spending and the spending amount. This paper attempts to replicate the effect of credit cards on the spending behavior. Given the widespread use of mobile payments in our daily life, this paper also explores whether the credit card effect can be extended to mobile payments. In a series of three studies, comprising two online studies and one lab study (total $N = 507$) conducted in the U.S. and Western-Europe respectively, we provide insight into the relationship between payment methods and impulsive buying behavior. Specifically, we fail to replicate the credit card effect using two different measures for the dependent variable, that is, willingness to pay and the number of hedonic items bought. We also fail to extend this effect to mobile payments with an analogous procedure and measure as the ones used in prior studies for credit cards.

Keywords: impulsive buying behavior, payment methods

Track: Consumer Behavior

1. Introduction

The past several decades have witnessed the rapid development and change of payment methods on the wave of technological breakthroughs. Besides the classic cash, consumers also use debit or credit cards as their payment method. More recently, computers, tablets, and smartphones have become an increasingly integral part of our lives. There is a widespread uptake of mobile payment taking advantage of a variety of smartphone apps. Meanwhile, there is no doubt that today's society has entered an age of consumption. Thanks in large part to advanced logistics and abundant information, consumers can almost purchase any desired products from all over the world anywhere and anytime. However, there are reasons to believe that convenient and effective purchase experience may trigger impulsive buying behavior.

The relationship between payment methods and impulsive buying behavior has received considerable research attention (Feinberg, 1986; Hirschman, 1979; Prelec and Simester, 2001; Raghubir and Srivastava, 2008). There is a large amount of evidence showing that credit cards increase both the probability of spending and the spending amount (Feinberg, 1986; Hirschman, 1979). Despite an extensive literature examining the relationship between payment methods and impulsive buying behavior, much of the work has focused on traditional payment methods, such as cash, debit or credit cards, and coupons, etc. To date, there is a lack of studies exploring the effect of mobile payments. This research aims to shed light on this neglected area by attempting to replicate the credit card effect and extend this effect to mobile payments. The following research questions motivate this exploration: (1) Whether the credit card effect can be replicated; (2) Whether this effect can be extended to mobile payments. The overall objective of this research is to provide insight into the relationship between payment methods and impulsive buying behavior through three studies, which use two different measures: willingness to pay and the number of hedonic items in the shopping cart.

2. Theoretical Background

2.1 Mobile payments.

Mobile payment research started soon after the first payment transaction was made with a mobile device in 1997 (Dahlberg, Guo, and Ondrus, 2015). Dahlberg, Mallat, Ondrus, and Zmijewska (2008) defined mobile payments as "payments for goods, services, and bills with a

mobile device by taking advantage of wireless and other communication technologies". According to a recent study by Cobanoglu, Yang, Shatskikh, and Agarwal (2015), there are two types of mobile payments: remote mobile payment and proximity mobile payment. Remote mobile payment (e.g., Short Message Service and PayPal) happens when there is no traditional POS system provided by receivers. Proximity mobile payment (e.g., RFID and NFC), on the other hand, facilitates transactions through POS and vending machines.

2.2 Impulsive buying behavior

Impulsive buying behavior is defined as "a sudden and immediate purchase with no pre-shopping intentions either to buy the specific product category or to fulfill a specific buying task" (Beatty and Ferrell, 1998). Prior studies investigating impulsive buying have focused mainly on two factors including individual characteristics (e.g., culture, Kacen and Lee, 2002) and environmental characteristics (e.g., atmospheric cues, Youn and Faber, 2000). As specified above, our focus will be on the effect of payment methods on impulsive buying behavior, but we will also take into account demographics, because they have been shown to play an important role in explaining impulsive buying behavior. Younger people have been found to be more impulsive and hence more likely to engage in impulsive buying behavior compared to older people (Wood, 1998). Female consumers were more likely to engage in impulsive purchases when buying symbolic and self-expressive goods concerning appearance and emotional aspects. In contrast, male consumers engaged more in impulsive purchases for instrumental and leisure goods expressing independence and activity (Dittmar, Beattie, and Friese, 1995).

2.3 The relationship between payment methods and impulsive buying behavior.

Prior studies have examined the effect of a variety of payment methods including cash, debit cards, credit cards, and gift cards on consumer behavior (Feinberg, 1986; Hirschman, 1979; Raghubir and Srivastava, 2008; Yao and Chen, 2014). Hirschman (1979) reported a significant increase in spending amount when the preferred mode of payment was a credit card as opposed to other payment methods. Subsequently, Feinberg (1986) experimentally demonstrated a substantial increase in spending amount and donation amount by merely exposing participants to credit card paraphernalia, that is, a picture of MasterCard logo was placed on the desk to participants in the credit card condition. Consistent with this literature, later studies (Prelec and Simester, 2001; Raghubir and Srivastava, 2008) have addressed a few methodological issues

existing in prior research and further supported the notion that the use of credit cards leads to increased willingness to pay and greater spending amounts.

To summarize our discussion thus far, credit cards trigger more spending behaviors and increase spending probability compared to cash (the credit card effect). As mobile payments share important characteristics with both credit cards (i.e., non-physicality) and cash (immediacy), it remains an open question whether mobile payments would enhance impulsive buying compared to cash or not. We hypothesize: H1: Compared to pay in cash, when consumers pay by credit cards, they will be more likely to engage in impulsive buying behavior. H2: Compared to pay in cash, when consumers use mobile payments, will they be more likely to engage in impulsive buying behavior?

3. Study 1

3.1 Method

One-hundred and eighty-five participants were recruited from Amazon Mechanical Turk for 1.0 dollar. Of these participants, five of them failed to pass the attention check and were excluded, leaving 180 participants in the study (89 males, 49.44%), and their age ranged from 18 to 71 (M_{age} = 35.92, SD_{age} =10.75). In order to manipulate payment methods, we adopted a similar priming method as designed by Chen, Xu, and Shen (2016). Participants were first exposed to a picture of cash, credit cards, or mobile payments depending on conditions. After viewing the picture, participants were asked to recall a recent purchase experience where they paid by corresponding methods and then write the thoughts they had when they were making the payment with an open question. They were also required to indicate how much they spent on the remembered occasion. Following the manipulation, we measured impulsive buying using a very similar task of product evaluation designed by Feinberg (1986): A company was allegedly planning to evaluate products for a better understanding of the price, the appearance, and the function. We selected the pictures of 10 products for this task. Participants were then presented with a picture of one product each time on a single page. We randomized the order of those products to rule out any unintended order effects. Upon viewing a picture, participants were asked to answer two questions on the same page. First, they were required to indicate their willingness to pay for the product. To mask our purpose, we also asked participants to indicate the most important aspect that they pay attention to when they buy corresponding products.

3.2 Results

A one-way between-subjects ANOVA on willingness to pay was completed for all products. As the analysis did not reveal a significant effect of payment methods on willingness to pay for each single product, we used the sum of 12 products to simplify the analysis. Because we selected products with a large price range, we first transformed the original data to logarithmic format and then standardized the logarithmic format. The one-way ANOVA did not show a significant main effect ($F(2,177) = 1.14$, $p = .32$) among different payment methods: cash (M = -.78, SD = 9.11), credit cards (M = 1.04, SD = 4.44), and mobile payments (M = -.29, SD = 6.48).

4. Study 2

The main aim of study 2 was to align our procedure better with the original manipulation and to add a more sensitive measure of spending behavior.

4.1 Method

Two-hundred and eleven participants were recruited from Amazon Mechanical Turk for 2.0 dollar. Of these participants, five of them failed to pass the attention check and were excluded, leaving 206 participants in the study (111 males, 53.88%), and their age ranged from 19 to 71 (M_{age} = 36.56, SD_{age} = 11.39). The procedure and measures for this study are the same as those in Study 1 except that we made some adjustments to the manipulation and added a new measure of impulsive buying behavior. We first asked participants to indicate whether they own a credit card and have already made purchases by means of the credit card. If the answer was yes, the requirement was identical to Study 1. If the answer was no, however, they were invited to imagine that they can use the credit card in the upcoming shopping trip as if they were possessing a credit card. We designed similar questions for the mobile payment condition as well. Before participants started the shopping trip, those assigned to the mobile payment condition were informed that the store accepts mobile payments, and they will pay with the app on their mobile phone. Those assigned to the cash or credit card condition were informed that they will pay in cash or by credit cards at the end of the store visit.

Following the manipulation, we measured impulsive buying behavior using two different kind of measures. First, we adopted a shopping task from Study 2 of Thomas, Desai, and Seenivasan (2011), in which participants considered 20 food products. To select utilitarian and hedonic

products, a pretest was conducted with 40 participants who did not participate in the main study. They were asked to rate both the healthiness and the impulsiveness of 30 different food products on a seven-point scale (1 = unhealthy/impulsive purchase and 7 = healthy/planned purchase). Then, we selected 10 hedonic and 10 utilitarian items based on the sum score of healthiness and impulsiveness. The selected 10 hedonic items (M = 3.28) were perceived to be less healthy than the 10 utilitarian items (M = 5.54; $t(39) = 7.45$, $p < .001$). The hedonic items (M = 3.73) were also perceived to be more impulsive than the utilitarian items (M = 5.36; $t(39) = 5.67$, $p < .001$). Participants were invited to participate in a food selection task: A large retail chain was allegedly planning to open a store in the town. In order to understand what types of products consumers buy on a typical shopping trip, the retail chain would conduct a shopping study. Participants were instructed to imagine that they were in this new store and they saw a variety of products. All participants saw 10 hedonic and 10 utilitarian products one at a time. To minimize any order effects, the product order was randomized. On the computer screen, the name of a product, the picture of a product, and the price were shown to participants. Below each picture, there were two options including "Add to shopping cart" and "No, continue shopping".

Second, participants were asked to complete a product evaluation task that was similar to Study 1. To stick closer to the original study by Feinberg (1986), we selected the pictures of 12 products for this task as the author did. Note that we selected some new products to replace the obsolete ones used in the original study. To control for unintended order effects, the products were determined randomly from one of four random orders using a random number generator.

4.2 Results

4.2.1 The first measure: willingness to pay

A one-way ANOVA using payment methods as a between-subjects factor and willingness to pay (the measure of the original paper) as the dependent variable was completed for all products. We again transformed the original data to logarithmic format and then standardized the logarithmic format to yield one measure of WTP for the following ANOVAs. The one-way ANOVA did not show a significant main effect ($F(2,203) = .23$, $p = .80$) among different payment methods: cash (M = -.50, SD = 7.96), credit cards (M = .45, SD = 9.43), and mobile payments (M = .03, SD = 7.49).

4.2.2 The second measure: the number of hedonic items in the shopping cart

As both hedonic and utilitarian items were shown to participants in the shopping trip, we conducted a two-way mixed ANOVA with payment methods as a between-subjects factor and the product type as a within-subjects factor. The two-way mixed ANOVA did not reveal a significant main effect of payment methods ($F(2,203) = .44$, $p = .65$) nor a significant interaction effect ($F(2,203) = .12$, $p = .88$). However, the main effect of product type was significant ($F(1,203) = 44.41$, $p < .001$). Specifically, participants added more utilitarian items ($M = 4.13$, $SD = 2.19$; $t = 6.67$, $p < .001$, Cohen's $d = .59$) to the shopping cart than hedonic items ($M = 2.71$, $SD = 2.60$).

Then, we conducted analyses by taking into account the number of hedonic and utilitarian items in the shopping cart, respectively. Hedonic items in the shopping cart and payment methods were submitted to a one-way ANOVA with payment methods as a between-subject factor. The ANOVA did not reveal a significant effect ($F(2,203) = .11$, $p= .90$) of payment methods among three conditions: cash ($M = 2.62$, $SD = 2.61$), credit cards ($M = 2.82$, $SD = 2.84$), and mobile payments ($M = 2.68$, $SD = 2.34$). A one-way ANOVA was conducted for utilitarian items as well, the result also did not show a significant effect of payment methods ($F(2,203) = .60$, $p = .55$).

5. Study 3

The main aim of study 3 was to align our procedure even more with the original one, and run a preregistered attempt to replicate in the lab. Based on estimated effect of the original study ($d = 0.60$) and a desired power of 0.80, we determined a sample size of n = 120.

5.1 Method

All 121 participants in this study were recruited from a Western-European student population, 40 were male (33.06%), and their age ranged from 18 to 63 ($M_{age} = 25.30$, $SD_{age} = 6.11$). We first conducted a pre-test with participants from the same population ($N = 28$) to select products. The selected 10 hedonic items ($M = 1.67$) were perceived to be less healthy than the 10 utilitarian items ($M = 5.44$; $t(27) = 28.47$, $p < .001$). The hedonic items ($M = 2.59$) were also perceived to be more impulsive than the utilitarian items ($M = 5.51$; $t(27) = 11.63$, $p < .001$). The procedure and measures are the same as those in Study 2 except that the study was run in a behavioral lab and that we also measured payment acceptability (Feinberg, 1986). Participants were asked to indicate on a five-point scale ranging from 1= highly acceptable to 5 = highly unacceptable with regards to their acceptability of using cash, credit cards, and mobile payments, respectively. More

specifically, participants were asked to respond to different types of purchase situations: 31 types of products, 9 types of stores, and 11 price levels.

5.2 Results

5.2.1 The first measure: willingness to pay

A one-way ANOVA using payment methods as a between-subjects factor and willingness to pay as the dependent variable was completed for all products. We transformed the data as we did in Study 1 and Study 2. The one-way ANOVA using the sum of 12 products as the dependent variable did not show a significant main effect ($F(2,118) = 1.62$, $p = .20$) among different payment methods: cash ($M = -.98$, $SD = 7.42$), credit cards ($M = -.63$, $SD = 7.59$), and mobile payments ($M = 1.63$, $SD = 5.97$).

5.2.2 The second measure: the number of hedonic items in the shopping cart

We first computed the number of hedonic and utilitarian items in the shopping cart for each participant. Then two measures were submitted to a two-way mixed ANOVA with payment methods as a between-subjects factor and the product type as a within-subjects factor. The two-way mixed ANOVA showed that the main effect of payment methods is not significant ($F(2,118) = 2.32$, $p = .10$). However, the results revealed a significant effect of product type on the items in the shopping cart ($F(1,118) = 61.63$, $p < .001$). Specifically, participants added more utilitarian items ($M = 4.21$, $SD = 2.01$; $t = 7.85$, $p < .001$, Cohen's $d = .94$) to the shopping cart compared to hedonic items ($M = 2.30$, $SD = 2.04$). Moreover, there was a significant interaction effect between payment methods and product type ($F(2,118) = 3.28$, $p < .05$). Further, hedonic items in the shopping cart and payment methods were submitted to a one-way ANOVA with payment methods as a between-subject factor. The ANOVA did not reveal a significant effect ($F(2,118) = .12$, $p = .89$) of payment methods among three conditions: cash ($M = 2.35$, $SD = 2.12$), credit cards ($M = 2.17$, $SD = 1.99$), and mobile payments ($M = 2.38$, $SD = 2.05$). However, the similar one-way ANOVA showed a significant effect of payment methods on utilitarian items in the shopping cart ($F(2,118) = 5.71$, $p < .005$). Participants added more utilitarian items to the shopping cart when the payment method was mobile payment ($M = 4.75$, $SD = 1.94$; $t = 3.18$, $p < .01$, Cohen's $d = .74$) and credit card ($M = 4.49$, $SD = 2.05$; $t = 2.59$, $p < .05$, Cohen's $d = .58$) than when the payment method was cash ($M = 3.38$, $SD = 1.79$). In addition, a 3 (payment methods) x 2 (gender) two-way ANOVA on the number of hedonic items revealed a significant main effect of gender ($F(2,115) = 6.18$, $p < .05$). Specifically, there were more hedonic items in

the shopping cart for the male participant (M = 2.95, SD = 2.45; t = 2.59, $p < .05$, Cohen's d = .49) compared to the female participant (M = 1.98, SD = 1.72). However, in all the other studies and for the willingness to pay in this study, there was no effect of gender, nor any interaction effects (all p's > .15).

5.2.3 Payment acceptability

We first used the mean of participants' response to different types of purchase situations as an indicator of payment acceptability. Then we performed the one-way ANOVA with payment methods as a between-subjects factor and the payment acceptability of cash, credit cards, and mobile payments as the dependent variable, respectively. The manipulation did not affect participants' payment acceptability for cash (F(2,118) = .01, p = .99), credit cards (F(2,118) = .88, p = .42) and mobile payments (F(2,118) = 1.10, p = .34). In addition, we tested whether the payment acceptability of three payment methods differed among participants. There are no significant differences between any of the scenarios: cash (M = 2.85) vs. credit cards (M = 2.73, t = -.95, p = .34), cash (M = 2.85) vs. mobile payments (M = 2.83, t = -.19, p = .85), and credit cards (M = 2.73) vs. mobile payments (M = 2.83, t = .72, p = .47).

6. Conclusion

Three studies investigated the effect of payment methods on impulsive buying behavior using two different measures including willingness to pay and the number of hedonic items in the shopping cart. The results from all these studies did not provide support for our hypotheses that credit cards would trigger impulsive buying behavior. In other words, we did not replicate the well-established credit card effect as revealed and discussed by prior studies. Also, we did not extend this effect to mobile payments with the similar procedure and measure used in prior studies for credit cards.

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