

Examining the Effect of Payment Transparency on Pain of Paying

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A Thesis from
John Molson School of Business

Presented in Partial Fulfilment of Requirements
For the Degree of Master of Science (Administration), Marketing at
Concordia University
Montreal, Quebec, Canada

August 2020

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CONCORDIA UNIVERSITY
School of Graduate Studies

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Abstract

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This article examines how payment transparency affects consumers' pain of paying and spending behaviours. Through one pilot study and two main studies, we provide some empirical evidence that low-transparency instruments do a better job of mitigating the pain of paying than transparent ones, encouraging consumers to spend more. In the pilot study, participants spent more when payment transparency decreases. However, the difference was not statistically significant. Study one replicates and supports the long-established finding that credit cards facilitate significantly more spending than cash, but no other results were found significant. Payment transparency did not have a systematic impact on consumers' willingness to pay, and the moderation role of the pain of paying was not observed. Study two provides further evidence that there is a negative relationship between payment transparency and willingness to pay. For Chinese, mobile payments promoted more spending than debit/credit cards and cash. On the contrary, for Canadians, mobile payments were not superior to debit/credit cards, but credit cards facilitated spending most. We identified that individual characteristics like debt aversion (negatively) and impatience (positively) directly impact willingness to pay. Moreover, debt aversion moderated the payment transparency effect for Chinese subjects – those with a strong debt aversion spent significantly more when using opaque payment methods than transparent ones, and those with a low debt aversion spent similar amounts regardless of payment modes. This paper contributes to the payment transparency and the pain of paying literature by investigating different payment methods, including the overlooked mobile payment, and their impact on consumers' consumption behaviours.

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Acknowledgments

Throughout my stay at John Molson Business School at Concordia University and especially when I dedicate to complete this thesis, I have received countless help of many to whom I would like to express my sincere thanks:

My supervisor, Dr. Thakor, who had been actively overseeing me from the beginning of raising a project to the very end of writing everything we have got into a paper. Although sometimes the progress did not seem satisfactory, he always tried to encourage me and showed me the way. Without his incredible accessibility and endless support, I could not finish this work by myself.

My peers, Jingning Zhang, Riya Rao, Upasana Banerjee, and Carolina Rocha. We were team members in several classes and produced so many amusing projects. The cooperation and friendship with them made my research path a precious memory.

Nima Masoumi, my partner, who has been my bay in the storm, and for his love, enlightenment, and mental support. He was the greatest source of my happiness on this academic journey.

Finally, my beloved parents, Yueming Liu and Yongmei Ma, who supported me unconditionally. They always accommodated me with love, comfort, and encouragement. Though we are on opposite sides of the Pacific Ocean, I never feel lost.

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1. Introduction

Consumers are in a world of numerous choices. There is a mass of merchandise and brands provided in the market, and even different ways of paying at the checkout counter. Unlike the early 20th century, when people were mainly dependent on banknotes, people now have plentiful options regarding payment methods such as cash, cheque, smart cards, gift cards, tokens, and electronic money (Soman, 2001). Among emerging payment methods, mobile payment is proliferating rapidly (Clement, 2019). In China, nearly 80% percent of consumers used their phones to pay in 2018 (Rooney, 2019). A market research report predicts that there will be near eight hundred million active mobile payment users in China at the end of 2020 (Luoluo, 2020). As for North American regions, people also make use of PayPal, GooglePay, ApplePay, and other equivalent platforms (MacGregor, 2020).

The standard consumer choice model assumes that consumers seek to maximize utility and minimize costs through the trade-offs. The psychological or hedonic factors should not be involved in the equation (Hands, 2010; Zellermyer, 1996). However, Prelec and Loewenstein (1998) suggest that a negative feeling – the “pain of paying” – might appear in transactions, which directs people to a choice opposite to the prediction of the traditional model (Shah, Eisenkraft, Bettman, & Chartrand, 2016). Researchers have found that the pain of paying is relatively subjective, and is affected by individual factors (e.g., debt aversion), temporal factors (e.g., time discounting), or situational factors like payment mechanism (Prelec & Loewenstein, 1998; Raghurir & Srivastava, 2008).

Early research discloses that people are prone to spend faster and spend more with the presence of credit-card-related stimuli (Feinberg, 1986; Hirschman, 1979; Prelec & Simester, 2001). Some researchers have latterly categorized this credit card effect into a more abstract and comprehensive mechanism called “payment transparency” (Soman, 2003). According to Soman, cash probably has the highest transparency due to its salient form, precise amount, and the immediate deletion of wealth (Soman & Lam, 2002). As a consequence, cash causes the most intense pain of paying during payments. On the contrary, credit cards have relatively low transparency under the same criteria because of their card format, indefinite amount of spending,

and delayed bills. Similarly, mobile payments might be more transparent than the instrument mentioned above since it is multifunctional and has a novel physical form compared to other payment methods (Pisani & Atalay, 2018).

According to payment transparency theory, less transparent means of payment are more likely to lower the pain of paying and facilitate spending than transparent ones. The salience of form and amount would be even less for mobile payment (Soman, 2003). Although numerous research has verified the “credit card premium” (Inman, Winer, & Ferraro, 2009; Rick, Cryder, & Loewenstein, 2008), the attention to mobile payments is sparse. For example, Falk, Kunz, Schepers, and Mrozek (2016) examine whether mobile payments users paid more than cash or card users. They reported a “mobile premium” over cash, which is similar to the “credit card premium” (Prelec & Simester, 2001). However, more research is needed to investigate whether the influence of new payment methods is consistent with the pain-of-payment hypothesis (Raghubir & Srivastava, 2008).

Apart from that, existing work overlooks the impact of individual differences on perceived pain of paying (Thomas, Desai, & Seenivasan, 2011). For example, consumers might have a strong aversion to debt and tend to avoid borrowing (Eckel, Johnson, Montmarquette, & Rojas, 2007; Prelec & Loewenstein, 1998; Wilcox, Block, & Eisenstein, 2011). Debt-averse people might constraint themselves from spending if the transaction puts them in debt. Some researchers also suggest that tightwads (people who have difficulty spending money) could experience a higher level of pain than spendthrifts (people who have difficulty controlling spending) when using the same payment instrument (Prelec & Loewenstein, 1998; Rick et al., 2008; Wilcox et al., 2011). Frugality is a concept similar to tightwadism, which demonstrates a trait with less compulsiveness to shopping and more consciousness to price (Lastovicka, Bettencourt, Shaw Hughner, & Kuntze, 1999). On the contrary, consumer impatience is linked to impulsive buying and rapid spending (Tobias Banaschewski, David Coghill, & Zuddas, 2018). The above two factors are likely to affect the perceived pain of paying and might confound the effect generated by the payment mechanism. The latter two factors might have an impact on willingness to pay (WTP). Considering previous research used willingness to pay as an indicator of the pain of paying, it is better to include them as covariates. Some research has discussed how

tightwad/spendthrift's trait affects one's desire to purchase vice products and preferences toward denominations (Raghubir & Srivastava, 2008; Thomas et al., 2011). However, to the best of our knowledge, other factors have not received enough attention in the literature.

Since the adoption of mobile payments and credit cards are at different stages in the world, these instruments might affect the pain of paying differently. In China, there were around seven hundred million mobile payment users in 2019, and the transaction scale of mobile payment reached nearly 55 trillion dollars in the first three quarters of 2019 (Luoluo, 2020). Paying with mobiles has become part of life for many Chinese, while the number of credit cards held per capita is only 0.47 (Iimedia, 2020). On the contrary, the credit card system has developed since the 1940s in North America, and it is highly mature now (MacDonald & Tompkins, 2017). People are used to debit/credit cards and take advantage of loyalty programs provided by banks. As a result, consumers are not motivated to use the mobile payment while the existing option is good enough (MacGregor, 2020). Therefore, people from the above two regions might spend in different ways when using mobiles or debit/credit cards. Existing research has examined the payment mechanism effect in European and North American countries where the card system is widely used (Soman, 2001, 2003), but Asian samples are rare.

In response to the above limitations, this work develops practical research built on the payment transparency theory (Soman, 2003) to examine whether less transparent instruments lead to lower pain of paying. We investigate the willingness to pay (WTP) and the pain of paying elicited by four payment methods (cash, debit cards, credit cards, and mobiles) through three studies. We look into the effect of individual differences on pain of paying and how these differences interact with the payment mechanism. We also examine whether people's pain of paying affects people's willingness to pay for merchandise. Generally speaking, this research intends to answer the following questions: Is payment transparency positively associated with WTP? Does the pain of payment mediate the effect of payment mechanism on WTP? The results for the effects of payment mechanism found so far have been based on Western samples – do these generalize to other populations, such as Asians? Do consumer characteristics and demographic factors affect the pain of paying/WTP?

This article is organized as follows. First, we provide a brief review of the pain of paying, its relationship with payment mechanism, and how individual characteristics might affect this relationship. We propose our hypotheses based on the literature review and discussion, following one pilot study and two primary studies. In the pilot study, we examine the effect of payment methods (cash, debit cards, credit cards, and mobile payment) on consumers' WTP for a product. Study one employs priming techniques to replicate the "credit card premium" findings and examines whether the pain of paying mediates the effect of payment transparency on one's spending behaviours. Finally, study two uses a scenario-based shopping context to examine whether consumers' spending (Canadians and Chinese) increases as payment transparency decreases. It also investigates whether individual differences (debt aversion, frugality, TW-ST, consumer impatience, and demographics) impact consumers' pain of paying. Contributions, limitations, and directions of future research are also discussed.

2. Theoretical background

2.1 Mental accounting

The normative consumer choice model views the cost of purchase as a forgone future utility where resources could be otherwise spent on other items (Prelec & Loewenstein, 1998). Decisions are assumed to be optimized and rational. However, consumers often behave differently from such expectations. Prospect theory proposes that people overweight gains over losses under uncertainty and make decisions dependent on references like current situations or one's wealth (Kahneman & Tversky, 1979). Reference points might change from case to case. People do not always spend all their time calculating the benefits and costs but seek a good choice with less mental efforts invested (Thaler, 1980). Therefore, consumers build cognitive references – mental accountings – to achieve the categorization and evaluation of financial outcomes (Henderson & Peterson, 1992; Thaler, 1985, 1999).

According to Thaler, mental accounting provides different references for judging gains or losses of economic activities. For example, people might purchase a discounted king-sized bedspread even though it overfits their double-sized bed. They cannot ignore this deal's attractiveness and adds it to the positive utility (Thaler, 1999). Meanwhile, the same activities

might be categorized into different accounts. In a laboratory experiment, Thaler (1985) reported that median subjects were willing to pay \$2.65 for a beer sold in a “fancy resort hotel” but to pay \$1.5 for the same beer coming from a “rundown grocery store”. People may perceive that the hotel has high operation costs than the grocery store, and they accept a price increase in a fancier place. It seems clear that consumers referred to different accounts to evaluate the fairness of the beer price.

Thaler (1983) proposes that consumers compare the actual price (p) of merchandise with their prospective price (p^*) drawn from mental accounts. When the actual cost is lower than the prospective price ($p < p^*$), consumers usually receive a pleasure; when the actual price is higher than the prospective price ($p > p^*$), consumers would experience discontent. Most often, paying and owning a product come at the same time. However, with the proliferation of credit card uses and financing, the consumption and payment in a transaction might be separated. Consumers sometimes find it hard to link the recurring costs with the benefits, especially when they do not fully exploit the merchandise (Prelec & Loewenstein, 1998).

2.2 Decoupling and Pain of paying

Prelec and Loewenstein (1998) refer to the separation of consumptions and payments as “decoupling”. As mental accounts are open when a transaction begins and closed after the transaction completes, consumers bring the accounts into minds whenever the consumption and the related payments occur (Prelec & Loewenstein, 1998; Thaler, 1999). In general, consuming something brings enjoyment while payments bring an immediate pain name “pain of paying” (Prelec & Loewenstein, 1998; Zellermyer, 1996). Ideally, consumption should be decoupled with payments that the thoughts about benefits overwhelm costs, and payments are coupled with consumption that the thoughts about costs will be cushioned by gains (Prelec & Loewenstein, 1998).

The coupling theory explains some controversial findings in decision makings. Unlike traditional economic assumes that consumers choose the marginal cost option, Prelec and Loewenstein’s model predicts that people will prefer prepayment over delay-payment and flat-rate pricing over measured pricing even if these choices cost them more. Some economical

options save money for consumers but make them experience the pain of paying each time when payments reoccur. Such pain becomes more distressing when the gains of purchased items have already reduced (e.g. an underused car) or gone (e.g. a finished trip). Similarly, Zellermayer (1996) reported that consumers prefer to clear out a lost item's debt since they will no longer benefit from it. These findings provide evidence that decoupled transactions lead to higher pain of paying.

According to Prelec and Loewenstein (1998), payment methods like credit cards naturally create coupling in transactions. When paying with cash, consumers pay immediately in exchange for the ownership of a product, and payments are linked to purchased items. However, when paying with credit cards, payments and items are not well linked that people have difficulty recalling what they have bought and what they have not paid (Prelec & Loewenstein, 1998). As a result, buying something with a credit card is not quite painful, but paying the bills at the end of each month becomes very unpleasant.

2.3 Payment transparency and pain of paying

Early research mainly focuses on the phenomenon that consumers overspend with credit cards. In one study by Feinberg (1986), he asked participants to read a booklet of several products with the credit card paraphernalia present on the table. Although researchers informed subjects that the stimuli belonged to another experiment, participants were still paid significantly more than those in the control group. Feinberg explained this result with the conditioning theory, where credit cards are mentally associated with spending. However, Hunt, Chatterjee, Florsheim, and Kernan (1990) replicated Feinberg's study and failed to find similar results. It also indicated that the conditioning hypothesis might not be the underpinning mechanism of the credit card effect.

Later, instead of comparing the WTP of each product between the manipulated and control groups, Shimp and Moody (2000) added the WTP of all the products and successfully observed the credit card effect. In this study, they also had a third group in which participants read the product booklet with credit card stimuli but filled the WTP question without the stimuli. However, the third group participants did not spend significantly more than those in the control

group, providing further evidence that the conditioning theory might not explain the credit card effect. Additionally, Shimp and Moody (2000) ruled out the weapon effect, which parallels credit cards as weapons and overspending as regressive behaviours.

From prospect theory, Tversky and Kahneman (1992) propose that people who are loss averse tend to perceive losses as more impactful than gains. In one experiment, they asked participants to choose between a sure reward of \$450 and \$1000 (or nothing) at a 50% chance. Most participants opted for the former option because the latter one came with a possible loss, which was unfavored. Although people in this experiment had a chance of winning more money, they prefer to avoid potential losses even with the price of reducing utility. Similarly, compared to using a credit card, consumers might have a stronger feeling of loss when using cash (losing tangible assets). As a result, consumers might pay less with cash to reduce losses. Loss aversion theory has also been questioned due to lack of evidence (Gal & Rucker, 2018) and applicability in small/moderate stakes (Mukherjee, Sahay, Pammi, & Srinivasan, 2017). However, the investigation of prospect theory and its effects on pain of paying is not in the scope of our study.

Apart from the investigations on credit cards, there was also a seemingly positive relationship between the utilization of cards (credit cards or store-issued certificate) and in-store expenditures, indicating that there might be a systematic difference among the means of payments (Hirschman, 1979). The proposition of pain of paying provides a comprehensive way of understanding the effect of credit cards and other payment methods on consumers' spending behaviours. Recall that consumption brings the benefits of purchase to mind while payments trigger the displeasure of financial loss (Prelec & Loewenstein, 1998). Payment methods like credit cards naturally create "decoupling". At the time of purchase, consumers are more likely to think about the benefits rather than merchandise costs and experience less pain of paying. Apart from the "coupling", there are other factors differentiating payment modes and the consequential pain of paying. For example, people tend to underestimate or often fail to recall the correct payment with credit cards (Soman, 1999), reducing the pain of paying and even encouraging future spending (Soman, 2001). Taken these findings together, Soman (2003) conceptualized "payment transparency" and decomposed it into three primary elements: the physical form, the salience of the amount spent, and the timing of payments.

In Soman's model, cash is the most transparent instrument considering its tangible form, salient payment amount, and immediate outflow of money. When considering cash as a baseline, debit cards are less transparent because the physical form becomes card instead of paper, and spending is not as clear as cash. Nevertheless, money is still taken away from the bank account at the time of purchase. On the contrary, bills come up to one month later than consumption when using a credit card to pay. Therefore, credit cards should be less transparent than both cash and debit cards. Soman (2003) conducted three field studies in which participants used prepaid cards or credit cards in paying photocopies, laundry, or groceries. In all three scenarios, subjects had a higher likelihood or amount of spending when using less transparent instruments. Raghubir and Srivastava (2008) reported similar results in a series of controlled experiments. Compared to cash, participants spent more when using credit cards and gift certificates. These findings provided further evidence that payment transparency was positively associated with the pain of paying and, consequently, affected consumers' spending behaviours.

Apart from debit/credit cards and cash, consumers nowadays also use their phones to pay. Relying on platforms like Apple Pay, PayPal, or Alipay, people could go shopping cashless or even card-less. Mobile payments are probably less transparent than credit cards because of their unique form, multifunctionality, and lower salience of payment amount compared to other instruments (Pisani & Atalay, 2018; Soman, 2003). Falk et al. (2016) showed that participants perceived mobile payment less transparent than credit cards and cash. In one study, they asked subjects to shop a list of 11 products in a simulated supermarket with either mobile, credit cards, or cash. They found a "mobile premium" over cash similar to the "credit card premium". Additionally, participants in the mobile condition spent slightly more than those in the credit card condition. Also, Pisani and Atalay (2018) found that mobile phones and watches generate lower pain of paying than credit cards. Taking into account the findings discussed so far, we propose hypotheses as follows,

- H1:** One's willingness to pay will decrease as payment transparency increases, such that,
- (a) debit/credit cards and mobile payment encourage more spending compared to cash;
 - (b) mobile payment facilitate more spending than debit cards and credit cards;
 - (c) credit cards promote more spending than debit cards.

H2: The pain of paying mediates payment transparency's effect on consumers' spending behaviours, such as the willingness to pay.

2.4 Individual characteristics and pain of paying

The pain of paying shares similarities with physical pain and psychological pain. In an in-depth interview, Zellermayer (1996) found that participants disliked payment when they could not control the costs, when they could not justify the expenses against gains, or when the spending had no end. He also indicated these descriptions shared similarities with feelings reported by subjects in physical-pain experiments. Knutson, Rick, Wimmer, Prelec, and Loewenstein (2007) provided further evidence with fMRI scan that pain of paying activates the insula in the brain, which is associated with physical pain and anticipating loss. Meanwhile, Mazar, Plassmann, and Robitaille (2016) reported that participants primed with psychological pain showed significantly lower WTP than those primed with physical or neutral pain. These studies suggest that the pain of paying might be a mix of corporal distress and adverse feelings. As a result, such pain can be relatively subjective. Researchers have identified several factors altering the pain of paying, such as the fairness of transactions, the judgment of purchases (investment vs. consumption), and temporality or coupling of payments (Prelec & Loewenstein, 1998; Soman, 2001; Zellermayer, 1996). Although the price of products matter in perceived pain of paying, it is not the most influential determinant (Zellermayer, 1996).

Similarly, personal traits might also affect to what extent consumers feel painful in a transaction. For example, consumers who habitually spend more might generally perceive paying less painful than those who have difficulty letting go of money (Prelec & Loewenstein, 1998). Rick et al. (2008) develop and validate a spendthrift-tightwad (ST-TW) scale, categorizing consumers into two groups. In one study, they showed that spendthrifts were more likely to pay for a leisure massage than tightwads, and tightwads found paying more painful compared to spendthrifts. Their findings suggest spendthrifts might generally experience low pain of paying while tightwads feel high pain of paying in the same circumstances. Frugality is a concept similar to tightwadism (Lastovicka et al., 1999), which refers to a lifestyle of acquiring only the necessary resources and economically utilizing existing resources. Preston, Kringsbach, and

Knutson (2013) argues that tightwadism is related to the pain of paying, but frugality is associated with the "pleasure of saving". Therefore, frugality should not impact one's pain of paying and willingness to pay. In summary, spendthrifts might be less sensitive to the payment mechanism's effect since they perceive less pain of paying naturally. On the other hand, tightwads feel more pain-when spending money and might need more justifications for the purchase. Less transparent payment methods like debit/credit cards and mobiles might reduce such pain and lead to higher spending for tightwads. Meanwhile, we will include frugality as a covariate in the model to examine its relationship with tightwadism and the pain of paying.

H3: The effect of payment transparency on pain of paying will be stronger for tightwads than spendthrifts.

Meanwhile, consumers might have debt aversion, which affects one's prepayment decision and restrains one from fully employing credit cards (Eckel et al., 2007; Prelec & Loewenstein, 1998). Therefore, a debt-averse person is less likely to borrow for unforeseen expenses, to keep the debt in the account for a long time, or to overspend with credit cards (Eckel et al., 2007; Wilcox et al., 2011). Debt-averse consumers might refrain from using non-transparent payment methods like credit cards and mobile pay because these instruments might put one in debt. Moreover, debt aversion also augments self-control over constraining impulsive buying (O'Curry, 2003; Wertenbroch, Soman, & Nunes, 2001). Debt-averse consumers might need more justifications for purchase as they are under the pressure of self-control. Less transparent payment modes like credit cards reduce the pain of paying, reducing one's control over impulsiveness (Thomas et al., 2011).

H4: The effect of payment transparency on pain of paying will be more noticeable for debt-averse consumers than those with low debt aversion.

Apart from debt aversion, situational factors like time proximity can also induce impatience and reduce self-control (Hoch & Loewenstein, 1991; McLeish & Oxoby, 2007). According to Hoch and Loewenstein, the near enjoyment of smoking cigarettes is overwhelmingly appealing to some people. However, when this reward is presented with another

reward, such as being healthy, people can make a more rational choice. In the psychology field, impatience is also associated with impulsive behaviours, such as a higher likelihood to buy or higher willingness to pay (Tobias Banaschewski et al., 2018). Cultural factors would also change one's impatience level in general. For example, H. Chen, Ng, and Rao (2005) show that Singaporeans primed with Western cultures are more likely to discount the future (be less patient) than those primed with Eastern cultures. Westerners tend to invest more money to achieve preferable outcomes, while Easterners prefer to prevent undesirable results (H. Chen et al., 2005). Therefore, a chance of purchasing something now might look more attractive to North American than to Asians. Overall, impatient consumers have less self-control power and might focus more on enjoying upcoming consumption benefits. They might pay less attention to the costs of obtaining a product, resulting in less pain of payment and a higher willingness to pay. The above effect might be stronger for North American samples. However, considering H. Chen et al. (2005) used the same population (Singaporeans) to prime Western/Eastern cultures, their findings may or may not hold for distinct populations (North Americans and Asians). We intend to explore the effect of cultural factors on consumers' impatience level and pain of paying but do not feel the existing theory gives us sufficient guidance to propose a hypothesis. Primarily, we will include consumer impatience as a covariate.

H5: Compared to patient consumers, impatient consumers would show a higher willingness to pay for an upcoming purchase.

3. Pilot study

The study attempts to replicate the well-established findings that consumers spend more when using a credit card than using cash (Feinberg, 1986; Hirschman, 1979). Another objective of this study is to examine whether payment transparency is positively associated with willingness to pay (Soman, 2003). The study employs a scenario-based method adopted from existing literature (Chatterjee & Rose, 2011; R. Chen, Xu, & Shen, 2017; Raghuram & Srivastava, 2008). As such a method has not been used for investigating mobile payment and its relationship with one's willingness to pay (WTP), it is necessary to evaluate the feasibility of the methodology and adjust accordingly before the full-scale study.

3.1 Method

The study is a single factor (Payment Methods: cash vs. debit cards vs. credit cards vs. mobile payment) between-subject design. Participants were asked to complete a survey regarding their WTP for a product and spending habits. Two hundred and seventy-one Canadian MTurk workers (male = 158 and female = 113, average age = 30.60) participated in the study for a small payment. Subjects first saw a screening question stated that "are you familiar with mobile payment? (e.g., apple pay, android pay, or other similar payment methods) ". Those who chose "yes" were assigned to the mobile payment condition and chose "no" were randomly assigned to the other three conditions. When the count of mobile payment condition was met, the rest of the participants would be sent to other conditions regardless of their response to the screening question.

Though the online recruitment method is as valid as standard sampling (Casler, Bickel, & Hackett, 2013), MTurk workers have access to the internet. They might answer questions based on other information out of the manipulation context. Therefore, it might be better if the stimuli are relatively new or fictitious products that participants would not find online easily. Apart from that, the stimuli are chosen based on two primary criteria: utilitarian and gender-neutral. As consumers need proper justifications for hedonic products (Okada, 2005), they are likely to feel more painful paying for that and react differently to the payment mechanism's effect. Gender-specific products are also excluded because most female participants do not need male products and vice versa. Based on these factors, a magnetic power bank was chosen as the stimuli in this study.

Similar to Chatterjee and Rose (2011) experiment, participants saw a magnetic power bank's picture and its product description with the price (\$29.99). The price was the same as its official price on the page of Kickstarter.com. A short scenario follows: "The power bank [Juice Card] is available in a nearby store that you frequently visit. For some reason, the store only accepts [cash/debit card/credit card/mobile payment]." Considering participants might not pay enough attention to the keywords of payment method as the survey was online, we strengthened the manipulation by adding a picture showing a hand either handling cash, or tapping debit/credit cards, or tapping a phone corresponding to the condition (R. Chen et al., 2017). A minimum

screen time was not set for the manipulation page. It might trigger adverse feelings such as impatience that causes the survey's discontinuation or the biased evaluation for the product.

Then participants indicated their WTP based on the information provided and proceeded to the demographic questions, including gender, age, and income level. The manipulation test was a single choice question at the end of the survey. The first one asked that "for some reason, the store you frequently visit only accepts which payment method?". Participants should choose the correct answer from cash, debit cards, credit cards, and mobile payments. The attention test required subjects to select the magnetic power bank's suggested price from \$19.99, \$29.99, \$39.99, and \$49.99.

3.2 Analysis and results

3.2.1 Data purification

The purification takes several steps. Firstly, one hundred and five surveys that were incomplete or completed within one minute were eliminated. Secondly, we examined the frequency histogram along with Q-Q plots and removed thirteen outliers. Thirdly, forty-two participants who failed to pass the manipulation test or attention test were not included in the data analysis. Finally, we excluded the data of three participants who did not own a credit card in the corresponding condition. In the end, we had 108 valid responses (65 male and 43 female, average age = 33.43) with 27 in the cash condition, 24 in the debit card condition, 27 in the credit card condition, and 30 in the mobile payment condition.

3.2.2 Payment transparency and WTP

A one-way ANOVA revealed no significant relationship between payment transparency and WTP ($F_{3,104} = .69$, $p = .559$). The independent t-test between the cash and the credit card condition indicated an insignificant result ($t_{52} = -1.49$, $p = .142$). To some degree, the trend of WTP across the four payment instruments was as expected – the average amount of spending increased from cash ($M_{cash} = 23.94$) to debit cards ($M_{debit} = 25.36$) and then credit cards ($M_{credit} = 26.37$). Mobiles ($M_{mobile} = 25.65$) generated higher WTP compared to cash but were not superior versus debit/credit cards. Considering some participants in the mobile payment

condition might not actively pay with their phones, we ran another one-way ANOVA analysis, which included only the other three conditions. Again, the results were not significant ($F_{2,75} = 1.08, p = .342$).

3.3 Discussion

In this study, the preliminary outcome shows that payment transparency might be positively associated with the pain of paying created by common instruments like cash and debit/credit cards. However, the difference in spending was not statistically significant, possibly due to the low price of stimuli. From the face validity and empirical evidence (Zellermayer, 1996), a cheap product should lead to generally lower pain of paying. In this case, consumers might not need justifications for the purchase and would pay for the suggested price.

Apart from that, several issues appeared in the study. First of all, the screening question failed to rule out the inactive mobile payment users. The majority of subjects perceived themselves as familiar with mobile payment, but they might only have heard about it or seen someone else use it. On the other hand, subjects might think they should answer “yes” to be eligible for the main study, even though they were supposed to say “no”. As we stated before, those unfamiliar with mobile payment would be assigned to the other three conditions. However, this display logic could risk exposing the study's real purpose and cause demand characteristics.

Secondly, the study's scenario might trigger negative feelings because the store only accepts a particular payment method in each condition. It is imaginable that sellers only take cash or debit/credit cards in some convenience stores. However, a scenario in which a store only accepts payment through mobile pay might not be realistic. Any negative feelings that result might decrease consumers' overall perception of the store and reduce willingness to pay. Finally, it might be argued that willingness to pay may not be a good measure of pain of paying. In the next study, we will address these issues using less obtrusive manipulation and measuring the pain of paying directly.

4. Study one

The directional increase of willingness to pay was found in the pilot study, but the difference was not significant. In general, the power bank was a relatively cheap product (\$29.99), and consumers are less likely to feel pain when purchasing it. This study intends to test the payment transparency's effect on willingness to pay with a less obtrusive approach – priming techniques. Also, we want to examine whether pain of paying mediates the above effect. Our investigation focuses on comparing cash, debit cards, and credit cards. Another objective of this study is to examine the effect of individual differences on pain of paying and willingness to pay. As we hypothesized before, the payment transparency effect should be stronger for debt-averse consumers than those with low debt aversion and stronger for tightwads than spendthrifts. Finally, impatient consumers incline to spend more than patient ones.

4.1 Method

The study is a single factor (Payment Methods: cash vs. debit cards vs. credit cards) between-subject design. One hundred and forty-one Canadian MTurk workers (male = 81 and female = 60, average age = 27.11) participated in the study for a small payment. They were randomly assigned to one of the three conditions of the payment mechanism.

Participants were asked to "recall a situation when you were using [cash/a debit card/a credit card] to make a purchase." A picture of either handing cash or tapping debit/credit cards was attached in line with the condition. They were not asked to describe the purchase. Then participants saw the image of a 20-inch suitcase and its brief description. The suggested price (CAD127.88) of the product was also given. This product was chosen according to the same criteria stated in the pilot study (utilitarian and gender-neutral). The price was selected as it was in the medium range of pricing in Canada's carry-on luggage market. A stimulus priced too low or too high might have an impact on price fairness perceptions. Following the manipulation, participants were asked to indicate "what is the maximum price you would be paying for this luggage." and then chose "how painful was it to pay for the luggage" (7-point Likert type scale 1 = very painless to 7 = very painful).

Then participants answered a set of questions related to individual characteristics. Debt aversion was measured with seven items like “do you have a credit card” or “do you pay off your credit card balances each month” (1 = No and 0 = Yes) (Eckel et al., 2007). We employed the frugality scale developed by Lastovicka et al. (1999) (7-point Likert type scale, 1 = strongly disagree to 7 = strongly agree). TW-ST scale was taken from Rick et al. (2008) (3 items, score classification scale, score 4 to 11 = tightwads, score 12 to 18 = unconflicted consumers, score 19 to 26 = spendthrifts). Finally, the consumer impatience scale was adopted from a study conducted by H. Chen et al. (2005). Specifically, participants were asked to “imagine that you are purchasing a novel online from a local retailer now. You can receive the book in five business days with the standard delivery, or receive it in one day if you pay \$6.59 delivery fee.” Then, they answered two questions examining their impatience level: “Right now, I would like to get a copy of the novel as quickly as possible” and “Buy now, get it instantly’ describes how I feel about the novel at this moment” (7-point Likert type, 1 = strongly disagree to 7 = extremely willing). All the questions related to individual characteristics were randomized to minimize the order effect.

The manipulation and attention test at the end was similar to the previous study, but with different criteria. For example, as for the question asking the suggested retail price of the stimuli, both \$100 or \$130 were allowed correct answers because one might perceive \$127.88 similar to either choice. The end of the survey was about mobile payment awareness, including familiarity, use of frequency, and means of payment (through credit cards, debit cards, or other third-party platforms like PayPal).

4.2 Analysis and Results

4.2.1 *Payment transparency and WTP/pain of paying*

The data purification was similar to that done for the pilot study. We removed six surveys that were completed within three minutes (the estimated finish time was fifteen minutes). Then eight outliers were eliminated using histograms and Q-Q plots. Finally, fifty-four participants who failed to pass manipulation or attention test were excluded. We got 73 valid responses (male = 48 and female = 25, average age = 34.17) with 22 in the cash condition, 19 in the debit card condition, 32 in the credit card condition.

A one-way ANOVA with payment methods (independent variable) and willingness to pay (dependent variable) revealed insignificant results ($F_{2,70} = 1.86$, $p = .164$). The planned contrast showed that participants were willing to spend more when using a credit card than using cash ($M_{credit} = 109.47$, $M_{cash} = 93.49$; $t_{52} = -1.849$, $p = 0.07$). No other outcome was found significant. Another one-way ANOVA was conducted with payment methods (independent variable) and the pain of paying (dependent variable). No significant results were found in the overall model and the planned contrasts. However, there was a marginally significant outcome between the credit card and the cash condition ($t_{52} = 1.695$, $p = 0.096$). See table 1 for the mean value of the pain of paying and the willingness to pay in the three conditions.

Table 1 The Pain of Paying and Willingness to Pay in Different Payment Groups (Study One)

Payment Methods	Pain of Paying	Willingness to Pay (CAD)
Cash	4.91 (SD = .97)	93.49
Debit cards	4.63 (SD = 1.42)	100.10
Credit cards	4.38 (SD = 1.24)	109.47

4.2.2 Reliability of measures

Debt aversion had a relatively low-reliability level (*Cronbach's* $\alpha = .45$). The correlation matrix for seven items showed that two items were poorly correlated to other items. An exploratory factor analysis further revealed that this scale could extract two components – the aversion to using credit cards and the aversion to borrowing from a financial institution. Since this paper's primary topic is on the payment mechanism side, items related to the first factor were used to measure the debt aversion. Spearman's correlation showed that these two items were significantly correlated (*Correlation Coefficient* = .45, $p < 0.01$). The reliability tests for other scaled covariates were acceptable: frugality (*Cronbach's* $\alpha = .70$) and consumer impatience (*Cronbach's* $\alpha = .82$). Similar to the classification used by Rick et al. (2008), we classified 60 participants into tightwads (scores = 4 to 11), and others were all unconflicted consumers (scores = 12 to 18). No participant was considered spendthrift (scores = 19 to 26).

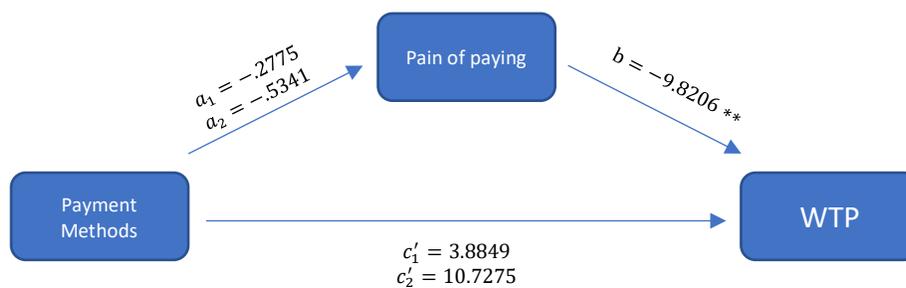
4.2.3 Covariates and moderators

The ANCOVA analysis revealed that neither individual characteristics (frugality and consumer impatience) nor demographic factors (age and income) were significant in the model ($F_{WTP(8,64)} = .75, p = .65$; $F_{pain\ of\ paying(8,64)} = .84, p = .57$). To test H3, we conducted a two-way ANOVA with payment transparency and debt aversion as the independent variables, both of which were categorical. No main effect and interaction were significant ($F_{payment\ transparency(2,67)} = .20, p = .82$; $F_{debt\ aversion(1,67)} = .08, p = .78$; $F_{pt*da(2,67)} = 2.10, p = .13$). To test H4, we conducted another two-way ANOVA with payment transparency and tightwadism as the independent variables (categorical). The results revealed insignificant main effects and interaction ($F_{payment\ transparency(2,67)} = 1.89, p = .16$; $F_{twst(1,67)} = .22, p = .64$; $F_{pt*twst(2,67)} = 1.06, p = .35$).

4.2.4 Mediation analysis

Using SPSS PROCESS V3.5 by Andrew F. Hayes, a model treating the pain of paying as the mediator of payment methods and WTP was tested. The results revealed that there was no direct main effect nor mediation effect ($F_{2,70} = 1.26, p = 0.29$), but the pain of paying had a significant negative relationship with WTP ($t_{72} = -3.55, p < 0.01$) (see figure 1).

Figure 1 The Mediation Diagram (Study One)



4.3 Discussions

This study replicates the findings that credit cards facilitate spending compared to cash. A mere recall of a recent purchase with a credit card buffered the pain of paying. However, credit cards did not lead to more spending or less pain of paying than debit cards, and debit cards were

superior to cash. Although the pain of paying had a direct effect on the willingness to pay, there was no mediation effect nor direct effect from payment transparency to participants' willingness to pay. These results partially support the hypothesis one. Meanwhile, TW-ST and debt aversion's moderating roles were not confirmed, which did not support hypotheses two and three. Consider that Chatterjee and Rose (2011) used a camera as stimulus (\$367.77 with an optional 2-year warranty at \$69.99) and revealed the significant difference in spending across payment mechanisms. The main effect might be more noticeable when selected products have a higher price and larger price variations like cameras. This study's sample size is also a bit small, possibly reducing the statistical power.

On the other hand, using the techniques for the mobile payment investigation might not be ideal. Around half of the participants indicated that they only knew a little about, or had never heard of mobile payments, and only a few people actively used it in daily life. It might be meaningless asking people to recall a recent purchase with mobiles when they have little or no experience with it. Therefore, a scenario-based context might be more suitable for the next study. Another issue that appeared in this study was that some items of the debt aversion measure are related to credit cards, causing the potential risk of exposing the research's real purpose. In the next study, we will try to solve these issues.

5. Study two

This study's objective is to examine the effect of four payment methods (cash, debit/credit cards, mobile payments) on willingness to pay and whether pain of paying mediates the effect. We also investigate whether the payment transparency effect applies to the Eastern population as existing research has done experiments mostly with the Western population (Raghubir & Srivastava, 2008; Soman, 2001). Furthermore, this study aims to explore how individual characteristics affect one's pain of paying and willingness to pay in two regions (Canada and China). As discussed before, the payment transparency effect should be stronger for debt-averse consumers than those with low debt aversion and stronger for tightwads than spendthrifts. Also, impatient consumers tend to have a higher willingness to pay than patient ones. This study uses a scenario-based manipulation similar to that in the pilot study. We

changed the wording to avoid negative feelings that might be induced by the context. Credit cards related questions were relocated to reduce the risk of revealing the real purpose of the research.

5.1 Method

The study is a single factor (Payment method: cash vs. debit cards vs. credit cards vs. mobile payment) between-subject design conducted with participants from two regions (China and Canada). One hundred and ninety-eight Canadians (male = 101, female = 97, average age = 27.03) were recruited from MTurk for a small payment. They were randomly assigned to one of the four payment method conditions. We selected a floor cleaning robot as the stimuli in this study. This product accords with the selection criteria stated before (utilitarian and gender-neutral). Furthermore, it has an overall higher value and price variations compared to the magnetic power bank or the carry-on luggage. Therefore, the variations on WTP or the pain of paying might be larger and more significant than those in the previous two studies.

The survey was translated into the Chinese language for Chinese subjects. Ten native speaker reviewers checked the translation, and the author revised the survey according to their general advice. Two hundred and ninety-seven Chinese workers (Male = 184, Female = 113, Average age = 25.1) from Tencent Survey participated in the study for a small payment. The cleaning robot's price was calculated based on the average currency exchange rate of the month (1 CAD = 5.31 Chinese Yuan), which was ¥1736.12 with an optional warranty at ¥343.70. The procedure was the same as that used for Canadian subjects in this study.

Participants first saw a picture of the floor cleaning robot and read a brief description of it. Similar to the method used by Chatterjee and Rose (2011), the suggested price of the product was given (\$326.77) with an optional two-year extended warranty at \$64.85. The presence of a warranty price could strengthen the manipulation, such that the WTP given by participants would have more variations. Additionally, the product's cost was of the medium range in the product category in both China and Canada, giving people an idea of the average price for such a product. The pictures of either handling cash, tapping debit/credit cards or mobiles were attached after the product description according to the condition. A scenario followed as "The product is

available now in the local stores. For some reason, you are considering purchasing one with [cash/a debit card/a credit card/mobile payment]".

In the next step, participants were asked to indicate their WTP for the stimuli in dollar value, and how painful it was to pay (Liker-type scale, 1 = very painless, 7 = very painful). Then they filled out questions related to debt aversion, frugality, and ST-TW. The questions were the same as in study one, except that items regarding credit cards were moved to the end of the survey to reduce the risk of revealing the research purpose. Similar to the method used by H. Chen et al. (2005), an online book shopping context came with one question asking how willing participants were to pay for the one-day premium delivery fee (Likert type scale, 1 = extremely unwilling, 7 = extremely willing). All the items related to individual characteristics were randomized to minimize the order effect. The rest of the survey consisted of the same sections as those in study one: mobile awareness (the familiarity with mobile payments, the frequency of use, and the payment mechanism) and the demographic information (gender, age, and income level).

5.2 Analysis and Results

5.2.1 Payment transparency and WTP/Pain of paying

The data purification was similar to study one. For Canadians, seven surveys completed within three minutes were eliminated. Four outliers were removed from the data. Seventy-four participants failed to pass the manipulation test or attention test. Fifteen participants who did not own a credit card or did not use mobile payment in life were excluded, leaving 98 Canadian subjects (Male = 50, Female = 48, Average age = 28.40). For Chinese, eight surveys completed within three minutes were eliminated. Twenty-five outliers were removed from the data. Two hundred and twenty-eight participants failed to pass the manipulation test or attention test. Twenty-six participants did not own a credit card in the corresponding condition, leaving a sample of one hundred and thirty-two (Male = 94, Female = 38, Average age = 25.1). In general, Chinese workers were less attentive to the survey and were less likely to own credit cards than Canadians.

Table 2 shows the number of subjects in each condition after the screening process. The ANOVA analysis demonstrated that payment methods significantly affected WTP for both Canadian ($F_{Canada (3,94)} = 6.43, p < 0.01$) and Chinese samples ($F_{China (3,128)} = 3.23, p < 0.05$) (see figure 2). Specifically, the Chinese spent significantly more than Canadian participants ($WTP_{Canada} = 239.92, SD_{Canada} = 90.07; WTP_{China} = 281.95, SD_{China} = 77.93; F_{1,228} = 8.31, p < 0.05$). In general, participants aged between 25 to 34 had a stronger WTP than those aged over 45 (see figure 3).

Payment methods did not impact Canadian subjects' pain of paying ($M_{Canada} = 4.73, SD_{Canada} = 1.79, F_{Canada (3,94)} = 1.15, p = .335$), even if we excluded the mobile payment condition ($M_{Canada'} = 4.78, SD_{Canada'} = 1.77, F_{Canada' (2,84)} = 1.48, p = .234$). On the contrary, payment methods had a marginal effect on Chinese subjects' pain of paying ($M_{China} = 4.55, SD_{China} = 1.07, F_{China (3,128)} = 2.14, p = 0.098$), and this effect became stronger when the mobile payment condition was excluded ($M_{China'} = 4.52, SD_{China'} = 1.12, F_{China (2,95)} = 2.79, p = 0.066$).

Figure 2 The Effect of Payment Methods on WTP

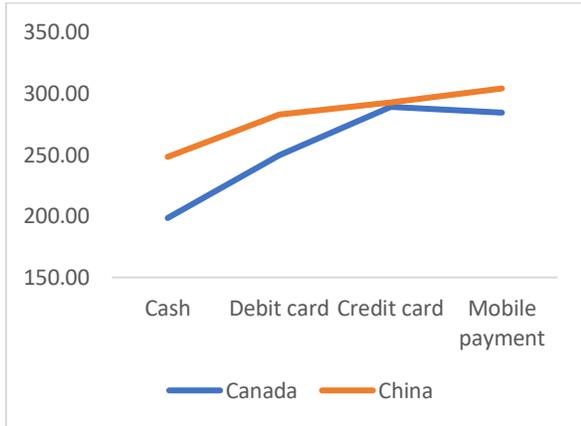


Figure 3 WTP in different age groups

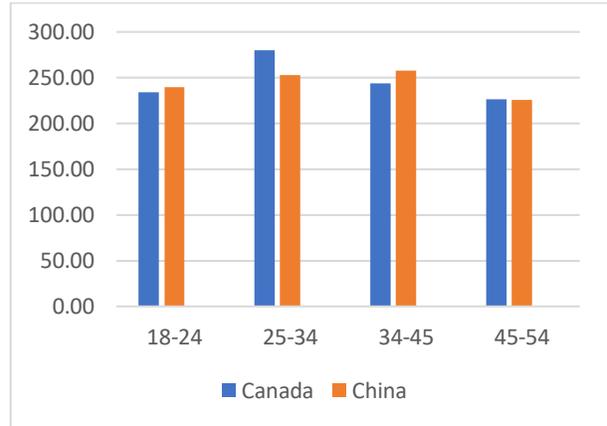


Table 2 The Number of Subjects in Each Condition after Data purification

	Cash	Debit Cards	Credit Cards	Mobile Payment
Canada	29	29	29	11
China	32	37	29	34

5.2.2 Covariates and moderators

The ANCOVA analysis was implemented for both groups. For Canadian participants, age, income, frugality, and consumer impatience as covariates were not significant ($F_{age(1,88)} = .28$, $p = .60$; $F_{income(1,88)} = .04$, $p = .84$; $F_{frugality(1,88)} = .00$, $p = .98$; $F_{impatience(1,88)} = .06$, $p = .82$). In general, debt aversion was negatively associated with WTP ($F_{1,93} = 6.30$, $p < 0.05$) and positively connected to the pain of paying ($F_{1,93} = 5.58$, $p < 0.05$) (see figure 4 and figure 5). To test H3, we conducted a two-way ANOVA with payment transparency and debt aversion as the independent variables, both of which were categorical. There was a main effect of payment transparency on willingness to pay ($F_{payment\ transparency(3,80)} = 3.65$, $p < 0.05$). The main effect of debt aversion and the interaction were not significant ($F_{debt\ aversion(4,80)} = 2.00$, $p = .10$; $F_{pt*da(4,80)} = 2.00$, $p = .10$). To test H4, we conducted another two-way ANOVA with payment transparency and tightwadism as the independent variables (categorical). The results revealed insignificant main effects and interaction ($F_{payment\ transparency(3,87)} = 1.63$, $p = .18$; $F_{twst(2,87)} = 2.00$, $p = .14$; $F_{pt*twst(2,67)} = 1.06$, $p = .35$). The simple planned contrast revealed that participants paid more when using debit/credit cards or mobile payments than cash (see table 3). Additionally, the planned difference contrast showed that debit cards ($WTP_{debit\ cards} = 249.47$) facilitated more spending than cash ($WTP_{cash} = 198.38$), but less spending than credit cards ($WTP_{credit\ cards} = 288.93$). Meanwhile, mobile payment ($WTP_{debit\ cards} = 284.10$) was not superior to other payment instruments except cash (see table 3).

Figure 4 The Effect of Debt Aversion on WTP



Figure 5 The Effect of Debt Aversion on Pain of Paying

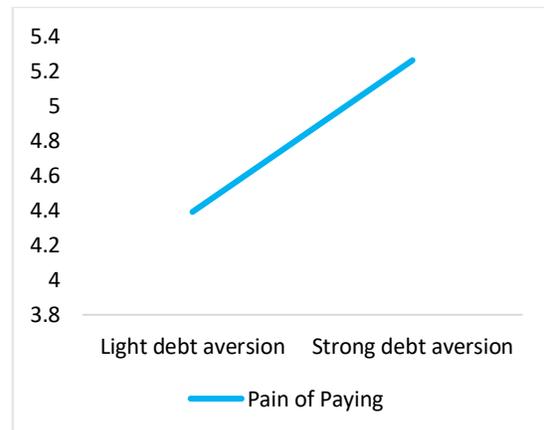


Table 3 The Planned Contrasts of WTP for Canadian Samples (A vs. B)

	Difference (A – B)	WTP
The simple planned contrasts		
Debit cards vs. Cash	49.49 (SD = 21.30)	$p < 0.05$
Credit cards vs. Cash	90.02 (SD = 21.30)	$p < 0.01$
Mobile payments vs. Cash	84.59 (SD = 28.72)	$p < 0.01$
The difference planned contrasts		
Credit cards vs. Debit cards	65.27 (SD = 18.44)	$p < 0.01$
Mobile payments vs. Credit Cards	38.09 (SD = 25.95)	$p > 0.05$

For Chinese participants, ANCOVA analysis showed that consumer impatience had a positive relationship with WTP ($F_{1,122} = 9.97, p < 0.01$) (see figure 6). Age, income, and frugality did not impact the payment transparency effect ($F_{age(1,122)} = 1.85, p = .18; F_{income(1,122)} = 3.48, p = .15; F_{frugal(1,122)} = .01, p = .91$). In general, debt aversion was negatively associated with WTP ($F_{4,112} = 2.31, p = 0.063$) and positively associated with pain of paying ($F_{4,110} = 2.63, p < 0.05$). To test H3, we conducted a two-way ANOVA with payment transparency and debt aversion as the independent variables, both of which were categorical. The main effects and interaction were significant ($F_{payment\ transparency(3,112)} = 3.09, p < 0.05; F_{debt\ aversion(4,112)} = 2.31, p = 0.063; F_{pt*da(12,112)} = 1.79, p = 0.058$). Participants with strong debt aversion spent more when using phones for mobile payment than when using debit/credit cards or cash (see figure 6). To test H4, we conducted another two-way ANOVA with payment transparency and tightwadism as the independent variables, both of which were categorical variables. The main effect of tightwadism was significant ($F_{twst(2,120)} = 3.24, p < 0.05$). No other results were found significant ($F_{payment\ transparency(3,120)} = 1.33, p = .27; F_{pt*twst(6,120)} = .42, p = .86$).

Finally, the planned simple contrasts revealed that only mobile payments ($WTP_{mobile\ payments} = 303.91$) facilitated more spending than cash ($WTP_{cash} = 248.22$). Cards ($WTP_{debit} = 282.65, WTP_{credit} = 292.52$) were not significantly superior to cash (see table 4). The planned difference contrasts indicated that mobile payment facilitated more

spending than other payment methods (see table 4). See table 5 for the average pain of paying/willingness to pay in the two countries.

Table 4 The Planned Contrasts of WTP for Chinese Samples (A vs. B)

	Difference (A – B)	WTP
The simple planned contrasts		
Debit cards vs. Cash	-0.97 (SD = 23.42)	p > 0.05
Credit cards vs. Cash	25.43 (SD = 23.96)	p > 0.05
Mobile payments vs. Cash	54.82 (SD = 19.94)	p < 0.01
The difference planned contrasts		
Credit cards vs. Debit cards	25.91 (SD = 21.86)	p > 0.05
Mobile payments vs. Credit Cards	46.67 (SD = 16.36)	p < 0.01

Table 5 The Average Pain of Paying and Willingness to Pay in Different Payment Groups (Study Two)

Payment Methods	Pain of Paying	Willingness to Pay (CAD)
Canada		
Cash	5.24 (SD = 1.64)	198.38
Debit cards	4.55 (SD = 1.70)	249.47
Credit cards	4.55 (SD = 1.94)	288.93
Mobile payment	4.36 (SD = 1.91)	284.09
China		
Cash	4.44 (SD = 1.37)	238.22
Debit cards	4.84 (SD = .76)	282.64
Credit cards	4.21 (SD = 1.15)	292.52
Mobile payment	4.65 (SD = .91)	303.91

Figure 6 The Effect of Consumer Impatience on WTP

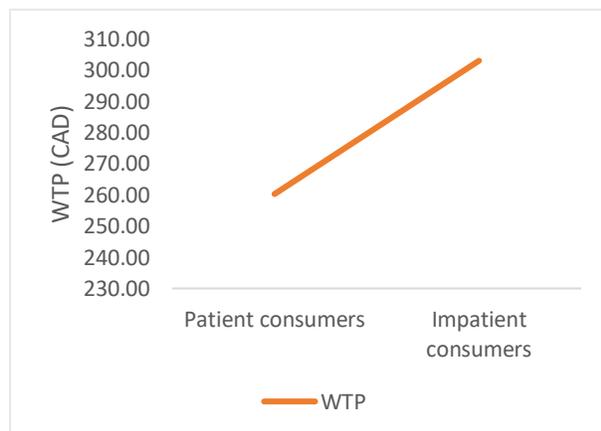
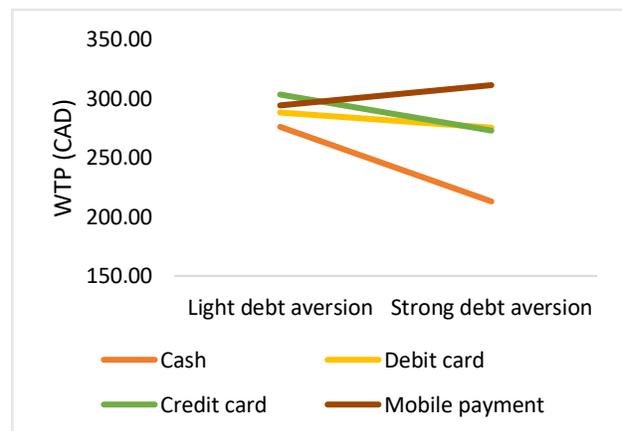
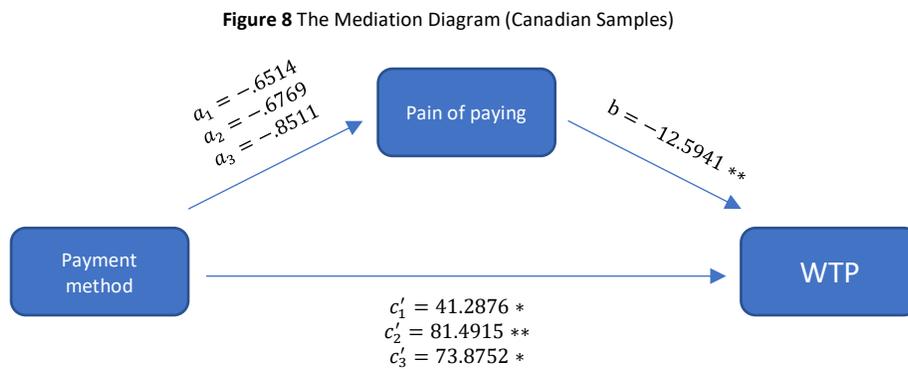


Figure 7 The Moderation Role of Debt Aversion

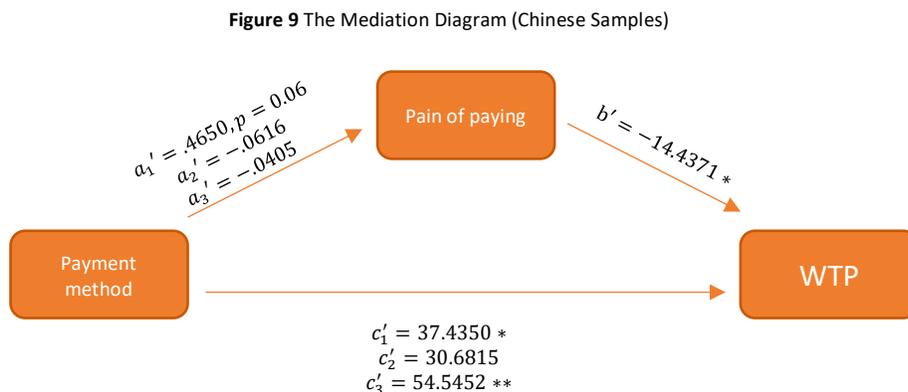


5.2.3 Mediation analysis

Using SPSS PROCESS V3.5 by Andrew F. Hayes, a model treating the pain of paying as the mediator of payment methods and WTP was tested. For the Canadian model, debt aversion was also included as a covariate. The results revealed no mediation effect because payment mechanisms did not significantly impact the subjects' pain of paying ($t_{debit\ card\ (97)} = -1.44$, $p = 0.15$; $t_{credit\ card\ (97)} = -1.50$, $p = 0.14$; $t_{mobile\ (97)} = -1.40$, $p = 0.17$). Nevertheless, there was a negative relationship between pain of paying and willingness to pay ($t_{97} = -2.66$, $p < 0.01$). (See figure 8)



For the Chinese model, we include debt aversion, consumer impatience, and income as covariates. The results showed that pain of paying partially mediated the effect of debit cards on WTP at a marginal significance level ($t_{debit\ card\ (131)} = 1.88$, $p = 0.062$) (see Figure 9). Other payment methods did not significantly affect the pain of paying ($t_{credit\ card\ (118)} = -.22$, $p = 0.83$; $t_{mobile\ (118)} = -.58$, $p = 0.57$). Again, pain of paying was negatively associated with willingness to pay ($t_{118} = -2.08$, $p < 0.05$).



5.3 Discussion

By investigating how payment transparency affects one's willingness to pay and the pain of paying in two geographical and culturally different samples (Chinese and Canadians), this study provides evidence regarding the generalizability of payment transparency theory (Soman, 2003). In general, the results partially support hypothesis one. Less transparent instruments like debit/credit cards and mobile payments generated a higher willingness to pay than cash, which is considered the most transparent payment mode. However, mobile payments did not facilitate more spending compared to debit/credit cards for Canadians, and debit/credit cards were not superior to cash for Chinese participants.

Meanwhile, debt aversion was an important covariate that accounts for a significant number of variations in the model. This factor also moderated the impact of payment modes on pain of paying (Chinese) when considering buying a relatively expensive product. These findings partially support hypothesis three. On the other hand, tightwadism neither had a direct effect on willingness to pay or the pain of paying, nor did it interact with payment mechanisms, providing no support to hypothesis three. Finally, in the Chinese sample where the measure was used, impatient consumers spent more than patient ones, supporting the fifth hypothesis.

6. General discussion

This work has three primary hypotheses: (1) payment transparency is positively associated with the pain of paying; (2) the tightwad/spendthrift trait moderates the main effect; (3) individual characteristics have a direct impact on pain of paying. One pilot study and two main studies were conducted to test these hypotheses. We manipulated payment transparency via payment method (cash, debit cards, credit cards, and mobile payments.) using a shopping scenario and asked subjects to indicate their willingness to pay. In general, participants' spending increased as payment transparency declined, but mobiles pay and credit cards performed differently in the two countries. For Canadian participants, debit/credit cards and mobiles were superior to cash in encouraging spending. However, mobile payment did not facilitate significantly more spending compared to debit/credit cards (see table 3). However, considering that we were able to obtain only eleven valid surveys in the mobile payment condition with Canadian subjects, more research is needed on mobile payments. On the other hand, in the

Chinese sample, debit/credit cards did not significantly promote more spending than cash, but mobile payment did (see table 4). These results partially support the first hypothesis and demonstrate that the payment transparency effect might vary due to the adoption of payment methods in a region. See table 5 for the summary of hypotheses and results.

Table 6 Hypotheses Tested in Each Study and Results

Hypotheses	Study	Results	Notes
H1: The pain of paying will decrease as payment transparency increases.	Pilot study, study one, and study two	Partially supported in all three studies	Directional increase of WTP was found ($W_{cash} < W_{debit\ card} < W_{credit\ card} < W_{mobile}$)
H2: The pain of payment mediates the effect of payment transparency on consumers' willingness to pay.	Study one and study two	Partially supported in study two	The mediating role of pain of paying was found for debit card payment (Chinese)
H3: The effect of payment transparency on pain of paying will be stronger for tightwads compared to spendthrifts.	Study one and study two	Rejected in both studies	No evidence to support this hypothesis
H4: The effect of payment transparency on pain of paying will be more noticeable for debt-averse consumers than for those with low debt aversion.	Study one and study two	Partially supported in study two	The variance of WTP across payment methods is larger for debt-averse Chinese consumers
H5: Compared to patient consumers, impatient consumers would show a higher willingness to pay for an upcoming purchase.	Study one and study two	Partially supported in study two	Impatient Chinese consumers spend more than patient ones

Apart from the main effect of payment transparency, the second study also revealed that debt aversion had a direct positive impact on pain of paying. Debt-averse participants (both Canadians and Chinese) paid significantly less for a product than others. For Chinese subjects,

debt aversion also moderated the impact of payment transparency on pain of paying. Specifically, Chinese participants who had low debt aversion paid a similar amount for the stimuli regardless of the payment method designated. At the same time, the debt-averse subjects preferred to reduce spending as payment transparency increases (see figure 7). These results provide some evidence for the fourth hypothesis. Although we employ the self-control theory to explain the moderation effect, further investigation might be needed to re-test these findings. On the other hand, no direct impact nor moderation was found related to the tightwad-spendthrift trait, so the second hypothesis was rejected. Rick et al. (2008) categorize people into tightwad, unconflicted, and spendthrifts based on scores. However, in practice, we noticed that most people obtained scores that classified them as tightwads or unconflicted while few were spendthrifts. The lack of variance in the samples might have caused the failure of moderation analysis. Finally, study two showed that other individual characteristics might also affect one's pain of paying. For example, impatient Chinese participants spent significantly more than patient ones.

To explain the different main effects of payment transparency in the two countries, we want to discuss the adoption rate and the decoupling effect. As we mentioned earlier, China has widely adopted mobile payments, while North America is slowly accepting it (Clement, 2019; Rooney, 2019). With supporting equipment for mobile payment ubiquitous in stores, Chinese consumers might have better experience paying with a phone. Additionally, most Chinese subjects indicated that they used third-party platforms like Alipay or WeChat Pay, where people deposit money in a virtual account for later use. As Prelec and Loewenstein (1998) propose, consumers have a subjective definition of payment timing. Some people might consider the deposit of money as the act of payment and might already experience the pain of paying. Therefore, they would use the money in the virtual account more generously, treating it like "monopoly money" (Prelec & Loewenstein, 1998; Raghurir & Srivastava, 2008).

Compared to mobile payments, Canadians were more familiar with credit cards. Most surveyed Canadian participants owned at least one credit card, while nearly half of the Chinese participants did not own one. Many Chinese have first embraced mobile payments and then get to employ credit cards. As a result, the Chinese might not be impressed by the convenience of

credit cards. It is also worth mentioning how credit cards work differently in the two countries. Canada has mature tapping technology with micropayment so that the payment happens in the blink of an eye. On the contrary, the same operation requires three steps in China – insert or swipe cards, input passwords, sign the owner's name – to finalize the process, resulting in inconvenient payment experience. Password input and card swipe action are needed for any debit/credit cards, making credit cards not much different from debit cards in China, whereas mobile payment is far easier to use.

7. Contributions

7.1 Theoretical contributions

Theoretically, this paper replicates and supports the previous findings that consumers spend more when using a credit card than cash (Chatterjee & Rose, 2011; Feinberg, 1986; Hirschman, 1979). Specifically, credit cards facilitated more spending for Canadian consumers than for Chinese consumers. Apart from that, we also identified an important factor – debt aversion – affecting pain of paying. Firstly, debt aversion had a direct impact on participants' willingness to pay, such that debt-averse consumers generally preferred to spend less money on a product. Secondly, the moderation role of debt aversion was found for Chinese but not for Canadian subjects. Chinese participants with high levels of debt aversion spent less with transparent payment methods, while those who had no debt aversion spent similar amounts regardless of payment modes. These outcomes accord with the self-control explanation that less transparent payment modes like credit cards would reduce one's control over impulsive shopping (Thomas et al., 2011). Though we argue that impatience is also related to weaker self-control power, the reasons these individual characteristics affect consumers' spending habits might need further investigation and clarification.

This work also provides some empirical evidence that mobile payment has low transparency and promotes spending. A few studies have paid attention to how this new payment method affects one's pain of paying compared to other payment methods. For example, Falk et al. (2016) found no difference in spending between debit/credit cards and mobiles. In our studies, the payment transparency effect seems less noticeable when the product's price is relatively low,

like in the pilot study and the first study. Falk et al. (2016) gave participants a small budget of either \$40 or \$50. They also did not include any covariates like individual characteristics and demographical factors so that the authors might have overlooked the mobile effect over debit/credit cards. More importantly, Chinese participants spent significantly more when using mobiles than other payment methods, but North American participants did not behave in the same way. The ease of use might be an important factor affecting the perceived transparency of a payment mode and then change one's spending behaviors. For example, people might spend significantly more with a phone in a mobile pay-friendly market. In contrast, people would pay more with a card if it is easier to use. Nevertheless, further research is needed to test the mobile payment effect.

Finally, we found that impatient Chinese participants paid significantly more than patient ones. This spending behaviour matches with the self-control model proposed by Hoch and Loewenstein (1991). When a reward (e.g. pleasure of consuming a product) is imminent, people are likely to be impatient and have a strong desire to obtain it. Research in psychology also indicated that impulsiveness is associated with impatience (Tobias Banaschewski et al., 2018). Meanwhile, less transparent payment methods reduce the pain of paying, providing further support to impulsive purchase.

7.2 Methodological contributions

First of all, the first study used a less obtrusive priming method than the shopping scenario with a designated payment method, providing firmer support to the credit card effect. Instead of asking participants to imagine purchasing products with a credit card, a recall of a recent purchase using a credit card also affects the pain of paying in an unrelated purchase (R. Chen et al., 2017; Raghurir & Srivastava, 2008). Secondly, we tried to verify the boundaries of the payment mechanism effect by including stimuli from different types and price ranges. For example, the pilot study showed that payment transparency did not significantly affect participants' willingness to pay for a \$29.99 power bank. We used a \$127.88 20-inch suitcase in study one, and only credit cards marginally promoted spending. Conceivably, power banks and suitcases are the types of products for which the amount consumers expect to pay does not vary much. Therefore, consumers might be unwilling to pay more even if the payment method has

low transparency. However, using a more expensive product – a cleaning robot in the second study – leads to significant results consistent with the payment transparency theory. These results suggest that price range might affect the effect size of the payment transparency effect, but further examination is needed to test this hypothesis.

7.3 Managerial implications

The results from three studies suggest that Chinese and Canadian retailers should adopt different strategies for installing in-store mobile payment machines. Most Chinese consumers are familiar with mobile payment and actively use it through platforms like Alipay or WeChat pay. However, quite a lot of them do not own a credit card. Therefore, managers in China could consider employing mobile payment paraphernalia to encourage consumers to use mobile payment and spend more on the merchandise. For example, retailers could install payment machines or use their phones as payment receivers to support whoever wants to pay with a cellphone. They could also display mobile payment logos around cashier or showcase to remind consumers of mobile payment. On the contrary, many North Americans are not actively participating in mobile payment transactions. There is no evidence that they would spend more using a phone than a credit card. Study two showed that Canadian consumers are more used to the bank card payment system and are more likely to overspend while using a credit card. Therefore, Canadian retailers might consider paying more attention to providing credit card payment options.

8. Limitations

Though the paper intends to examine if consumers' pain of paying rises as the payment transparency declines, the sample size for the mobile payment condition was small (Canadian). Most surveyed participants had rarely used mobile payment or had only heard about it. Besides, Chinese subjects might not be good representatives of the population because most of them are young, aged 18 to 25. It might be better for future research to go through the screening process to find active mobile pay users and then follow up with the main study some days/weeks later. Meanwhile, participants did not pay for the product in our studies, which might reduce our study's external validity. Future research could consider conducting a quasi-experiment in stores

or collect secondary data from supermarkets to examine how payment transparency affects the pain of paying in reality. Furthermore, it seems that the main effect's strength becomes more potent as the product's price increases. Researchers could employ a factorial experimental design with payment methods and price range to further explore the boundary of the payment transparency effect. As the usage of cash or close human contact has been significantly restricted due to Covid-19, further studies are not possible.

According to Soman (2003), payment transparency changes consumers' pain of paying, and the latter factor is tightly associated with consumers' spending behaviours. However, we only identified the direct negative impacts from the pain of paying and payment transparency to participants' willingness to pay. Payment transparency did not significantly change participants' pain of paying. It would be better to employ laboratory experiments and let participants make actual purchases (e.g. incentive-compatible BDM method).

9. Future research

There are also other directions to go. Firstly, R. Chen et al. (2017) showed that people primed with credit cards constructed abstract thoughts belonging to higher construal levels. Those primed with cash formed concrete ideas of lower construal levels (Trope & Liberman, 2010). They also argued that pain of paying and construal levels might interact and affect each other. People feeling pain in purchase might pay more attention to price, and then thoughts about price lead to lower construal levels. It would be interesting to explore the relationship between the pain of paying and the construal level theory. Secondly, our study shows that impatient Chinese consumers spent significantly more when using a credit card or a phone. These behaviours are associated with impulsiveness (Tobias Banaschewski et al., 2018), and in turn, credit cards could also trigger impulsive shopping (Thomas et al., 2011). Future research could examine the interactions between payment methods and impulsive behaviours.

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Appendix

Appendix A – Measures

A.1 Willingness to Pay

Questions	Coding	References
Pilot study - “Considering the information provided, how much are you willing to pay for a Juice Card in this store?”	Record the price (CAD)	Adapted from Chatterjee and Rose (2011)
Study one – “Considering the product information, what is the maximum price you would be willing to pay for this luggage?”		
Study two – “Considering the given information, how much are you willing to pay for the cleaning robot?”		

A.2 Pain of Paying

Questions	Coding	References
Study one – “How painful would it be to pay for the luggage?”	1 = very painless 2 = painless 3 = somewhat painless 4 = neither painful nor painless 5 = somewhat painful 6 = painful 7 = very painful	Adapted from Rick et al. (2008)
Study two – “How painful would it be to pay for the cleaning robot?”		

A.3 Debt Aversion Scale

Questions	Coding	References
1. “If you had to make an unexpected expenditure today of <u>\$500</u> or more, would you use a credit card?” 2. “If you had to make an unexpected expenditure today of <u>\$5000</u> or more, would you use a credit card?”	0 = yes 0.5 = maybe 1 = no	Adapted from Eckel et al. (2007)

A.4 Tightwad-Spendthrift Scale

Questions	Coding	References
<p>1. “Some people have trouble limiting their spending: they often spend money - for example on clothes, meals, vacations, phone calls - when they do better not to. Other people have trouble spending money. Perhaps because spending money makes them anxious, they often don't spend money on things they should spend it on.</p> <p>a. Do you have trouble controlling your spending?</p> <p>b. Do you have trouble spending your money?”</p>	<p>1 = never 2 = rarely 3 = sometimes 4 = often 5 = always</p>	
<p>2. “Mr.A and Mr.B are on a shopping spree at a local mall. When they enter a large department store, they see that the store has a "oneday-only-sale" where everything is priced 10-60% off. Mr. A realizes he doesn't need anything, yet can't resist and ends up spending almost \$100 on stuff. Mr. B figures he can get great deals on many items that he needs, yet the thought of spending the money keeps him from buying the stuff.</p> <p>In terms of your own behavior, who are you more similar to, Mr.A or Mr.B?”</p>	<p>1 = Mr.A 3 = around the same or neither 5 = Mr. B</p>	<p>Adapted from Rick et al. (2008)</p>
<p>3. “Which of the following description fit your better?”</p>	<p>1 = tightwad (difficulty spending money) 6 = around the same or neither 11 = spendthrifts (difficulty controlling spending)</p>	

The sum of scores categorization

4 – 11: tightwads

12 – 18: unconflicted

19 – 26: spendthrifts

A.5 Frugality Scale

Questions	Coding	References
<p>1. "If you take good care of your possessions, you will definitely save money in the long run."</p> <p>2. "There are many things that are normally thrown away that are still useful."</p> <p>3. "Making better use of my resources makes me feel good."</p> <p>4. "If you can re-use an item you already have, there's no sense in buying something new."</p> <p>5. "I believe in being careful in how I spend my money."</p> <p>6. "I discipline myself to get the most from my money."</p> <p>7. "I am willing to wait on a purchase I want so that I can save money."</p> <p>8. "There are things I resist buying today so I can save for tomorrow."</p>	<p>1 = strongly disagree 2 = disagree 3 = somewhat disagree 4 = neither agree nor disagree 5 = somewhat agree 6 = agree 7 = strongly agree</p>	<p>Borrowed from Lastovicka et al. (1999)</p>

A.6 Consumer Impatience Scale (Study One)

Questions	Coding	References
<p>"Imagine that you are purchasing a novel online from a local retailer now. You can receive the book in five business days with the standard delivery, or receive it in one day if you pay \$6.59 delivery fee. Answer the following questions based on your preferences.</p> <p>1. Right now, I would like to get a copy of the novel as quickly as possible.</p> <p>2. Buy now, get it instantly' describes how I feel about the novel at this moment."</p>	<p>1 = strongly disagree 2 = disagree 3 = somewhat disagree 4 = neither agree nor disagree 5 = somewhat agree 6 = agree 7 = strongly agree</p>	<p>Adapted from H. Chen et al. (2005)</p>

A.7 Consumer Impatience Scale (Study Two)

Questions	Coding	References
<p>“Imagine that you are purchasing a novel online from a local retailer now. You can receive the book in five business days with the standard delivery, or receive it in one day if you pay \$6.59 delivery fee. Answer the following questions based on your preferences.</p> <p>1. Are you willing to pay for one-day delivery of the book rather than wait for the standard shipping period?”</p>	<p>1 = extremely unwilling 2 = unwilling 3 = slightly unwilling 4 = neither willing nor unwilling 5 = slightly willing 6 = willing 7 = extremely unwilling</p>	<p>Adapted from H. Chen et al. (2005)</p>

A.8 Attention Check

Questions	Responses	References
Pilot study – “What is the suggested retail price of the Juice Card?”	<p>A = \$19.99 B = \$29.99 C = \$39.99 D = \$49.99</p>	N/A
Study one – “What is the suggested retail price of the luggage?”	<p>A = Around \$70 B = Around \$100 C = Around \$130 D = Around \$160</p>	
Study two – “What is the suggested retail price of the cleaning robot?”	<p>A = Around \$100 B = Around \$200 C = Around \$300 D = Around \$400</p>	

A.9 Manipulation Check

Questions	Responses	References
Pilot study – “For some reasons, the store you visit frequently only accepts which payment method?”	A = Cash B = Credit card C = Debit card D = Mobile payment	N/A
Study one – “You were asked to recall a situation where you made a purchase with which payment method?”		
Study two – “You were considered to purchase an Amos with which payment method?”		

Appendix B – Scenarios

B.1 – Pilot Study

Product description	Manipulation	References
<p>“The Juice Card is a certified wireless charging battery pack by EXO. The juice card is of 5000mAh and weighs 134g. It’s compatible with most of the existing devices in the market, including the Air Pod Pros. You can charge up to two devices at the same time, conveniently and fast. One device wirelessly and the other device by the included cable. You can also use a car vent clip for hands-free charging while driving.”</p> 	<p>“The Juice Card is available in the store you visit frequently. For some reasons, the store accepts [cash/debit card/credit card/mobile] payment only.”</p> 	<p>Adapted from Chatterjee and Rose (2011); R. Chen et al. (2017)</p>

B.2 – Study One

Manipulation	Product description	References
<p data-bbox="201 310 724 415">“Recall a situation when you were using [cash/debit card/credit card/mobile] to make a purchase.”</p> 	<p data-bbox="764 310 1300 743">“This is a piece of 20-inch spinner luggage for weekend gateways or as an international carry-on. It has a protective hardshell with scratch-resistant finish, fully lined interior with divider, 150D polyester interior organizer with 3 zippered pockets for conveniently storing smaller items. This luggage can be expandable for up to 15% additional packing capacity and it has 4 double spinner wheels to ensure smooth-rolling mobility in any direction.</p> <p data-bbox="764 785 1300 852">The suggested retail price for this product is \$127.88”</p> 	<p data-bbox="1344 575 1479 827">Adapted from Chatterjee and Rose (2011); R. Chen et al. (2017)</p>

*The manipulation came before the product description

B.3.1 – Study Two (Canada)

Product description	Manipulation	References
<p data-bbox="201 1281 776 1713">“The picture below shows a sweeping robot from Amos. Amos can suck dirt, dust, and hair from hard floors and carpets. The full suite of sensors intelligently navigates the robot under and around the furniture to help thoroughly clean your floors. The robot can also cross the thresholds at your home with ease. The suggested retail price for this product is \$326.77 (Note: retailers can set price higher, equal, or lower to this price), with an optional two-year extended warranty at \$64.85.</p> 	<p data-bbox="803 1281 1297 1423">“Amos is available now in the local stores. For some reason, you are considering to purchase an Amos with [cash/debit card/credit card/mobile].”</p> 	<p data-bbox="1344 1465 1479 1717">Adapted from Chatterjee and Rose (2011); R. Chen et al. (2017)</p>

B.3.2 – Study Two (China)

Product description	Manipulation	References
<p>“下图展示了一款来自Amos的扫地机器人。Amos可以从坚硬的地板或地毯上吸取灰尘和头发。全套传感器智能地引导机器人在家具下方和周围进行彻底清洁这款机器人也可以轻易跨过家里的门槛等地面障碍。该产品的建议零售价为1736.12元，（注意：零售商可以将价格设置为高于，等于，或低于此价格）并有344元的2年延保服务供您选择。”</p> 	<p>“Amos 扫地机器人现在在您附近的商店有售。由于某些原因，您考虑使用借记卡购买一台该产品。”</p> 	<p>Adapted from Chatterjee and Rose (2011); R. Chen et al. (2017)</p>