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Overview

My dissertation consists of two projects, both of which investigate how consumers react to price changes as numeric cues. I begin with the premise that consumers have initial preferences for certain economic behaviors, such as how many products they would like to purchase (Chapter 1) or how much debt they would like to repay in a certain period of time (Chapter 2). I propose that those preferences can be flexible in an acceptable range. This range is shaped by several contextual factors, such as a consumer's product quantity preference (Chapter 1) or a debt holder's financial obligations (Chapter 2). In general, consumers' purchasing decisions are influenced by those preferences and the economic information in the pricing. As a consequence, the numeric cues in the pricing lead to surprising situations in which consumers buy more when the price is higher. In Chapter 1, I found cases in which consumers purchase fewer units of a product when more (vs. fewer) units of the product are offered at a lower price. In other words, consumers buy more when the average unit price is higher. I propose consumers take the price-increase point as a numeric cue for their decisions, but these numeric cues influence decisions only if they fall within consumers' acceptable range. In Chapter 2, I found cases in which consumers repay a loan faster if its rate will rise in the more distant future (i.e., the cost of debt is relatively lower) than if its rate has increased or will rise in the near future (i.e., the cost of debt is relatively higher). I propose consumers take the timing of the rate rise as a decision point: they view repaying their debt before the expected rate increase as a goal, and this goal increases motivation to repay. However, this goal-setting process only occurs when consumers believe that it is feasible for them to repay their debt before the rate increase (i.e., the timing falls within consumers' acceptable range of repayment time period).

Chapter 1: The Dragging-Down Effect: Consumer Purchase Decisions in Response to Unit Price Increases

Abstract

Five studies, across a range of consumer purchase domains and manipulating unit-price increases in different forms, all found that consumers purchased fewer units of a product when a discount applied to a larger (vs. smaller) number of units. In each case, this purchasing pattern led consumers to purchase more units of the same item when they were sold for a higher per-unit price. Results show that consumers take the quantity at which the unit price of a product increases as the quantity they choose to purchase, but they do so only if that quantity falls within a reasonable range relative to the consumer's purchasing preferences. Mediation analyses reveal that the perceived acceptability of a given quantity as a purchase quantity explained the importance of this numeric cue in causing the observed pattern. Implications of the research for consumers, marketers, and policy-makers are discussed.

Introduction

Promotions and discounts are key tools that marketers use to vary pricing. These discounts are generally used to incentivize consumers to purchase more of their products. Discounts, such as coupons, commonly come with quantity limits, particularly in the case of large discounts. For example, the coupons offered by Costco typically have quantity limits presented next to the discounted price, such as "limit 4 each." Coupons from other stores also

come with fine-print limitation terms, such as "limit 1 per customer" or "limit of 4 like coupons in same shopping trip" (The Krazy Coupon Lady 2011). In cases of quantity-limited discounts, consumers can buy up to a certain number of units at the discounted price, but they will have to pay the regular price for additional units beyond that limit. Consequently, the unit price of a product increases as the number of items purchased increases beyond the quantity limit. However, quantity-limited discounts do not appear only when a discrete number of items can be purchased. For example, the United Kingdom offers a Personal Savings Allowance in which taxpayers can earn up to £1,000 in savings income tax free (HM Treasury 2017). Beyond that amount, they pay the basic tax rate on their savings. In this case, we can consider £1,000 in savings income as the quantity limit. We consider quantity-limited discounts broadly in a range of contexts where consumers receive a discount that returns to a base level as the consumer purchases greater amounts.

Presumably, firms decide quantity limits carefully and expect that consumers will purchase more (or save more in the case of the UK tax exemption) when the limits are higher. However, we propose that this type of promotion might instead lead consumers to purchase fewer units when the limits are higher. This oversight could lead to mispredictions about the effect of a price promotion, such that a change intended to increase purchase quantity has the opposite effect. The research aims to study the relationship between the quantity limit (i.e., the number of units available at a discounted price) and consumer purchase decisions.

We might reasonably expect price-sensitive consumers to purchase an equal or greater number of units of an identical product as the unit price of the product decreases.[1] This pattern should hold irrespective of whether a reduction in the base price of the product or a discount

[1] This tendency would hold in most but not all cases. For example, Veblen goods and Giffen goods do not work this way, but they are beyond the scope of this work.

leads to the unit-price decrease. However, we find situations in which consumers purchase less when the seller provides more discounts. In this research, we demonstrate this purchasing pattern across online, lab, and field studies that vary product type as well as the form of the price increase. We propose that people take the quantity available at a discount as a stopping point for purchasing, but only when that quantity falls within their reasonable range of preference for purchasing. This price-increase cue exerts particular strength as a stopping point because of its implications for transaction utility.

Discounts with Quantity Limits

Research in consumer behavior has explored psychological factors that influence consumers' purchase decisions in reaction to discounts (Cheng and Cryder 2018; Inman, Peter, and Raghubir 1997; Janiszewski and Cunha 2004; Shampanier, Mazar, and Ariely 2007; Sussman and Olivola 2011; Wansink, Kent, and Hoch 1998). When making purchase decisions, economic factors (e.g., costs and benefits) are not the only elements that influence choices. For example, consumers' perceptions of price depend on contextual factors such as the way price and cost are framed and the reference price consumers choose for a particular transaction (Rajendran and Tellis 1994). In some cases, additional product features or additional unattractive items in an otherwise attractive set can reduce the probability of purchasing the product or the set (Hsee 1998; Simonson, Carmon, and O'Curry 1994). Furthermore, consumers can derive pleasure from the act of purchasing if their actual price is lower than the expected price (Thaler 1985). Finally, consumers may anchor on random numeric cues presented in the shopping context when making purchasing decisions (Manning and Sprott, 2007; Wansink, Kent, and Hoch 1998). Research on the influence of numerical cues on decision-making underlies our predictions about how consumers will react to promotions with quantity limits.

Research has shown that numeric cues presented in price promotions can influence purchase-quantity decisions (Manning and Sprott 2007; Wansink, Kent, and Hoch 1998). These numeric cues include the quantity in multiple-unit prices, purchase-quantity limits, and suggestive selling. Prior research has examined situations in which these cues act as anchors (see Tversky and Kahneman 1974). For example, Wansink, Kent, and Hoch (1998) find that promotions can increase purchase quantities by acting as anchors. Consumers who were presented with high anchors in the form of high (vs. low) purchase-quantity limits purchased more units of product. Moreover, consumers purchased more units when the pricing was presented in multiple-unit prices than in single-unit prices (e.g., "6 cans for $3" vs. "1 can for 50c"). This pattern was specific to high-consumption products (Manning and Sprott 2007).

Although research on anchor-based promotions suggests that random numbers can influence purchase decisions, we propose that there is a qualification to that effect. An anchor-based account predicts that consumers will purchase more units as more units are available at a discounted price. This pattern would also be consistent with a basic reaction to prices, purchasing more when the available price is less. However, we propose that consumers will be more likely to take a numeric cue as an anchor if the number seems reasonable than unreasonable to them. This will lead to situations in which consumers may actually purchase fewer units when more are on sale. For example, consider a promotion in which either 1 or 3 units of a product are available on sale. If 1 unit is outside of a consumer's preference range and 3 units is within the range she considers reasonable, she would purchase more with a quantity limit of 1 unit than with a limit of 3 units, which cannot be explained by the traditional anchoring account.

In the anchoring literature, existing evidence about the effect of implausible or extreme anchors is mixed. From the anchoring-and-adjustment perspective, no matter how extreme or

implausible a numerical anchor is, it can influence one's judgment of an uncertain value (e.g., Epley and Gilovich 2006; Jacowitz and Kahneman 1995). The selective accessibility model also supports the notion that extreme or implausible anchors can produce larger effects than plausible anchors (Mussweiler and Strack 1999; Strack, Bahnik, and Mussweiler, 2016; Strack and Mussweiler 1997). This model suggests that people adjust from the implausibly extreme values to the boundary of plausible ones, and they confirmatively test the hypothesis that the suitable answer is equal to the adjusted value. Thus, the implausible anchors produce effects at least as large as do plausible anchors, because the boundary of plausible values is the extreme of all possible answers. However, other evidence suggests that implausible anchors exert less influence than plausible ones (e.g., Wegener et al. 2001, 2010). Chapman and Johnson (1994) find that implausibly extreme anchors exert a diminishing anchoring effect. Furthermore, Wegener et al. (2010) find that implausibly extreme anchors can produce weaker effects than moderately extreme anchors and explain their finding from an attitude change perspective. Zhang, Hsee, and Yu (2018) found that participants' evaluations of a fair compensation can be influenced by a reasonable anchor but not by an unreasonable anchor.

The current research demonstrates a pattern that has similarities to prior work in anchoring, in which extreme anchors can have a weaker impact on decisions or judgments. However, the present work identifies a unique underlying psychological mechanism and specifies conditions under which an anchor is likely to have a weak influence or have no influence on a decision or judgment. Furthermore, we provide evidence that this differential reliance on numeric cues can lead to situations in which people purchase more units of a product when the per-unit price is higher (vs. lower).

While extreme anchors examined in prior anchoring literature have typically been far

away from the non-extreme values (e.g., $48 vs. $13,660 per year for a guess of annual salary; 68 vs. 158,020 years old for a guess of age in Wegener et al. 2001), numeric cues in this work are close to each other in absolute value and are not likely to be considered numerically extreme (e.g., limit 1 vs. limit 3 in Study 2; limit 2 vs. limit 6 in Study 6). Instead, while the units separating an extreme vs. a non-extreme focal value in the current work may be small, the psychological distance is large. Specifically, whether or not a focal value is considered reasonable as a purchase quantity determines the extent to which a consumer will rely on it as an anchor or decision point. We propose that numeric cues that are incompatible with consumers' preferences are less likely to affect decisions, even if the values are not extreme, such as a limit of one versus three on a product for which a consumer would normally purchase about five. Thus, we build on existing literature on anchoring and promotions, proposing that quantity limits, taken by consumers as numeric cues, can affect consumers' purchase decisions and further develop theory underlying when these numeric cues will or will not be relied upon. Drawing from this theory, we arrive at a novel conclusion.

Quantity Limit as a Decision Point

We propose that the quantity limit of a discount is a numerical cue that influences subsequent decisions by acting as a decision point (e.g., Cheema and Soman 2008; Soman and Cheema 2011; Tsiros and Hardesty 2010; Wansink, Kent, and Hoch 1998). Cheema and Soman (2008) found that separating an aggregated quantity of food or money into smaller units indicated by a partition could reduce the quantity consumed. They reasoned that the partition introduced a small transaction cost that provided participants with a "decision point" at which they would pause to consider whether to continue consuming or to stop. Without such a decision point, consumers would be more likely to absentmindedly continue consumption. Rather than

being limited to a partition, a variety of numeric cues could serve as decision points as well.

Similarly, the point of a price increase in a quantity-limited price promotion (e.g., limit of 3 per person) can serve as a decision point, attracting attention and prompting consumers to consider whether to continue purchasing (e.g., Cheema and Soman, 2008). In contrast to prior research on decision points, we propose that the introduction of decision points does not always reduce consumption and in fact, decision points at low levels may actually increase consumption relative to those at higher levels. Consumers may take the quantity of discountable products as a cue when making purchase decisions, but only when that quantity seems like a reasonable purchase amount. During the phase of purchasing or consumption, consumers make a decision either to take that quantity limit as a stopping point (i.e., decide to stop) or to abandon it (i.e., decide to continue and ignore the cue), returning to their initial purchasing preference.

Although decision points have been discussed in the context of a partitioning framework (Cheema and Soman 2008), they may also share some properties with other numeric cues, such as anchors (e.g., Hsee, Dube, and Zhang 2008; Mussweiler and Strack 1999; Tversky and Kahneman 1974) or target values (i.e., goals; e.g., Heath, Larrick, and Wu 1999; Pope and Simonsohn 2011; Sackett et al. 2014). When a numeric quantity is treated as a goal, people will exert extra effort to meet or exceed the goal amount. Similarly, people are more likely to select goals for themselves that they believe are achievable, and they are more committed to reaching attainable (vs. unattainable) goals once they are set (Bandura 1977; Locke and Latham 2002; Soman and Cheema 2004).

Current Research

In this research, we examine how a unit-price increase at a given purchase quantity influences consumers' purchase decisions. Specifically, we find situations in which consumers

choose to purchase fewer units of a product when the product's unit price increases at a higher purchase quantity than when it increases at a lower purchase quantity.

For many products, consumers have an initial preference for how many they want to consume. Often, that preference is flexible and can be extended across a reasonable range, with a reasonable threshold that denotes the minimum quantity that is acceptable to consumers. In a pilot survey (N = 104), we found 79% of grocery shoppers make a shopping list when they go grocery shopping and, for most of the products they frequently purchase, 82% of the shoppers have an idea of how many of each product they would like to purchase. In our research we consider this initial idea of how much consumers believe they will purchase to be their "initial preference." This can also be considered as similar to a consumer's internal reference quantity. In our research, we examine how initial preferences influence subsequent consumption. For example, imagine John, who enjoys hanging out with friends at bars. When John goes to a bar with friends, he commonly orders five drinks over several hours, i.e., his initial preference. But he is also happy to consume as few as three drinks or as many as seven drinks. Any number outside of that range is either too few or too many drinks for him to really enjoy his time at the bar, and he would rather be home. Thus, his reasonable range for drinking at a bar is between three and seven drinks.

Suppose the bar is running a promotion in which each customer can get a discount for one drink at the bar. Because John will not enjoy consuming only one drink during his time at the bar, he would order more at the regular price. In this case, John would not take the quantity limits of one drink as his stopping point, because it is below his reasonable range. This choice can be compared to one that is made in the face of an unreasonable goal or anchor value that is often ignored. Instead, he would base the decision on his initial preference for drinks, largely

ignoring the one-drink decision point, and be more likely to purchase five drinks.

In another situation, suppose the bar is running a promotion and the same discount for drinks is limited to three per person. In this case, the three-drink value would be salient because of the price increase. Furthermore, we would expect John to take this salient value (i.e., the three-drink quantity limit) as his decision point and stop consumption at this quantity because this quantity falls within his reasonable range of preference (i.e., three drinks are good enough for the night) and stopping at this quantity provides him the largest utility (i.e., he is taking the full advantage of the discount). As a result, we predict a purchasing pattern in which John purchases fewer units of a product (three drinks vs. five drinks) when more units are discounted (three drinks vs. one drink). Moreover, we predict John will purchase fewer drinks when three drinks are discounted, as compared to his initial preference of purchasing five drinks when there is no price discount. That pattern is inconsistent with a focus purely on price. Therefore, we propose the following hypotheses:

H1A: There are situations in which consumers purchase fewer units of a product if the price of the product increases at a high purchase quantity than at a low purchase quantity.

H1B: There are situations in which consumers purchase fewer units of a product if the price of the product increases at a given purchase quantity than if the price is static at the regular level (e.g., no price discount).

H2: Consumers are more likely to take the price-increase point as their purchase quantity if that point falls within the reasonable range of preference than if it is below that range.

Moreover, the reasonable range of a consumer's preference determines whether or not a consumer considers the quantity available at a discount as an acceptable purchase quantity. A consumer is more likely to find a quantity acceptable if the quantity falls within her reasonable range of preference than if it falls outside of the range. The consumer is subsequently more likely to respond to a price increase at an acceptable purchase quantity by choosing to purchase exactly this amount while ignoring a price increase point that occurs in an unacceptable range. Therefore, we predict that acceptability mediates the effect of a price increase on the purchase quantity.

H3: Acceptability of a given quantity as a purchase quantity mediates the effect of a price increase at a certain purchase quantity on the purchase decision.

We label the phenomenon described in H1A and H1B as the "dragging down" effect, because the anomaly (depicted in Figure 1) leads to situations in which the pricing strategy of quantity-limited discounts can drag down the quantity purchased by consumers. The x-axis in Figure 1 represents the quantity of discounted units and the y-axis represents the quantity purchased. The grey dashed line represents the reasonable range of a consumer's preference. The solid line represents our prediction of purchase quantity in response to the quantity of discounted units.

Note that this research focuses on the left side of the chart, which is where we would expect to see the pattern described. Although we would anticipate that a similar process would also operate on the right side of the chart (the upper end of a consumer's reasonable range of purchasing), we would not necessarily expect this pattern to lead to a dragging-down effect in

which people purchase fewer items as more are offered at a discount. Although consumption might return to a consumer's initial preference level when the discounted quantity increases above her reasonable range, there are additional factors at play. For example, people may not be as confident in their upper threshold as they are in their lower threshold. Additionally, a more traditional anchoring effect may counteract an ambiguous desire for a given quantity and push in the opposite direction. Because we do not have a clear prediction for a similar dragging-down effect on the right side, an examination of the right side of the chart is beyond the scope of this research and we instead focus on the dragging-down effect.

In most cases, we would expect a price-sensitive consumer to purchase an equal or greater quantity of a product as more units of the product are discounted, all else being equal. In other words, we would not expect the solid curve in Figure 1 to decrease. Consider the previous drinking example: if maximizing the pleasure of consumption were the only relevant factor for John, he would order five drinks irrespective of whether one or three were on sale (i.e., a flat curve). By contrast, if John cared only about maximizing the value of the deal, he would only order the discounted number of drinks in both situations (i.e., a monotonically increasing curve). In reality, consumers often aim to reconcile both factors, and the combination effect of cost minimizing and consumers' initial preferences leads to the pattern of a kink in the curve, which we label as the dragging-down effect.

We explore the effect of price increases on purchase decisions, examining the role of a priori preferences for quantities of consumption in these decisions. We examine unit price increases across consumer purchase domains. For example, studies include price increases that occur when a consumer purchases a given number of discrete units of a food (Studies 1, 2, and 4) and when a consumers' cost of borrowing money to finance a purchase increases at a certain cost

(Study 5). Product types vary as well, including perishable (Studies 1 and 2) and durable (Studies 3, 4, and 5) products, material (Studies 1, 2, 4, and 5) and experiential (Study 3), hedonic (Studies 1, 3, 5) and utilitarian (studies 2 and 4), and high (Studies 3, 4, and 5) and low cost products (Studies 1 and 2). Study 1 provides initial evidence of the dragging-down effect (H1A and H1B) in an incentive-compatible study of purchasing behavior in the lab. Study 2 replicates the basic effect in the field, examining behaviors of grocery shoppers. Study 3 explores underlying mechanisms of this purchasing pattern and tests potential mediators. Analyses reveal that the acceptability of a price-increase point as a purchase quantity explains the importance of the price-increase point as a numeric cue in causing the observed pattern (H3). Studies 4 and 5 examine the reasonable range as a moderator of the observed patterns (H2). Study 4 manipulates participants' reasonable range and finds that the dragging-down effect occurs only when the price-increase point falls within consumers' reasonable range of preference (H2). Finally, Study 5 extends the findings from purchase quantity decisions to a broader domain of quantity decisions such as willingness to spend and conceptually replicates findings from Study 4.

Note on Sample Size and Data Exclusions

All sample sizes were determined in advance, with the number of participants increasing as a function of the number of conditions and the subtlety of the manipulation in each experiment. Across studies, we included several comprehension questions, which were intended to ensure participants understood key characteristics of the scenarios in the studies (Downs, et al., 2000; Goodman, Cryder, & Cheema, 2013). In most cases, this resulted in two to six comprehension questions. Failure to answer more than two-thirds of those questions indicated that participants either did not pay attention or they misunderstood the scenario. Therefore, we excluded participants who did not correctly answer at least two-thirds of comprehension

questions from all analyses. This rule was decided before any data analyses. Across all studies, results remain consistent when all participants are included.

Study 1: Demonstrating the Dragging-Down Effect in the Lab

In Study 1, we tested Hypotheses 1A and 1B. We examined whether participants purchased and consumed fewer chocolates when more units of the chocolate were offered for free than when fewer or no units were offered for free. Purchase decisions were implemented for all participants.

Method

Participants. We recruited a total of 130 participants (42% female; M_{age}=33.84, from 19 to 70) to complete this experiment in a lab for nominal monetary compensation. They received a fixed payment of $2 for participating, plus a $0.68 bonus they could use to purchase chocolates during the experiment.

Design and Procedure. All participants were told the experiment consisted of two parts. The first part would last five minutes, during which they could eat M&M's milk chocolates. They could eat as many or as few as they wanted. They did not need to do anything else during those five minutes. In the second part, they would answer a survey about their opinions of the chocolates.

Participants were randomly assigned to one of four conditions (price discount: all for free, none for free, one for free, or five for free) in a between-subjects design. In the all-for-free condition, participants were told that each chocolate they ate was free. In the none-for-free condition, they were told that each piece of chocolate they ate cost 1 cent and that the experimenter would deduct the cost from their bonus. In the one- (or five-) for-free condition,

they were told that the first piece (or first five pieces) of chocolate they ate was (were) free; after that, each piece cost 1 cent and the experimenter would deduct the cost from the bonus. In all the conditions, we clarified that participants could only eat during the five minutes in the first part of the experiment at the specified price and they could not take those chocolates home. During the experiment, participants were presented with a bowl of M&M's and they decided how many to eat. A magazine was present that they could read if they chose. We recorded the number of chocolates participants chose to eat during the experiment as our main dependent variable. After consuming the chocolates, participants answered a survey in which we asked them to report their feelings toward the candy, their happiness during the experiment, their hunger level, the time of their last meal, and whether they were on a diet, as well as demographic information. The experimenter deducted the cost of the chocolates participants consumed according to the pay schedule in their experimental condition before giving bonuses. Additional details on all studies reported in this dissertation can be found in the online supplementary materials.

In a post-test, we asked a separate group of participants (N = 30) how many M&M's chocolate (i.e., the ideal, the minimum, and the maximum number) they would like to eat if they were selected to participant in this experiment. We found the minimum was M = 5.03 chocolates, which supports our assumption that eating five chocolates was acceptably few for participants. The ideal and maximum numbers were M_{ideal} = 10.53 and M_{max} = 15.20.

Results and Discussion

Data from four participants who reported being on a diet (indicating they did not want to eat chocolate) were excluded from all analyses. Results are summarized in Figure 2. A one-way ANOVA revealed a significant effect of condition, $F(3, 122) = 7.50$, $p < .001$, $\varphi^2 = 0.16$. We conducted several planned comparisons to test our hypotheses. First, the comparison between all-

free and none-free was significant ($t(122) = 2.32$, $p = .022$, $d = 0.42$), indicating participants were sensitive to a price difference between zero and 1 cent per piece.

Consistent with H1A, the comparison between the five-free and the one-free conditions was significant (*M*s = 8.42 and 16.66, *SD*s = 7.24 and 17.58, *Median*s = 5.00 and 9.00; $t(122) = 2.14$, $p = .034$, $d = 0.39$), indicating participants purchased fewer M&M's when five chocolates were free than when one was free, despite the lower unit cost of eating more chocolates past the free amount in the five-free condition. Participants in the one-free condition paid almost four times the price for each chocolate they consumed (0.81 cents) than participants in the five-free condition (0.22 cents).

Consistent with H1B, the comparison between the five-free and the none-free condition revealed participants purchased fewer chocolates when five chocolates were offered for free than when none were free (*M* = 17.59, *SD* = 19.14, *Median* = 11.00; $t(122) = 2.23$, $p = .028$, $d = 0.42$). Similarly, they paid approximately twice as much per chocolate in the none-free condition (1.00 cent) than participants in the five-free condition (0.22 cents). We also found a significant difference in the quantity consumed across the five-free and all-free conditions (*M* = 27.75, *SD* = 19.39, *Median* = 24.50; $t(122) = 4.73$, $p < .001$, $d = 0.86$).

Finally, in evidence that is suggestive of H2, when only one piece of chocolate was free, participants' purchases did not differ from the none-free condition ($t(122) < 1$, *n.s.*).

In addition to the comparisons, we analyzed whether participants took exactly the number of free samples as their purchase quantity in the free-sample conditions. Examining the number of participants who consumed exactly one chocolate, we found no difference across conditions (6% in one-free, 0% in all other conditions; $\chi^2(3, N=126) = 5.28$, *n.s*). However, significantly more participants in the five-free condition (39%) consumed exactly five chocolates than those

in the other conditions (3% in one-free, 0% in all other conditions; $\chi^2(3, N=126) = 35.16$, $p < .001$). These results suggest participants took five chocolates (a reasonable amount) but not one chocolate (an unreasonable amount) as a stopping point.

We found no differences across conditions in responses to other questions collected, including participants' attitudes toward M&Ms and their happiness during the experiment (Fs < 1.74, *n.s.*). Furthermore, we tested perceived scarcity as an alternative explanation, which argues that a small quantity limit may signal scarcity and thus lead consumers to purchase more. In a posttest ($N = 54$), we presented a separate group of participants the instructions of either the one-discounted or the three-discounted condition and asked, "Given the price, how scarce do you think the product is? (1=not scarce at all, 5=very scarce)" We found no difference in perceived scarcity between the two discount conditions ($t(52) < 1$, *n.s.*).

Study 1 provided initial evidence supporting H1A and H1B, showing that participants may purchase and consume more units of a product when fewer units of the product are offered at a discounted price, despite the fact that each of these units is offered at a higher per-unit price. In this experiment, participants made the decision of whether to continue consuming more chocolates as they ate (i.e., during the consumption process). In the next experiment, we will test whether the effect persists when decisions are made before consumption.

Study 2: A Field Examination of the Dragging-Down Effect

Study 1 provided initial evidence for the dragging-down effect in a lab setting involving real consequences. However, the findings may not be broadly representative. First, free products might be an extreme example of price discounts, because zero is a special price in consumers' cost-and-benefit analyses as compared with non-zero discounts (Shampanier, Mazar, and Ariely

2007). Second, participants spending bonus money may act differently than consumers spending regular income.

To address these possible limits, Study 2 used non-zero prices. Importantly, Study 2 also extended the findings to a field setting, which allowed us to test whether these patterns are strong enough to operate outside of a controlled laboratory environment and are likely to be consequential for marketers.

Method

Participants. We partnered with two fruit shops on the east coast of China (one located in Hangzhou and one in Shanghai) that allowed us to vary the prices for peaches over a one-week period in August of 2017. We observed 212 peach buyers (148 females; M_{age}=31.42) out of 1299 total customers walking by the peach stand during this period. Customers were residents living nearby who generally visited the shop once or twice per week.

Design and Procedure. Prior to the experiment, we talked to the shop staff about fruit-sales patterns and customers' preferences. We also observed grocery shoppers' fruit-purchasing behaviors in stores for a few days. Peaches were a popular fruit for the season and customers generally purchased four to five peaches at a time. Therefore, we decided to set three peaches as slightly, but acceptably, below customers' typical purchase quantity and one peach as unacceptably below this quantity.

This experiment adopted a 3 (price discount: zero discounted (control), one discounted, or three discounted) between-subject design. We ran the experiment for six days. We rotated the three conditions every one and a half hours each day across two different grocery store locations, from 5:30pm to 10:00pm, and we also rotated which condition began each day. In the two sale conditions, customers could get 3 RMB (equivalent to $0.45) off each peach, but this discount

was limited to either one per customer or three per customer, depending on the condition. The discount information was written on a post next to the price tag for peaches (see Figure 3), so every customer walking by could see the promotion. The regular price for peaches was 13.8 RMB per 500g. Roughly speaking, each peach cost around 8 RMB (equivalent to $1.20). In addition to the posted sign, research assistants told customers in the two sale conditions who approached the peach stand that the peaches were on sale. After communicating the discount, research assistants then left customers to make independent decisions (e.g., without RAs watching them) about how many to purchase. In addition to these two sales conditions, research assistants observed peach-purchasing patterns but did not interact with customers in a control condition in which no discounts were available.

The main dependent variable was the number of peaches purchased. When buying peaches, customers usually pick one after another by themselves. Thus, the research assistants could easily record data without being noticed. After picking the peaches, customers would receive a checkout coupon corresponding to their condition. Research assistants also recorded the total number of customers who walked by the peach stand during the time period of each condition, basic demographic information such as gender and age (guessed), and whether the customer purchased other fruits at the same time.

Results and Discussion

A summary of results can be found in Table 1. A one-way ANOVA revealed a significant effect of condition ($F(2,209) = 17.04$, $p < .001$, $\varphi^2 = 0.14$). Planned comparisons show that customers in the three-discounted condition ($M = 3.38$, $SD = 1.40$, $Median = 3.00$, $Mode = 3.00$) bought significantly fewer peaches than customers in the one-discounted condition ($M = 5.14$, $SD = 2.34$, $Median = 5.00$, $Mode = 4.00$; $t(209) = 5.82$, $p < .001$, $d = 0.81$), consistent with H1A.

This analysis shows that a discount that was applied to more units of product resulted in customers buying fewer. Furthermore, when comparing customers in the three-discounted condition with the control condition (M = 4.37, SD = 1.48, *Median* = 4.00, *Mode* = 4.00), we found that customers in the three-discounted condition bought significantly fewer peaches than those receiving no discounts ($t(209) = 2.59$, $p = .011$, $d = 0.36$), consistent with H1B.

Next, we found that, compared with the control condition, customers in the one-discounted condition bought significantly more peaches ($t(209) = 3.31$, $p = .001$, $d = 0.46$). These results indicate customers value discounts and would likely purchase more when the quantity limit of the discounts is above consumers' reasonable range.

We next examined the distribution of responses to gain insight into whether participants in the one-discounted or the three-discounted condition were likely to take the number available at a discount as a stopping point. Specifically, if they were, we would expect to see a discontinuous spike in purchases at the discounted number. Examining the number of purchases at one unit, we found no differences in the number of one-peach purchases across conditions (1% in control, 3% in one-discounted, and 4% in three-discounted; $\chi^2(2, N=212) = 1.14$, *n.s.*). However, significantly more customers in the three-discounted condition (52%) purchased exactly three peaches than customers in the control condition (13%) or the one-discounted condition (13%; $\chi^2(2, N=212) = 26.00$, $p < .001$). These results support H2, which predicts that customers take the price-increase point as their purchase quantity only if that point falls within their reasonable range.

Examining the histogram by condition (Figure 4), we found a peak in the number of customers who purchased three peaches in the three-discounted condition as well as a decrease in the number of customers who purchased four or five peaches in that condition, as compared with

the other two conditions. These distributions suggest that a price discount limited to three peaches led customers who originally wanted to purchase four or five peaches to stop their purchases at three peaches. The asymmetric data flow from right above the quantity limit to the exact quantity limit also suggests that customers treated the quantity limit as a decision point that takes on properties of a target value rather than an anchor (Bartels and Sussman 2018).

Although customers bought fewer peaches when more peaches were discounted, customers in the three-discounted condition might have found the discount more attractive and were more likely to purchase peaches at all, when compared to the one-discounted condition. Furthermore, the low purchase quantity may have come from customers who had not planned to purchase peaches. However, we found no evidence supporting that proposition. Across conditions, we found no difference in the percentage of peach buyers out of the total number of customers who walked by the peach stand ($\chi^2(2, N=1299) < 1$, *n.s.*; see Table 1).

Customers who bought fewer peaches in the three-discounted condition might also have been more likely to purchase other fruit during their visit. That is, they might have considered spending the money they saved from the peaches on other fruits. To test that possibility, we recorded whether each customer who bought peaches also purchased other fruits during the same visit.[2] We found no significant differences between the three conditions in the likelihood of peach buyers buying other fruits during the same visit ($\chi^2(2, N=161) < 1$, *n.s.*; see Table 1). Thus, our evidence does not support the possibility that the customers who purchased fewer peaches in the three-discounted condition were more likely to purchase other fruits in the shop instead.

Different from the previous study, we found customers purchased slightly more peaches in the one-discounted condition than in the control condition in this field experiment. One

[2] This data was not available for the first two days.

possibility is that the presence of a research assistant introducing the discount in the two discount conditions might have caused the increased purchase quantity. Given the nature of the field experiment, although the research assistant was present in all conditions, she was not able to say anything about the promotion in the control condition to be consistent with procedures in the store when no promotions are present. While differences in the research assistant interaction could potentially explain the increased purchase quantity in the one-discounted condition as compared with the control condition, it would not explain the difference between the one-discounted and the three-discounted condition.

Consistent with our hypotheses, the results of this field experiment suggest that a quantity limit that falls within customers' reasonable range of preference can "drag down" the quantity of items purchased. Results from the first two experiments demonstrated the basic effect with purchase decisions both during the process of consumption and prior to consumption, both in the lab and in the field. In the next study, we aim to explore boundary conditions of this purchasing pattern and test the role of a reasonable range in purchase decisions.

Study 3: Exploring the Mediating Role of Acceptability

The previous studies demonstrated the dragging-down effect in both a lab setting and a field setting. In this study, we examined whether the observed patterns would extend to a new consumer context, examining the purchase of tickets to a museum-pass that varied the number of museums available at a discount. Additionally, the current study explores the underlying mechanism of this effect.

We propose that the effect of a price-increase point on purchase quantity operates through two paths. The first path is perceived acceptability—whether or not a consumer

considers the quantity available at a discount as an acceptable purchase quantity. A consumer is more likely to find this quantity acceptable if the price-increase point falls within her reasonable range of preference than if it falls outside of this range. Consumers are subsequently more likely to respond to a price increase at an acceptable purchase quantity by choosing to purchase exactly this amount while ignoring a price increase point that occurs in an unacceptable range. We therefore predict that acceptability mediates the dragging-down effect.

In addition, for exploratory purposes, we also tested a variety of alternative explanations, including transaction utility, consumption (or social) norms, reference prices, decision weights, and anticipated regret. The transaction utility explanation suggests that consumers derive extra utility from taking advantage of price promotions, which causes their decisions to be based on the pricing. The consumption (or social) norm explanation suggests that consumers might infer a suggested purchase quantity from the quantity limits in the promotions and that they might be more likely to conform if the suggested quantity is reasonable than if it is not. The reference price explanation suggests that consumers might form different reference prices corresponding to the different price conditions (Grewal, Monroe, and Krishnan 1998; Rajendran and Tellis 1994), which in return could lead to the observed purchasing pattern. If consumers set a lower reference price when more units are available at a discount, the lower reference price might discourage consumers from purchasing the product at its regular price. The decision weight explanation suggests that a better discount might shift consumers' decision weights from following their initial purchase preference to taking advantage of price discounts. The anticipated regret explanation suggests that consumers might anticipate more regret if they fail to minimize the cost (Tsiros and Hardesty, 2010) when there is a better deal.

Method

Participants. Three hundred and fifty-four participants (53% female; M_{age}=33.73, from 18 to 74) from MTurk participated in exchange for nominal monetary compensation.

Pretest. We ran a pretest with a separate sample from Amazon Mechanical Turk (*N* = 196) to determine consumers' preferences for the focal stimuli, the number of museums consumers would like to visit for a two-week vacation in New York City. We elicited preferences for the ideal number of museums as well as the minimum and maximum that they would like to visit. Results showed that participants, on average, would ideally visit 5 museums (*Mean* = 5.27, *SD* = 2.53, *Mode* = 5.00), with a minimum of 2 museums (*Mean* = 2.78, *SD* = 1.75, *Mode* = 2.00), and a maximum of 8 museums (*Mean* = 7.61, *SD* = 3.86, *Mode* = 8.00) for such a vacation.

Design and Procedure. This study adopted a 3 (price discount: zero, one, or three discounted) between-subject design. Based on pretest results, we chose a price-increase point at one museum visit as a quantity outside of consumer's reasonable range of preference (i.e., 2 to 8), a price-increase point at three museum visits as a quantity within the reasonable range though lower than the optimal preference (i.e., 5), and a control condition in which none was discounted.

All participants read that they were travelling to New York City for two weeks on a vacation and wanted to visit the museums there. Ideally, they would like to visit five museums, but they could also be flexible depending on pricing. They decided to purchase all the museum visits on a museum pass because the pass gave them additional benefits such as fast-track access to the museums. They could only purchase visits on the museum pass for themselves. Participants in the zero-discounted (control) condition read, "On the museum pass, each museum visit costs $30." Participants in the one-discounted condition read, "On the museum pass, the

first museum visit costs $20, and each additional costs $30." Participants in the three-discounted condition read, "On the museum pass, the first three museum visits each cost $20, and each additional costs $30." After answering a few comprehension questions, all participants then decided how many museum visits they would like to purchase.

On the next screen, we asked several questions to explore the underlying process and examine possible explanations. To test the reasonable range account, we measured the acceptability of the price-increase point as a purchase quantity, "To what extent do you think it is acceptable for you to visit only X museums in order to make your trip worthwhile?" (1=definitely not acceptable, 7=definitely acceptable; X equals to the price-increase point).

We also tested a list of alternative explanations. To test the transaction utility account, we measured participants' perceived transaction utility at purchasing one or three museum visit(s), "Given the pricing, how good of a deal do you think it is for you to purchase exactly 1 (or 3) museum visit(s) on the museum pass?" (1=not a good deal at all, 7=a very good deal). To test the role of consumption (or social) norms, we asked: "Given the pricing, how many museum visits do you think a typical buyer of the Museum Pass would usually purchase?" (free response). To test the role of reference prices, we asked: "Given the price information in the scenario, what do you think is a fair price (i.e., not too high nor too low) for museum admission fee?" (a sliding scale from $0 to $40). To test the role of shifting decision weights, we asked: "When making your purchase decision, to what extent did you base your decision on the price discounts and to what extent did you base it on your museum-going preferences?" (1=my decision was entirely based on the price discounts, 7=my decision was entirely based on my museum-going preference). Finally, to test the role of anticipated regret, we adapted a question from Tsiros and Hardesty, 2010, asking: "If I purchase additional museum visits with the higher price on the pass

(i.e., purchase more than 1 visit), I will regret it later" (1=strongly agree; 7=strongly disagree).

Results and Discussion

Consistent with our prior exclusion criteria, we excluded seventeen participants who failed the comprehension check and of three participants who provided responses that were more than three standard deviations away from the total mean from all analyses. After data exclusion, the sample size is N = 334 (53% female; M_{age}=33.97, from 18 to 74).

Purchase Quantity. A one-way ANOVA revealed a significant effect of condition ($F(2,331) = 5.27$, $p = .006$, $\varphi^2 = 0.03$), see Figure 5. As predicted, planned comparisons revealed that participants in the three-discounted condition purchased significantly fewer museum visits (M = 4.38, SD = 1.23, *Median* = 5.00, *Mode* = 5.00) than either those in the one-discounted condition (M = 4.84, SD = 1.16, *Median* = 5.00, *Mode* = 5.00; $t(331) = 2.77$, $p = .006$, $d = 0.36$) or those in the zero-discounted condition (M = 4.84, SD = 1.29, *Median* = 5.00, *Mode* = 5.00; $t(331) = 2.85$, $p = .005$, $d = 0.39$). In addition, significantly more participants purchased exactly three museum visits if three were discounted (25%) than if none were discounted (7%; $\chi^2(1, N=224) = 15.29$, $p < .001$) or if only one was discounted (5%; $\chi^2(1, N=222) = 11.56$, $p < .001$). We did not find any difference in the likelihood of purchasing exactly one museum visit if one was discounted (4%) than if none was discounted (2%; $\chi^2 < 1$, *n.s.*) or if three were discounted (1%; $\chi^2 < 1$, *n.s.*). These results suggest consumers were more likely to take the price-increase point as their purchase quantity when the price-increase point fell within the reasonable range of preference than outside of the range.

Acceptability. We measured the acceptability of the price-increase quantity as a purchase quantity only in the two discount conditions because this question would not have been comprehensible in the control condition where there was no price increase. Results showed that

participants in the three-discounted condition considered visiting only three museums significantly more acceptable (M = 5.63, SD = 1.47) as compared to participants' feelings towards the idea of visiting only one museum in the one-discounted condition (M = 3.58, SD = 2.30; $t(222) = 7.92$, $p < .001$, $d = 1.06$).

Mediation Analyses. To test whether acceptability explains the dragging-down effect (H3), we conducted a mediation analysis with acceptability and all the alternative explanations (transaction utility, consumption/social norm, reference price, decision weight, and anticipated regret). Our model included the price-increase point as the independent variable (with one-discounted coded as 0 and three-discounted coded as 1), acceptability and the other potential mediators as the mediating variables, and the purchase quantity as the dependent variable. We used the bootstrap procedure with 10,000 resamples (PROCESS Model 4; Hayes 2012) and only found a significant indirect effect of acceptability (indirect effect = -0.38, SE = 0.11, biased-corrected 95% confidence interval = [-0.62, -0.20]). The three-discounted condition significantly increased acceptability (a = 2.04, $p < .001$), and acceptability was negatively associated with purchase quantity (b = -0.19, $p < .001$). Including acceptability in the model reduced the effect of a price increase on purchase quantity (from c = -0.46, p = .008 to c' = -0.07, p = .69). Thus, we concluded that acceptability mediated the dragging-down effect, see Figure 6.

Results in this study suggest the dragging-down effect can apply to not only food but also to more expensive, experiential consumption, products. These results also support the hypothesis that acceptability explains the effect of a price increase on purchase quantity. Acceptability is related to consumer's reasonable range of preference: A quantity is more acceptable when it falls within a reasonable range of consumer's preference. Therefore, in the next study, we manipulate the reasonable range and test the moderation effect of the range.

Study 4: The Moderating Role of Reasonable Range

Study 4 was designed to test whether reasonable range would moderate the pattern of results observed thus far. We directly manipulated participants' reasonable range and compared purchase decisions when the same price-increase point fell within versus below the reasonable range, shifting whether the price-increase point would be considered acceptable as a possible purchase quantity. Since we propose that acceptability of the discounted quantity influences the dragging-down effect, we hypothesize that varying the reasonable range will moderate the dragging-down effect. Specifically, we predict consumers will be more likely to take the price-increase point as their purchase quantity if that point falls within the reasonable range of their preference than if it is below that range (H2).

Method

Participants. We recruited 401 participants (51% female; M_{age} = 33.38, from 18 to 86) online through Amazon's Mechanical Turk (MTurk) platform, and they completed the study for nominal monetary compensation.

Design and Procedure. This study adopted a 2 (price discount: 2 vs. 6 discounted) x 2 (reasonable range: narrow vs. wide) between-subjects design. Participants were asked to imagine they were buying wines for themselves to consume while they were staying at a new town for several weeks. We manipulated the quantity limits for a price promotion for wines: The wines in the store were 30% off, but the discount was limited either to two or to six bottles per person.

To keep the preference for the optimal purchase quantity constant across conditions, all participants were told that they were thinking of buying 10 bottles of wine, but they could be flexible within a given range depending on pricing. In the narrow range conditions, the flexible range was 6 to 14 bottles. In the wide range conditions, the flexible range was 2 to 18 bottles.

Note that the discounted quantity of six bottles was within the reasonable range in both conditions, but the discounted quantity of two bottles was acceptable only in the wide range condition. After answering comprehension questions about the scenario, participants reported how many bottles of wine they wanted to buy in a free-response format.

Results and Discussion

Consistent with our prior exclusion criteria, we excluded forty-eight participants who failed more than half of the comprehension check questions from all analyses. After this data exclusion, the sample size was N = 353 (52% female; M_{age}=33.48, from 18 to 86).

A 2 (price discount: 2 vs. 6 discounted) x 2 (reasonable range: narrow vs. wide) ANOVA revealed no main effect of price discount ($F(1, 349) < 1$, *n.s.*), a significant main effect of range ($F(1, 349) = 14.08$, $p < .001$, $\varphi^2 = 0.04$), and a significant interaction between price discount and range ($F(1, 349) = 9.08$, $p = .003$, $\varphi^2 = 0.02$), see Figure 7. The comparison within the narrow-range conditions replicated the dragging-down effect and revealed that participants purchased significantly fewer bottles of wine if six bottles were discounted, a quantity within their reasonable range, (M = 8.53, SD = 2.30, *Median* = 10.00, *Mode* = 6.00) than if two bottles were discounted, a quantity outside of their reasonable range, (M = 9.49, SD = 2.23, *Median* = 10.00, *Mode* = 10.00; $t(349) = 2.27$, $p = .024$, $d = 0.42$). By contrast, in the wide-range conditions, participants purchased significantly more bottles of wine if six bottles were discounted (M = 8.31, SD = 2.44, *Median* = 10.00, *Mode* = 6.00 and 10.00) than if two bottles were discounted (M = 7.48, SD = 3.95, *Median* = 10.00, *Mode* = 10.00; $t(349) = 2.00$, $p = .047$, $d = 0.25$), consistent with a more traditional pricing or anchoring explanation.

In the conditions with two items discounted, participants with a narrow preference range purchased significantly more bottles of wines than those with a wide range ($t(349) = 4.63$, $p <$

.001, d = 0.63). Moreover, significantly more participants chose to purchase exactly two bottles of wine in the wide-range condition (27%) than those in the narrow-range condition (5%; $\chi^2(1, N=164) = 15.82$, $p < .001$). These results indicate that participants were more likely to take the price-increase point as purchase quantity if the point was within (rather than outside of) the reasonable range. Consistent with our predictions for cases in which the price increase amount falls within the preference range, we found no difference in purchase quantities between the narrow and wide range conditions when six bottles were discounted ($t(349) < 1$, *n.s.*). In this case, we found no difference in the percentages of participants who purchased exactly six bottles between the two range conditions (narrow = 40% and wide = 43%; $\chi^2(1, N=189) < 1$, *n.s.*).

Results in this study demonstrate the role of reasonable range as a moderator, and supports hypothesis 2. Consumers were more likely to respond to a price-increase within their reasonable range than below that range. The reasonable range is likely to be related to a variety of contextual factors such as the usage frequency of the focal product, a consumer's frequency of shopping, familiarity of the product, and the durability and the storage cost of the product. Consequently, the importance of reasonable range for the dragging down effect demonstrated here suggests that these additional contextual factors are likely to influence the observed dragging down patterns to the extent that they alter a consumer's perceived reasonable range.

Study 5: Reasonable Range and Novel Discount Type

Study 5 aimed to replicate the role of the reasonable range on the dragging-down effect through moderation. In addition, this study tests quality inference as a possible alternative explanation and tests whether the dragging-down effect extends to cases in which the price increase takes a different form, with implications for consumers' willingness to spend on a single

product.

One alternative explanation for our findings is that consumers may infer inferior product quality from the discounted low price, leading them to purchase fewer units when more are available at a discount (e.g., Raghubir and Corfman 1999). This explanation would be inconsistent with the findings in Study 1, in which the price promotion took the form of free samples, given research that suggests free gifts maintain quality perceptions while increasing perceptions of a deal (Darke and Chung 2005), or with Study 5 which includes identical price discounts and finds different patterns as a function of reasonable range. However, to further probe whether inferior quality inferences explain the dragging-down effect, we designed the current study to vary pricing without inferences for product quality by changing the cost of funds used to make a purchase rather than the price of the product itself.

Moreover, we aimed to extend the findings from the previous study to a broader domain of consumer decisions. Instead of varying the price of a product on a per-unit basis and examining a traditional measure of purchase quantity (e.g., "how many units of product consumers would like to buy"), we tested the effect of increasing the cost of borrowing money to finance a purchase. Through this approach, we were able to examine the effect of unit-price increases on quality decisions (i.e., what quality product would consumers choose to purchase) and to conceptually extend our findings from items that consumers are likely to purchase many units of to those of which consumers may purchase only one. In the current study, we used willingness to spend on a product as a proxy for quality selected and tested the effect of a unit-price increase in financing costs on the consumers' willingness to spend on a single product.

Method

Participants. We recruited 340 participants (56% female; M_{age} = 35.14, from 19 to 74)

online through Amazon's Mechanical Turk (MTurk) platform, and they completed the study for nominal monetary compensation.

Design and Procedure. This study adopted a 2 (price increase: low vs. high) x 2 (range: narrow vs. wide) between-subjects design. Participants were asked to imagine they were shopping for a new three-piece sectional sofa set for their newly remodeled living room.

In this study, we used another form of a price increase, namely, an increase in the financial cost associated with the purchase. The price increase was operationalized through the interest cost of purchasing the focal product. Because a sofa is a big-item purchase, participants were told they had to use their credit cards (with different rates and spending limits) for the purchase: "You plan to use your credit cards to pay for the furniture and repay the money in a year. You have two credit cards, and you can use either or both of them. Card A charges an annual interest rate of 22% and has no spending limit. Card B charges an annual interest rate of 12% and has a spending limit of [low] $100 / [high] $500." Thus, if participants preferred a high-quality sofa set, they would have to incur a higher interest rate for every dollar they spent above $100 (or $500).

We manipulated consumers' reasonable range of preference through the advice of an expert: "Your friend, an interior designer, recommends that a typical sofa suitable for your newly remodeled living room should cost you around $750, but you may also consider any sofa with a price range [narrow] between $500 to $1,000 / [wide] between $100 to $1400." Note that in the narrow-range conditions, $500 was within the recommended price range of a decent sofa set, whereas $100 was well below the standard. In the wide-range conditions, both $100 and $500 were within the price range. Participants then reported their willingness to spend of the purchase.

Results and Discussion

Consistent with our prior exclusion criteria, we excluded ten participants who failed more than half of the comprehension check questions from all analyses. After this data exclusion, the sample size was N = 353 (57% female; M_{age}=35.22, from 19 to 74).

Results are summarized in Figure 8. A 2 (price increase: low vs. high) x 2 (reasonable range: narrow vs. wide) ANOVA revealed a significant main effect of range (F(1, 326) = 4.04, p = .045, φ^2 = 0.01), and a significant interaction (F(1, 326) = 4.79, p = .029, φ^2 = 0.01). We found no main effect of cost increase (F=1.28, *n.s.*). The comparison within the narrow-range conditions replicated the dragging-down effect and revealed that participants planned to spend significantly less on a living room sofa set if they would incur a higher interest-rate cost for the amount they spent over $500 (*M* = $597.13, *SD* = 139.42, *Median* = $500, *Mode* = $500) than for the amount they spent over $100 (*M* = $663.11, *SD* = 138.20, *Median* = $700, *Mode* = $750; t(326) = 2.43, p = .016, d = 0.27). As a result, participants in the latter condition would have ended up paying a higher total cost for the purchase, measured both in dollars and in financing costs. By contrast, we found no difference in willingness to spend as a function of the cost-increase point for the wide-range conditions (*M*s = $600.68 and $579.63, *SD*s =172.10 and 252.21, *Median*s = $500 and $650, *Mode*s = $500 and $750, for high and low; t(326) < 1, *n.s.*). These results suggest that when both the low and high cost-increase points fell within consumers' reasonable range, their purchase decisions were insensitive to this difference.

Next, we examined whether participants took the price-increase point as their purchase quantity in each condition. Within the narrow-range conditions, we found no difference in the number of purchases of a $100 sofa set (1% for $100-Limit, 0% for $500-Limit; χ^2(1, N=176) < 1, *n.s.*) but significantly more purchases of a $500 sofa set in the $500-Limit condition (61%)

than in the $100-Limit condition (22%; $\chi^2(1, N=176) = 26.79, p < .001$). These results replicate previous findings and support H2, namely, that consumers take the price-increase point as their purchase quantity only if the point falls within their reasonable range. Within the wide-range conditions, we found significantly more purchases of a $100 sofa set in the $100-Limit condition (12%) than in the $500-Limit condition (0%; $\chi^2(1, N=154) = 9.64, p < .01$), and significantly more purchases of a $500 sofa set in the $500-Limit condition (38%) than in the $100-Limit condition (20%; $\chi^2(1, N=154) = 6.51, p < .05$). These results suggest that when both price-increase points fell within participants' reasonable range, participants could take either one as their purchase quantity, in line with the price-increase amount.

The interaction effect suggests the reasonable range of preference moderates the dragging-down effect. A cost-increase encourages consumers to stop spending at the point of the increase only if it falls within consumers' reasonable range. Study 5 again provided evidence supporting the hypothesis regarding the reasonable range (H2). Directly manipulating participants' reasonable range of preference, we found additional evidence that a price increase can affect willingness to spend on a purchase, but only if the point of increase is within consumers' reasonable range.

General Discussion

Across five studies, we observed a dragging-down effect in purchase decisions. Specifically, consumers purchased fewer units of a product when the unit price of the product increased at a high purchase quantity than when it increased at a low purchase quantity, or if the unit price was static at the regular level. As a consequence, consumers purchased more units of the product while paying a higher per-unit price for their purchases when fewer units were

available at a discount. Consumers' desire to take full advantage of the price promotion and their initial purchasing preferences together led to this pattern.

Exploring mechanisms and boundary conditions, we found that consumers take the price-increase point as a decision point and are more likely to choose to stop purchasing additional units when the unit price increases at a quantity within consumers' reasonable range for consumption. In this case, the quantity is close to their preference and has the additional benefit of minimizing costs. However, when a unit price increases at a quantity below consumers' reasonable range, consumers do not stop purchasing at the decision point and instead rely on their initial preferences for the purchase decision.

Studies 1 and 2 demonstrate the dragging-down effect (H1A and H1B) in consequential settings. Using real money in a lab setting, Study 1 examined participants' decisions to purchase chocolates as a function of the number of free samples available. Study 2 presented supermarket shoppers with different price promotions and examined how these promotions differentially affected the number of fruits purchased in a field experiment. Study 3 examined the mechanisms underlying the dragging-down effect, finding that that acceptability of the price-increase quantity mediates the effect of a price-increase point on purchase quantity (H3). Study 3 also tested a series of alternative explanations for the effect. Studies 4 and 5 further examined the moderating role of reasonable range and found that a price-increase affects purchase decisions only when this price-increase point falls within the reasonable range of consumers' preference. Study 5 also extended the dragging-down effect from decisions about purchase quantity to decisions about how much to spend. Across these studies, we find evidence of the dragging-down effect for a wide range of consumer products.

One alternative reason people might purchase fewer items when more are available at a

discount is that consumers infer a motivation (e.g., inferior quality) for the price promotions with a larger quantity limit. If this inference leads consumers to develop an unfavorable impression of the product or the marketer, it could lead to lower purchase quantities. However, we manipulated the source of the price increase in several ways, such as by introducing free samples, discounts with quantity limits, and an interest cost increase, and found the dragging-down effect in each case—despite different inferences that people may make about the reason for the price discount in each case. Perhaps most relevant, the price increase in the form of an interest cost (Study 6) came through a third party rather than the company selling the focal product, making the possibility that participants would infer the retailer's motives unlikely. Moreover, the reasonable range moderated the effect of the additional interest on the dragging-down effect, which is inconsistent with a quality-inference explanation.

In this research, we demonstrated that price increases act as decision points and take on properties of numeric cues, such as anchors or target values, with consumers placing less weight on the cue when it is outside of a range they perceive as reasonable. This moderation builds upon prior literature on extreme anchors and elucidates specific conditions under which numeric cues may not be incorporated into judgments and decisions. In contrast to prior literature, the numbers in our studies were not extreme values—they were not far away from the reasonable ones in terms of an absolute difference but were instead considered unreasonable as purchase quantities (e.g., limit 1 vs. limit 3 in Study 2; limit 2 vs. limit 6 in Study 4). Thus, the mechanism behind the dragging-down effect may contain elements of anchoring, but the patterns we describe (i.e., focal values that can lead people to purchase less as they increase in value) materialize as a function of a reaction to focal values that goes beyond what has been documented in prior literature on anchoring.

Furthermore, in our context, we find the distribution of consumers' choices in response to these values mimics that of a typical distribution of responses around target values rather than anchors (e.g., see Figure 4 for a representative histogram of responses, taken from Study 2). Specifically, we see asymmetric piling up at the decision point, suggestive of a response to a goal amount rather than a symmetric distribution that would be suggestive of an anchor (see Bartels and Sussman, 2018).

We focus on the effect of a price increase on purchase decisions in this work, but a price increase is only one example of a numeric cue that may signal a decision point for consumers to consider whether to continue purchasing additional items. We propose that other factors may also trigger such a decision point. For example, setting a default value (Goswami and Urminsky 2016; Haggag and Paci 2014) or presenting a social norm by indicating how much others consume (Goldstein, Cialdini, and Griskevicius 2008) may produce the same effect. As in the case of a price increase, we would expect that when the default value (or social norm) suggests a consumption level that falls within their reasonable range, consumers would be more likely to adopt this amount and take it as their purchase quantity. When the default value (or social norm) is below their reasonable range of consumption preference, they would be more likely to ignore the default value (or the social norm) and stick with their initial preferences. In the case of a price increase, taking advantage of discounts adds to the motivation for consumers to adopt the external cue as their decision point. In other cases, alternative motivations (e.g., need to conform) may be operating instead. Although the underlying reason for such effects would be different from the effect caused by price increases, these alternative cues could similarly influence consumer decisions by acting as plausible numerical cues. In the case of price increases, resulting effects yield counter-intuitive purchasing patterns in which people purchase

fewer units of a product when they are offered at lower per-unit costs.

In this research, we examined a consumer's reasonable range as one moderator of the dragging-down effect and found that consumers were more likely to respond to a price-increase quantity within their reasonable range than below that range. We propose that the reasonable range is related to a variety of contextual factors including product type, a consumer's familiarity of the product, and the usage frequency of the product. For example, consumers may be more likely to have a wider range of purchasing preferences for durable goods (rather than perishable goods) or for products with low storage costs. Similarly, uncertainty about usage frequency or unfamiliarity with a given product may lead to a wider range of preference because the consumer does not have firm beliefs that bound this preference range. While we did not find that moderation by product type in the current research, we believe that product type could be correlated with a variety of contextual factors that can affect the dragging-down effect through their impact on the reasonable range.

Implications

We show that pricing strategy can influence consumers' purchase and consumption decisions in counterintuitive ways. One implication for marketers is that when designing promotion strategies, they should consider their consumers' reasonable range for consumption. They should set the quantity limit of price promotions either low enough for consumers to ignore them as a decision point or high enough to be above consumers' initial consumption quantity to avoid leading consumers to purchase lower quantities at a lower price. When the price-increase point falls between these two levels, the promotion may be damaging for two reasons. First, firms forgo more profit to offer more units of product on sale; and second, the higher quantity limit could reduce purchase quantity when the quantity limit falls within consumers' reasonable

range for consumption.

Another possible implication is inverse price-break points as a new kind of behavioral nudging. In the context of energy consumption, researchers have been exploring possible ways to encourage savings consumption, such as emphasizing the health hazard (Dietz, 2015) or introducing a time-varying electricity pricing (Badtke-Berkow et al. 2015). One method some countries have adopted to reduce energy consumption is to use inverse tiered pricing for electricity. For example, in South Korea, the electricity rates vary from 8.1 to 62.0 South Korean won, based on energy use (Bojanczyk 2012). As households consume more energy, the price increases at discrete intervals. In an additional study with an electricity consumption scenario using a pricing strategy similar to the South Korea case, we found that participants chose to consume less energy when the electricity rate increased at a reasonably low household consumption level than at an unreasonably low consumption level. These findings suggest the price-increase point can be used to alter consumption, and the choice of this point may be useful for changing consumption behavior based on this pricing approach. A price increase at unreasonably low consumption levels is unlikely to affect decisions or reduce energy consumption.

The current findings also suggest that non-linear pricing strategies could help consumers regulate unhealthy consumption in other domains. For example, an extra tax on soda drinks exceeding a certain consumption quantity may help consumers reduce the quantity of sugar consumed. Compared with a flat soda tax, a tax-increase at a reasonable consumption level may provide consumers with additional decision points to reconsider their choices. In the context of financial decision-making, extra credits or reduced tax on predetermined levels of savings, such as the UK Personal Savings Allowance, may encourage consumers to save more. Importantly, to

avoid an unintended effect, the level of such tax-free income should be set in a way that exceeds an average household's savings.

Concluding Remarks

The current research addresses a fundamental issue in consumer behavior, examining how consumers react to price increases. Consumers encounter price increases in various forms, such as limited free samples, discounts with quantity limits, price surcharges or additional interest costs above a specified quantity, or tax breaks below a certain amount. This research adds to the literature of non-linear price increases in marketing by studying cases in which price increases can lead consumers to purchase more (vs. less) units when the per-unit price is higher (vs. lower). Future research should explore additional psychological factors that may influence consumer behavior in response to price increases.

Chapter 2: The Expediting Effect: Consumer Debt Repayment Decisions in Response to Interest Rate Increases

Abstract

Consumers frequently encounter loans with fluctuating interest rates. This research examines how the timing of an interest rate increase influences debt repayment decisions. The authors find that consumers will repay a loan faster if its rate will rise in the more distant future (i.e., the cost of debt is relatively lower) than if its rate has increased or will rise in the near future (i.e., the cost of debt is relatively higher). This pattern runs counter to the aim of minimizing total interest paid. The authors propose that consumers take the timing of the rate rise as a decision point: they view repaying their debt before the expected rate increase as a goal, and this goal increases motivation to repay. However, this goal-setting process only occurs when consumers believe that it is feasible for them to repay their debt before the rate increase. Across four studies, the authors provide evidence for these hypotheses, examine boundary conditions and moderators. The authors conclude by discussing implications for marketers, policymakers, and consumer welfare.

Introduction

Consumers frequently encounter fluctuating interest rates when taking out loans. For example, credit card companies commonly offer short-term introductory 0% interest-rates (APRs) as a marketing strategy to incentivize customers to sign up for a new account. Retail stores employ similar strategies to lure consumers with low or no interest financing on big-ticket

items if the balance is paid in full within 6 or 12 months. Changing interest rates extend to other consumer loans as well, such as variable rates on home mortgages or car loans. The prevalence of these changing interest rates raises important questions about how they influence consumers' financial decisions. This research aims to provide insight into these questions by exploring how changing rates influence consumers' perceptions of urgency and their decisions about when to repay their outstanding debt.

Total consumer credit outstanding in the US has been increasing since 2010, surpassing three trillion dollars in 2014 (Federal Reserve, 2014). Low and moderate-income households are particularly burdened by debt, lacking adequate savings to repay their outstanding balances (Consumer Federation of American, 2012). Consumers often do not understand basic properties of their credit cards such as how interest rates affect their finances and underestimate the effort required to pay off their debts (Soll, Keeney, & Larrick, 2013). They have trouble understanding their credit card fees (Stango & Zinman, 2011) and fail to optimize debt repayment across multiple credit cards (Amar, et al., 2011; Gal & McShane, 2012).

Economists have primarily examined consequences of changing interest rates in the context of adjustable-rate mortgages. They found mortgages with low initial "teaser" rates that change to (generally higher) adjustable rates after two or three years have been problematic for consumers in a variety of ways. These adjustable rate mortgages were at least partly responsible for the rise in delinquent payments between 2005 and 2008 (Mayer, Pence, & Sherlund, 2009). Borrowers with adjustable-rate mortgages underestimated the extent to which their interest rates could increase (Bucks & Pence, 2008), tended to focus disproportionately on the initial rather than the long-term costs of loans (Miles, 2004), and discounted the long-term costs of loans since they were overly optimistic about their future (Brunnermeier & Parker, 2005).

Imagine that a consumer who takes out a credit card with a 0% promotion rate to purchase a big-ticket item. Over the first couple of months, she may pay only the minimum fee to take advantage of the 0% rate and may anticipate that she will be able to repay the balance later. A few months later, she realizes that the interest rate is going to increase to 18% soon. The consumer will need to start paying a large amount of interest if she does not repay the debt in full before the rate increases. Now there are two possibilities. One possibility is that the consumer is motivated and able to spend less and save enough to repay the debt in full before the increase occurs. An alternative possibility is that the consumer is unable to repay before the increase and becomes much less motivated to repay this debt after the rate increase occurs. In this research, we study repayment decisions in response to future interest rate increases and identify factors that motivate consumers to repay debts in a timely manner. We discuss implications of our findings for policymakers and consumer advocates. For example, our research suggests early reminders of future rate increases combined with budget planning tools can help consumers leverage motivation from future rate increases, better manage their debts, and save on interest costs.

Psychological Contributors to Debt Repayment

Existing research has yet to explore how psychological factors influence consumers' repayment decisions when faced with rising interest rates. We predict that two distinct factors—sensitivity to change and perceptions of goal feasibility—interact to influence debt repayment decisions in this context. First, consistent with existing research demonstrating that decision makers are more sensitive to changes than to absolute states (Franconeri & Simons, 2003; Hillstrom & Yantis, 1994; Kahneman & Tversky, 1979; Tsuchiya & Koch, 2005), we anticipate that upcoming changes in interest rates are more salient to consumers than static rates. As a

result, consumers may take the timing of the rate change as a deadline and set a goal of repaying all of their outstanding debt before that deadline.

However, this goal setting process only occurs when this self-imposed deadline would be considered feasible. Perceptions of goal feasibility can influence which goals people select for themselves as well as how committed they will be to accomplish these goals (Kruglanski, et al., 2002; Locke & Latham, 2006). Although many goals are initiated and pursued in a deliberate and intentional manner, goals can also be adopted or activated automatically by certain values or environmental cues without any external pressure to meet the implicit goal. For example, students completing the SATs, baseball players aiming for a particular batting average, and marathon runners targeting a particular finishing time are all likely to view round numbers as goals (Pope & Simonsohn, 2011; Sachett, et al., 2014). People also tend to take temporal landmarks as goals, such as construing the end of the year as a deadline to quit smoking (Mukhopadhyay & Johar, 2005). However, people are more likely to select goals for themselves that they believe are feasible and are more committed to reaching feasible (vs. infeasible) goals once they are set (Bandura, 1977; Locke, 1996; Locke & Latham, 2002). We propose that the likelihood that an individual relies on an external temporal cue as a deadline depends on whether she perceives the deadline as feasible. Consider, for example, a person who would like to save a hundred dollars and believes she can save that amount before her next birthday; she may use her next birthday as the deadline for her savings goal. However, if she believes it is impossible to do so in time, she is unlikely to adopt such an early deadline. Building on the goal setting literature, this research demonstrates that consumers only respond to and take feasible time limits as their goal for repayment. This psychological process can lead to behaviors that run counter to minimizing economic costs.

Research has shown that consumers struggle in managing debt repayments over time. For example, they underestimate the annual percentage rates of their loans and the impact on their future finances (Lee & Hogarth, 1999; Stango & Zinman, 2011). They are confused by credit card terms and policies, which leads to mispredictions of the monthly payments required to pay off a debt over time (Soll, Keeney, & Larrick, 2013). Because consumers systematically underestimate exponential growth, they underestimate the effort needed to repay a debt and are unable to correctly value their future incomes (McKenzie & Liersch, 2011; Soman & Cheema, 2002). When it comes to making financial decisions, consumers not only lack the knowledge to understand their finances, but also have problem finding the right strategy to manage their debts. Instead of optimizing their debts through cost and benefit analysis, they base their decisions on numeric cues from credit card statements or heuristic strategies, rather than aiming solely to minimize interest costs (Amar, et al., 2011; Keys & Wang, 2014; Stewart, 2009).

While existing research has examined various reasons why consumers fail to make optimal financial decisions, the question of how psychological factors influence repayment decisions when consumers anticipate future interest rate increases remains unexplored. The current research makes both a practical and theoretical contribution. From a practical perspective, it adds to literature on the consumer financial decision making process, revealing insights to help consumers make better decisions around debt repayment. From a theoretical perspective, this research examines how expected changes in the environment (in this case, changes in interest rates) can jump-start the goal setting process. It reveals situations when consumers create repayment goals given external reference points, irrespective of explicit financial penalties.

Current Research

In this research, we examine how knowledge of the timing of a future interest rate increase influences a person's decision about when to repay her outstanding debt. To the extent that consumers' primary aim is to minimize the total cost of carrying a loan, they should prioritize their repayment efforts according to the absolute interest rate, paying back a debt sooner when it has a higher rate. Given this assumption of minimizing costs, consumers should make greater effort to repay a loan quickly if the rate on the loan increases tomorrow than if the rate on the loan will rise two months from now, conditional on their ability to do so (e.g., assuming no immediate liquidity constraints). In other words, consumers should have lower demand for a high cost product than an otherwise identical lower cost product. The change in rate should influence decisions only insofar as it alters the overall costs associated with holding the debt.

Feasible Repayment by Rate Rise as a Decision Point

Contrary to the cost-minimizing approach that predicts responses exclusively to the aggregate amount of the interest, we propose that consumers respond to anticipated increases in the interest rate and subsequently the rate increase event spurs their motivation to modify their repayment plans. Specifically, we predict that consumers will take the timing of a rate change as a deadline by which to repay their debt, but consumers only do so if they perceive repaying debt before the deadline as feasible.

In the absence of a rate increase, a consumer is likely to have a rough idea of how long she expects it to take to repay a certain amount of debt. We refer to this as the *default repayment time*. In addition, a consumer may hold beliefs about the minimum amount of time necessary to repay the debt if needed. We refer to this as the *earliest repayment time*. Both the default

repayment time and the earliest repayment time are determined by several factors such as the person's savings, spending, liquidity constraints, and the outstanding balance of the debt.

When anticipating a rate increase, we propose that consumers will consider using the time of the rate increase as an internal repayment deadline if repayment before that point seems possible. For the sake of clarity in this paper, we define the *near future* as the period during which a consumer does not believe she could repay her debt in full, starting from the present and ending at the *earliest repayment time*. If a rate rise occurs within the *near future*, a consumer would consider complete repayment before this rate rise as implausible. Consequently, she will not take the timing of the rate increase as motivation to repay her debt. In this case, the consumer may stick with the default repayment plan and ignore the rate rise. Therefore, a rate rise that happens in the *near future* will not expedite repayments.

Next, we define the *more distant future* as the period starting at the *earliest possible repayment time* and ending at the *default repayment time*. Consumers consider it possible to repay a balance before a rate rise in the *more distant future*, but they also believe that this would require additional effort. When a consumer perceives the rate rise timing as feasible for repayment, the person will take that time as a new repayment goal and commit to repaying before the rate increase (e.g., to avoid extra interest costs). Since the feasible repayment time is earlier than the person's *default repayment time*, the feasible goal motivates consumers to repay faster than when the rate increase (and associated goal) is absent. Thus, we predict an interesting pattern in which a rate rise in the *more distant future* leads a consumer to repay her debt earlier than if the rate rise happens in the *near future*, despite the fact that the consumer has to pay a higher overall interest with the rate rise in the *near future*.

H4: Consumers will plan to repay a loan sooner when the rate rises in the *more distant future* than when it rises in the *near future*.

As we explained before, a rate rise in the more distant future can trigger a feasible repayment goal, which is even earlier than a person's default repayment plan. Thus, we label this repayment pattern as the *expediting effect*, with the interest rate increase serving to expedite overall payment of the debt. Since consumers are more sensitive to rate changes than to static interest rates, we propose the following:

H5: Consumers will plan to repay a loan sooner if its rate is currently low and will increase in the *more distant future* than if its rate is already high.

As we explained previously, whether consumers perceive it as a feasible or infeasible goal to repay a debt before its rate rises determines whether they respond to that temporal cue and take the rate rise time as their deadlines for repayments. Thus, we propose:

H6: Perceived goal feasibility of repaying a debt before the rate increase mediates the expediting effect.

Finally, we explore a method to encourage consumers to make repayment decisions that are sensitive to the overall economic cost and consistent with minimizing overall interest cost. We propose that highlighting the overall cost of different loans at varying interest rates will lead consumers to focus on these absolute costs rather than the rate increases. Specially, we predict

that if consumers can calibrate the rate by directly comparing it with other rates, they will make repayment decisions consistent with the aim of minimizing total costs. Therefore:

> **H7**: When consumers are prompted to compare interest rates, the pattern of repayment decisions will reverse and become consistent with the aim of minimizing total interest costs.

Study 1 examines how consumers respond to interest rates as a function of when the interest rates increase. Results from Study 1 provide evidence that a rate rise in the more distant future leads consumers to repay their debt sooner than if the rate would rise in the near future (H4). Study 2 replicates the expediting effect in settings with real monetary consequences. Study 3 extends findings (H4, H5) to more realistic credit card debt settings and to a decision context of monthly repayment amount, suggesting important implications for public policy. Study 4 examines boundary conditions and finds that the pattern occurs when temporal cues are related to interest rates but does not extend to other temporal cues. Study 5 explores possible mechanisms underlying the observed patterns and finds evidence that a goal feasibility factor—including goal setting, goal feasibility, sense of control, determination, and regret—mediates the expediting effect (H6). Finally, we explore a method to encourage consumers to make repayment decisions that are sensitive to the overall economic cost. Study 6 tests evaluation mode as a moderator of the expediting effect (H7). We find that consumers' repayment decisions reverse when they view multiple rates simultaneously, becoming consistent with a focus on minimizing costs. We conclude by discussing public policy implications for consumer welfare and suggestions for improving borrowing and repayment patterns.

Study 1: Identifying an Expediting Effect

Study 1 aims to test whether there is evidence for the expediting effect in a nationally representative sample by measuring repayment decisions in response to future interest rate increases.[3]

Method

Participants. Six hundred and thirteen participants were recruited online through the Fulcrum Academia platform. They received $1.50 for participating in this study. The platform allowed us to access a sample of participants representative of the national population based on the following dimensions: gender, age, ethnicity, education, region, political party, and household income. Prior to all analyses, we discarded data from 29 nonsense responses, 83 participants who failed comprehension checks, and 7 outliers that were more than three standard deviations from the mean. Our final sample consisted of 494 participants (46% male) who were 18-86 years of age (M_{age} = 47.40).

Design and procedure. Participants read a scenario stating that they took out a 0% introductory rate credit card for the sole purpose of paying their tuition (a cost of $3,500), with the plan to repay the credit card company later. Participants were randomly assigned to one of two conditions in which they were told that the 0% rate would expire in either one month or in four months. They received their credit card statement for the current month and realized that the 0% rate was "going to expire in one month" (near future condition), or was "going to expire in four months" (more distant future condition).

They were told that they had no savings and after paying only basic living expenses (including rent, essential groceries, utilities, etc.), they had $1,000 remaining to spend each

[3] This study was pre-registered at AsPredicted.org (link: http://aspredicted.org/blind.php?x=qf5wx4).

month. This money needed to get them through the month and will be used for all additional expenses. In a typical month, they usually spend about $300 on these expenses.

After reading this information, participants were asked to decide when they would like to repay the debt, and they entered the number of months it would take them to repay the debt in an open-ended text box.

After answering this main question, participants responded to a list of additional measures as well as a comprehension question asking them to recall the time when the interest rate would increase. The additional measures were included for exploratory purposes and consisted of a 13-item financial literacy measure: numeracy, preference for numerical information, attitude toward money, need for cognition, consumer confidence in financial information search, restraint and impulsivity (all adopted from Lynch 2011), subjective financial literacy, and attitude towards debt. We also measured participants' prior experience with credit cards and debts (e.g., whether they had used credit cards, applied for cards, and carried balance to the next month, etc.) and basic demographics.

Results and Discussion

Consistent with our hypothesis, participants in the in-four-month condition decided to repay the credit card debt faster (M = 6.46 months, SD = 6.09) than participants in the in one month condition (M = 8.28 months, SD = 7.08; $t(492) = 3.06$, $p = .002$, $d = 0.28$), despite the fact that participants in the in-one-month condition would have to pay higher average monthly interest costs. Furthermore, 48% of participants in the in-four-months condition chose to repay before the interest rate increase (i.e., repay within four months), but only 3% of participants in the in-one-month condition chose to do so (i.e., repay within one month; $\chi^2(1, N = 494) = 129.19$, $p < .001$, $\varphi = 0.51$). If we compare the percentage of participants repaying within four months

between the two conditions, significantly more participants chose to do so in the in-four-months condition than those in the in-one-month condition (48% vs. 24%; $\chi^2(1, N = 494) = 30.28$, $p < .001$, $\varphi = 0.25$).

Next, we examined whether the expediting effect held after accounting for customer demographics (e.g., gender, age, household income level, ethnicity, education level, region, etc.) and money-related traits (e.g., numeracy, preference for numerical information, attitude toward money, need for cognition, consumer confidence in financial information search, restraint and impulsivity, etc.). We ran a linear regression with condition (in-one-month coded as 0 and in-four-months coded as 1), financial literacy, and all the other trait measures as independent variables, and months to repay as dependent variable. We found condition significantly predicted months to repay ($\beta = -0.14$, $t(466) = 3.07$, $p = .002$) when controlling for all additional characteristics collected. Of all the other measures, we only found significant main effects of age ($\beta = 0.19$, $t(466) = 3.57$, $p < .001$) and how often participants generally carry over their credit card balance to the next month ($\beta = 0.13$, $t(492) = 2.45$, $p = .015$) in predicting months to repay.

A possible concern regarding this experiment may be whether participants in this sample held credit cards, and whether they are able to estimate the decision task reasonably. Therefore, we tested the expediting effect including only those (79% of participants) who reported being credit card users. We found the same significant results ($M_{four\text{-}month} = 6.43$ and $M_{one\text{-}month} = 8.03$; $SD_{four\text{-}month} = 6.07$ and $SD_{four\text{-}month} = 6.87$; $t(390) = 2.45$, $p = .015$, $d = 0.25$).

One reason for measuring money-related personal traits was to examine whether consumers scoring high on numeracy or financial literacy might be less likely to respond to the timing of an interest rate increase and more likely to make decisions consistent with economic costs. Thus, we tested whether there was an interaction between these factors and condition in

predicting time to repay. We ran a linear regression with condition, numeracy (the score of four numeracy questions adopted from Lynch 2011), the interaction between condition and numeracy as independent variables, and months to repay as dependent variable. We found significant effects of condition (β = -0.33, $t(489) = 3.34$, $p = .001$), numeracy (β = -0.13, $t(489) = 2.21$, $p = .027$), and their interaction (β = 0.2 4, $t(489) = 2.21$, $p = .027$). These results suggest that high numeracy participants chose to repay faster overall than low numeracy participants. Furthermore, the expediting effect was stronger with low numeracy participants while higher numeracy participants tended to make more cost consistent repayment decisions. We ran a parallel set of analyses using financial literacy (the score of 13 questions adopted from Lynch 2011) rather than numeracy, but did not find significant main effects or interactions with this measure ($ps > .40$).

These results provide initial evidence for the expediting effect: a rate increase in a *more distant future* period expedites repayment decisions relative to a rate increase in the *near future*. This effect corresponded to participants repaying lower cost loans (those charging lower interest rates for longer periods) sooner relative to the more expensive loans (those charging higher interest rates for longer periods).

Study 2: Incentive Compatible Debt Repayment Game

The previous study provided evidence for H4 using hypothetical scenarios. We next examine whether the expediting effect persists in a setting with consequential outcomes for participants.

Method

Participants. Two hundred and fifty-nine participants were recruited online through Amazon's Mechanical Turk platform. They received fixed compensation of $0.80 for

participating in this experiment, plus a variable bonus that ranged from $0.14 to $0.48 depending on their choices in the game. Thirteen participants dropped out in the middle of the game, and their responses were not included in the analyses. There was no difference in the drop-out rate across conditions, and the results remain the same if their partial data are included. Prior to analyses, we discarded data from one participant who was under 18 years old and 33 participants who failed comprehension checks. Thus, our final sample consisted of 212 participants (48% male) who were 18-72 years of age (M_{age} = 36.29).

Design and procedure. As previous research has used the paradigm of a debt game as the experimental method to study financial decision making (Kettle, Trudel, Blanchard, & Haubl, 2016), we designed a computer-based debt repayment game to examine participants' willingness to exert real effort towards repaying their debt in response to the anticipation of rate increase. Participants were invited to play a game that simulated the debt payment process. Participants started the game with a certain amount of debt. The debt would start to incur a 5% interest rate at some point during the game. Their goal in the game was to repay their debt, and they could continue to earn money after repaying their debt. To repay the debt and earn money, they could choose to work on one of two tasks, either a typing task or a riddle task. The typing task was relatively harder and more boring but paid more[4]. Participants had to type a long nonsense string (e.g., "'H{l1^7+a8z=tC") correctly to receive payment (and they had to re-type if they got it wrong). The riddle task was easier and more fun but paid less. Participants read a riddle (e.g., "What can you catch but not throw?") and saw the correct answer (e.g., "a cold") after entering a guess; they were paid regardless of their answers. Participants saw two samples, one for each task, before the game started. The game was played over 10 periods. Participants began by

[4] These tasks were pretested on difficulty and enjoyment.

selecting which task they would be working on, selecting the same task for all 10 periods. Their earnings would first be used to repay their debts. After paying off the debt, the extra earnings would go to a savings account. Participant bonuses depended on how much debt they still owed or how much extra earnings they had accumulated at the end of the game.

Manipulation. We manipulated when the interest charges began, either at the beginning of the 1st period (near future condition) or at the beginning of the 8th period (more distant future condition). We designed the initial debt levels in both conditions such that participants choosing the typing task would repay in seven periods while participants choosing the riddle task would repay in nine periods. In other words, participants could either repay their debt in seven or nine periods—and would receive the same corresponding bonus payments—irrespective of their condition. Note that the key difference between the two conditions was that participants could repay their debt before the rate increased only in the more distant future (8^{th} period) condition, but not in the near future (1^{st} period) condition. Participants responded to comprehension questions to test whether they understood the instructions.

After the instructions, participants were reminded of the two options, along with the financial consequences of each choice, before indicating which task they would like to work on. For example, in the near future condition they read that if they chose the typing task, they would pay off their debt before the 8^{th} period and pay a total interest of $1495. If they chose the riddle task, they would pay off their debt before the 10^{th} period and pay a total interest of $1961.

In the more distant future condition, they read that if they chose the typing task, they would pay off their debt before the 8^{th} period and pay no interest. If they chose the riddle task, they would pay off their debt before the 10^{th} period and pay a total interest of $99[5].

[5] There was a higher initial debt in the more-distant-future condition to allow us to keep the repayment periods the same across conditions given different interest rate structures. To offset the possibility that participants starting with

Right after their decisions, they performed the task they chose. Participants received their bonus after completing the experiment.

Results and Discussion

Findings replicated the patterns observed in the previous studies, supporting Hypothesis 4. Significantly more participants chose the more effortful, higher paying job, which enabled them to repay the debt sooner in the more distant future condition than in the near future condition (79% vs. 67%; $\chi^2(1, N = 212) = 4.46$, $p = .035$, $\varphi = 0.31$). Because of their choices, participants in the more distant future condition received, on average, higher bonuses than participants in the near future condition (42 cents vs. 37 cents; a 13.51% difference).

The results in this study replicated the expediting effect in a situation with monetary consequences. This data provided additional evidence that when participants had the chance to repay before the rate increased, they exerted additional effort to repay sooner before rate increase occurred.

Study 3: Selection of Monthly Payment Amount

Study 3 aims to test the expediting effect in a more realistic setting that mirrors a real credit card repayment decision. In this study, survey stimuli are modeled from real credit card statements. We use the scenario in which participants receive their credit card bill for the current month and then make payment decisions. When facing such a decision, consumers may naturally think of the decision as how much they are willing to pay this month or how much they would like to pay each month, instead of when they would like to pay it off. Therefore, the dependent

a higher debt were more motivated to choose the hard task, we explicitly highlighted the interest payments associated with each option when participants were making their choice. Since the difference in interest payments between the two options was smaller in the more-distant-future condition, highlighting this cost should work against our hypothesis.

variable is a monthly repayment amount, and we test whether the expediting effect persists in such a context.

In addition, this study adds a control condition in which the interest rate is already at the increased level. This condition is included to test whether the rate increase in the more distant future expedite the repayments or the rate increase in the near future prolong the repayments.

Method

Participants. Two hundred and seventy-seven participants were recruited online through Amazon's Mechanical Turk platform and completed the study for nominal monetary compensation. Prior to analyses, we discarded data from 39 participants who failed comprehension checks. Thus, our final sample consisted of 238 participants (54% male) who were 18-84 years of age (M_{age} = 35.06).

Design and procedure. Participants read a scenario stating that they took out a 0% introductory rate credit card for the sole purpose of paying their tuition (a cost of $4,000), with the plan to repay the credit card company later. Participants were randomly assigned to one of three conditions, in which they were told that the 0% rate would expire at different points in the future (five, six, or 10 months after the account opened). Participants read that five months had passed, and they had been paying only the minimum payment due in each of the prior months. They then received their credit card statement for the current month and realized that the 0% rate "expired at the end of last month" (already increased condition), was "going to expire in one month" (near future condition), or was "going to expire in five months" (more distant future condition). They were told that they had no savings and their disposable income was around $900 per month.

On the next page, participants saw a credit card statement designed to look as similar as

possible to credit card statements that consumers typically receive. These statements contained a summary of the account balance, payment due date, and the interest charge calculation (Figure 9). In the interest rate calculation table, we stated the expiration date for the 0% rate, which credit card statements in the US are required, by law, to include.

After reading this information, participants were asked to set up a monthly payment for the credit card. They could choose from a list of plans, ranging from paying the minimum fee of $35 per month to paying $900 per month. The repayment plans also displayed the total number of months required to repay the outstanding balance, the total amount and the total interest that would be paid over the life of the loan, and the rate in the last month of payment (see Figure 10 for an example of the repayment plans). These additional values were included to assist participants in determining the full costs associated with repaying the loan in each case.

Results and Discussion

A one-way ANOVA found a significant effect of condition ($F(2, 237) = 5.55$, $p = .004$, $\eta^2 = 0.05$). Specifically, participants in the more distant future condition chose a significantly higher monthly payment (M = \$482.17, SD = 256.59) than participants in the near future condition (M = \$392.66, SD = 267.33; $t(235) = 2.18$, $p = .030$, $d = 0.34$) or participants in the already increased condition (M = \$348.92, SD = 243.83; $t(235) = 3.28$, $p = .001$, $d = 0.53$). These higher monthly payments in the more distant future condition (vs. the near future condition and already increased condition) correspond to faster repayment of the outstanding balance, even though the costs were lower in the more distant future condition. We found no significant difference in payment amount between the near future and the already increased conditions ($t(235) = 1.09$, *n.s.*).

In the current study, the expediting effect holds even when participants considered the repayment decision by determining how much they would like to pay each month. Notably, the

current paradigm instructed participants to make a single decision for several upcoming months. While many consumers make repayment decisions on a monthly basis, consumers often have the ability to choose a repayment plan and stick with it as a recurring payment each month. These findings are particularly important to the extent that consumers can set this payment plan as a default through an auto-payment feature, and suggests that this behavior may be particularly effective at reducing debt when rates are increasing in the future.

The results also rule out the alternative explanation that participants selected certain options because a specific timeframe was mentioned in the scenario, without considering or correctly calculating associated interest costs. In the current study, we calculated the overall cost associated with each choice and explained this clearly to participants as they were making their choices.

Study 4: Would Any Temporal Cue Serve as a Goal?

The previous studies have demonstrated the expediting effect: Consumers react to the time of an interest rate increase in the future and take that time as their repayment deadline, but they only do so when it is feasible for them to repay before the time of the rate increase. Next, Study 4 tests whether consumers would react to any temporal cues when making repayment decisions.

Method

Participants. Two hundred and fifty-six participants were recruited online through Amazon's Mechanical Turk platform and completed the study for nominal monetary compensation. Before the analyses, we discarded data from 10 participants who failed to understand the scenario as demonstrated through responses to manipulation checks. Thus, our

final sample consisted of 246 participants (47% male) who were 19-76 years of age (M_{age} = 35.90).

Design and procedure. This study adopted a 2 (time: near future vs. more distant future) x 2 (Temporal cue: rate change vs. policy change) design. All participants read that they had taken out an auto loan from a bank a while ago. The initial annual interest rate of the loan was 2%, but it would rise later. At the moment, they still owed the bank $6,000. In the two rate change conditions, participants read that the interest rate of the loan would increase from 2% to 8% either next month (near future condition) or in six months (more distant future condition) and that it would not increase again. In the two policy change conditions, participants read that the bank's monthly mailing bill policy would change to a paper-less online bill policy either next month (near future condition) or in six months (more distant future condition). After reading that information, all participants were asked when they would repay the loan.

Results and Discussion

Results are summarized in Figure 11. A 2 (time: near future vs. more distant future) x 2 (temporal cue: rate change vs. policy change) ANOVA on time to repay revealed a significant main effect of time ($F(1,242) = 4.26$, $p = .040$, $\eta^2 = 0.017$), no main effect of temporal cue ($F(1,242) < 1$, *n.s.*), and no interaction effect between time and temporal cue ($F(1, 242) = 1.38$, $p = .24$). Next, planned contrast analyses revealed that the expediting effect was replicated in the rate change conditions, but not in the policy change conditions. Participants chose to repay the loan significantly sooner when the rate would increase in six months (M = 11.48 months, SD = 7.37) than when it would increase the next month (M = 15.14 months, SD = 10.89; $t(242) = 2.38$, $p = .018$, $d = 0.39$). Significantly more participants in the six months condition (27%) chose to repay the loan within six months than those in the one month condition (8%; $\chi^2(1, N = 246)$ =

7.58, $p = .006$, $\varphi = 0.18$). However, we failed to find that participants chose to repay the loan sooner when the mailing policy would change in six months ($M = 13.00$ months, $SD = 7.11$) than when it would change the next month ($M = 14.01$ months, $SD = 9.10$; $t(242) < 1$, *n.s.*). Although there were significant differences in the interest rate conditions and not in the policy change conditions, the lack of a significant interaction between time and temporal cue means that differences across these two types of cues should be interpreted with caution.

In this study, we found the temporal cue associated with mailing policy changes did not lead to the expediting effect. It suggests that participants did not take the non-interest related temporal cues as deadlines to repay their loans and that these non-interest related cues failed to have as strong of an effect on their repayment decisions.

Study 5: Feasible Goal as a Mediator

Study 5 aims to explore the underlying mechanism of the expediting effect further. Specifically, we test potential explanations including goal setting, goal feasibility, sense of control, determination, regret, rate perception, and reference points, which we describe as follows.[6]

First, according to the goal-setting literature, people are more likely to select goals for themselves that they believe are feasible (Bandura, 1977; Kruglanski, et al., 2002). Setting specific goals can increase goal commitment and motivation (Locke & Latham, 2006; Wright & Kacmar, 1994). When the timing of a rate rise is further in the future, a consumer might perceive the possibility of repayment by that deadline as more feasible, and thus be more likely to take the timing of the increase as a new repayment goal. A consumer may also feel more sense of control

[6] This experiment was pre-registered at AsPredicted.org (link: http://aspredicted.org/blind.php?x=2bm2we).

over her finances when the goal is feasible, and this sense of control could contribute to the repayment motivation.

Second, consumers might take the timing of the rate increase as a goal is anticipated regret (Zeelenberg, 1999). Consumers might feel regret if they fail to repay the debt before the rate increase, and the negative emotion motivates them to take actions towards repayment. Separately, consumers may adopt different reference points when evaluating the interest rate of the debt. They might take the increased rate as their reference point in the near future condition, and thus do not feel the need to repay before this increase, perceiving the higher interest rate as reasonable. In contrast, those in the more distant future condition make take the original interest rate as their reference point, increasing their motivation to repay before the rate rise (e.g., reacting to loss aversion; Kahneman & Tversky, 1979).

Method

Participants. Three hundred participants were recruited online through Amazon's Mechanical Turk platform and completed the study for nominal monetary compensation. Before the analyses, we discarded data from four participants who failed to understand the scenario and three outliers. Thus, our final sample consisted of 293 participants (45% male) who were 18-67 years of age (M_{age} = 34.93).

Design and procedure. Participants read that they had taken out a loan from a bank a while ago. The initial annual interest rate of the loan was 2%, but they were aware that it would rise later. At the moment, they still owed the bank $7,000 and their disposable income was around $1,200 each month. Participants were randomly assigned to one of two conditions, in which they were told that the rate would increase from 2% to 8% either in one month (near future) or in six months (more distant future) and that it would not increase again. Then,

participants were asked when they would repay the loan, which was the main dependent variable.

Potential Mediators. After measuring the main dependent variables, we tested several possible mediators for the expediting effect. Those mediators were:

Goal setting. "When you were making the decision, to what extent did you view repaying the loan before the rate goes up in one/eight month(s) as a potential goal?" (1=I definitely did not view this as a goal, 7=I definitely did view this as a goal.)

Goal feasibility. "When you were making the decision, did you think it would be possible to repay the debt within one/eight month?" (1=I thought it would definitely not be possible to repay the debt, 7=I thought it definitely would be possible to repay the debt.)

Sense of control. "When you were making the decision, did you think it would be within your control to repay before the rate goes up in one / eight months?" (1=Repaying the debt before the rate increase would definitely not be in my control, 7=Repaying the debt before the rate increase would definitely be in my control.)

Determination. "When you were making the decision, how determined were you to repay the debt before the rate goes up in one/eight months?" (1=I was not at all determined, 7=I was extremely determined.)

Regret. "Would you regret it if you decide to repay the debt after the rate goes up in one/eight months?" (1=Definitely not, 7=Definitely would.)

Rate perception. "How high do you think the 8% interest rate (the rate you would get after one/eight month(s)) is?" (1=Extremely low, 7=Extremely high.)

Reference point. "Which interest rate do you think is more common for loans like those described in the scenario?" (1=Definitely 2%, 7=Definitely 8%.)

Results and Discussion

We replicated the expediting effect: Participants decided to repay the loan sooner when the rate would rise in six months (M = 11.95 months, SD = 7.53) than when the rate would rise in one month (M = 14.73 months, SD = 10.17; $t(291) = 2.65$, $p = .009$, $d = 0.31$). Furthermore, significantly more participants in the six months condition (25%) chose to repay the loan within six months than those in the one-month condition (11%; $\chi^2(1, N = 293) = 8.23$, $p = .004$, $\varphi = 0.17$).

Next, we tested possible explanations for the expediting effect by analyzing potential mediators. Each question testing for potential mediation aimed to measure a different aspect of participants' thoughts and processes, but some of the questions (e.g., goal setting and goal feasibility) might have measured a similar construct. To test that possibility and to understand the underlying mechanism better, we first conducted a factor analysis with all the potential mediators. The analysis yielded two factors explaining a total of 68.607% of the variance for the entire set of variables (see Table 2). Factor 1 was labeled *goal feasibility* due to the high loadings of goal setting, feasibility, sense of control, determination, and regret. This first factor explained 50.718% of the variance. Factor 2 was labeled *reference rate* due to the high loadings of rate perception and reference point. This factor explained 17.889% of the variance.

Based on the factor analysis results, we combined the five measures in Factor 1 and used their average as the goal feasibility score (Cronbach's $\alpha = 0.89$). As would be expected, participants in the more distant future condition reported perceiving higher goal feasibility than participants in the near future condition (Ms = 4.57 and 2.60, SDs = 1.50 and 1.46; $t(291) = 11.35$, $p < .001$, $d = 1.33$). We also combined the two measures in Factor 2 and used their average (with rate perception reverse coded) as the reference rate score (Cronbach's $\alpha = 0.40$). However, we found no significant differences between the two conditions in reference rate, rate

perception, or reference point (*t*s<1, *n.s.*).

Since the additional measures in this study loaded on two factors, goal feasibility and reference rate, we conducted a mediation analysis with these two factors. Our model included the rate increase time as the independent variable (with the near future coded as 0 and the more distant future coded as 1), goal feasibility and reference rate as the mediating variables, and the time to repay as the dependent variable. We used the bootstrap procedure with 10,000 resamples (PROCESS Model 4; Hayes 2012) and found a significant indirect effect of goal feasibility (indirect effect = -4.70, *SE* = 0.93, biased-corrected 95% confidence interval = [-6.68, -3.05]). The more distant future condition significantly increased goal feasibility (a = 1.97, p < .001), and goal feasibility was negatively associated with time to repay (b = -2.39, p < .001). Including goal feasibility in the model reduced the effect of a rate increase on time to repay (from c = -2.78, p = .009 to c' = 1.92, p = .09). Thus, we concluded that goal feasibility mediated the expediting effect.

Findings in this study suggest that, when the rate rise happened in the more distant future (rather than in the near future), participants were more likely to take the timing of the rate increase as a deadline to repay their debt and set it as a goal, and they considered such a goal as more feasible to achieve and were more committed to that goal. The goal setting and their commitment in turn led them to repay the debt sooner.

Study 6: Preference Reverse When Comparison to Other Rates is Highlighted

The previous studies have demonstrated the expediting effect and uncovered the relevance of goal/feasibility in repayment decisions. Next, Study 6 aims to explore an additional moderator of the expediting effect and test H7, which states that drawing consumers' attention

back to the interest rate amount will reduce the expediting effect. Specifically, this study examines whether joint evaluation (Hsee & Zhang, 2010) alleviates the expediting effect.

Study 6 also aims to examine two alternative explanations for the expediting effect. First, participants might want to repay a loan with a higher interest cost more slowly than one with a lower interest cost due to higher short-term costs coupled with immediate liquidity constraints. Second, participants might feel mistreated as they received short notice of interest rise increase in the near-future condition and therefore deliberately delayed the payments. In either case, we would not anticipate a reversal when the two loans were presented at the same time.

Method

Participants. One hundred and seventy-six participants were recruited online through Amazon's Mechanical Turk platform and completed the study for nominal monetary compensation. Before the analyses, we discarded data from eight participants who failed to understand the scenario. Thus, our final sample consisted of 168 participants (36% male) who were 18-73 years of age (M_{age} = 38.90).

Design and procedure. This study adopted a 2 (time: near future vs. more distant future) x 2 (evaluation mode: joint vs. single) mixed design. In the two single evaluation conditions, participants read that they had taken out a car loan from a bank a while ago. The initial annual interest rate of the loan was 2%, but it would rise later. At the moment, they still owed the bank $9,000 and they were informed that the rate would increase from 2% to 8% either next month (near future) or in eight months (more distant future) and that it would not increase again. Participants were asked when they would repay the loan.

In the joint evaluation condition, participants could read and compare the two situations side by side. They were asked to imagine that they had borrowed two loans from two different

banks. The initial annual interest rates of both loans were 2%, but they would rise later. At the moment, they still owed each bank $4,500. They were given the following information about each of the loans:

> *Loan A: You are informed today that the bank has just increased its interest rate to 8% next month. (It will not increase the rate again.)*
> *Loan B: You are informed today that the bank will increase the interest rate to 8% in eight months. (It will not increase the rate again.)*

Participants reported when they would repay each loan. Note that in this design, we did not give any income or savings assumption. All participants responded to two reading comprehension questions and basic demographics before completing the survey.

Results and Discussion

Results are summarized in Figure 12. We replicated the expediting effect in the single evaluation conditions: Participants decided to repay the loan sooner when the rate would rise in eight months (M = 18.93 months, SD = 11.64) than when the rate would rise next month (M = 26.39 months, SD = 15.47; $t(110) = 2.88$, $p = .005$, $d = 0.54$). Next, we examined participants' responses in the joint evaluation condition and found a reversed pattern. When participants could compare the two loans and two interest rates side by side, they repaid the loan with the rate increasing next month faster (M = 10.43 months, SD = 12.04) than the loan with the rate increase in eight months (M = 13.71 months, SD = 12.44; $t(55) = 2.70$, $p = .009$, $d = 0.27$). Finally, we performed a hybrid t-test as proposed by Hsee (1996) and found a significant interaction between time and evaluation mode ($t(165) = 3.51$, $p < .001$, $d = 0.55$).

Results in the joint evaluation condition revealed that participants were sensitive to overall costs when they were able to compare the two rates. In this condition, participants chose to repay the loan with higher interest costs sooner, suggesting that liquidity constraints (e.g., the inability to pay the higher interest rate loan as quickly as the lower interest rate loan as a result of insufficient funds being immediately available to cover additional interest costs) were not driving earlier results. This decision reversal in the joint evaluation condition also ruled out the possibility that participants judged the short notice of the immediate rate rise as unfair and chose to delay payment as punishment to the loan company for this reason[7]. Instead, we found in joint evaluation consumers chose to repay the early rising loan sooner, indicating that they were aware of the cost of paying late and not expressing resentment to the lender in the form of late payment.

The findings in Study 6 suggest that forcing consumers to compare an anticipated rate rise with other interest rates that consumers are facing will encourage them to make repayment decisions in accordance with minimizing their total interest costs. However, in our everyday lives, consumers frequently encounter bills in sequence as they arrive, rather than in direct comparison against one another. Results from a pilot survey of credit card holders (N = 188) support this pattern, showing that 69% of them did not know or could not recall the interest rates of their credit cards. These results are consistent with previous research, which shows that consumers are confused and unfamiliar with their interest rate (Lee & Hogarth, 1999; Soll, Keeney, & Larrick, 2013; Stango & Zinman, 2009).

General Discussion

In this research, we provided the first demonstration of an expediting effect: participants

[7] People may take this action as a punishment to express disapproval, even if they are not actually hurting the company by doing so.

reported repaying a loan sooner when the interest rate would increase in the more distant future than when the rate would increase in the near future (Study 1). We found that the effect held in incentive-compatible contexts (Study 2) and when the dependent variable was monthly payment amount instead of time to repay (Study 3). We tested boundary conditions and found that the expediting effect occurred with rate change temporal cues but not with non-interest related temporal cues, suggesting the expediting effect is specific to cost increases (Study 4). Finally, in Study 5, we explored underlying mechanisms and found that perceptions that repayment by the time of rate rise was feasible mediated the expediting effect. Moreover, repayment decisions reversed in situations where participants focused on the value of the interest rates by evaluating two interest rate schedules side by side in joint evaluation, proposing a solution for consumers while also suggesting that the central findings are not attributable to liquidity constraints or beliefs about fairness (Study 6).

This research provides both theoretical and practical insights for understanding consumer behavior. Theoretically, this research contributes to our knowledge of how people create goals given external reference points, irrespective of explicit financial penalties. We show that people's sensitivity to change can lead them to incorporate an upcoming increase in interest rates as a deadline by which to accomplish a goal of debt repayment. However, this goal-setting process occurs only when people consider goal feasible.

This insight can be applied to help us understand existing patterns of debt payment. Research has found consumers' payment is bimodal, with most consumers either paying their credit card balances in full or else paying near the minimum each month (Keys & Wang, 2014). Perceptions of feasibility may be one factor shaping this bimodal pattern. Even absent of special offers, credit card consumers typically receive interest-free loans if they repay the loan in full by

that month's billing deadline. The interest rate for these customers rises at the end of the billing cycle, when the credit card company begins charging interest for unpaid debts. If consumers are close to being able to repay their debt in full before their bill comes due, they may adjust both their spending and debt repayment behaviors to ensure they can achieve this goal. However, consumers who do not believe they will be able to repay their loan in full before the interest-rate increases at the end of the month may lose motivation to repay more than they need to avoid a large financial penalty, thus paying only the minimum amount. Furthermore, once consumers acknowledge that they will not be able to pay their debt in full for a given month, they may then forego the motivation that accompanies the monthly deadline and increase their spending. In this way, consumers may incur greater debt in anticipation of failing to meet their goal.

Implications for Consumers

More than half of consumers in the United States have at least one credit card (Foster et al., 2011). Rising interest rates can present problems for consumers by increasing the total amount of debt accumulated if the full debt remains unpaid prior to the rate increase. The current research contributes to an underdeveloped behavioral literature that aims to understand how consumers manage their debt (Hershfield, et al., 2015; Amar, et al., 2011; Soll, Keeney, & Larrick, 2013; Sussman & O'Brien, 2016). While economic analysis assumes that people react to interest rate levels (i.e., financial incentives), we find that consumers can be relatively insensitive to the overall monetary cost when a rate is static or is rising in the near future. Our findings instead support existing evidence, which shows that consumers are often confused by interest rates and unfamiliar with the terms on their loans (Lee & Hogarth, 1999; Soll, Keeney, & Larrick, 2013; Stango & Zinman, 2009). Perhaps most problematic, interest rates may rise for consumers holding loans without their awareness or attention. Thus, reminding and informing

consumers of their current interest rates is a crucial first step to help consumers better understand and manage their debts. This is consistent with empirical evidence showing that a monthly text reminder of due date, APR, and the individual's financial goal improves the credit scores of low-score individuals (Bracha & Meier, 2014).

Rather than being solely a cause for concern, findings presented here suggest that by leveraging future changes in interest rates this can increase consumers' motivation to repay debt. Since consumers are sensitive to change, the rate change event could be used as a signal to trigger motivation to repay debt in an active manner. However, for these rate changes to be motivating, they must be salient to consumers with enough advance notice that the timing of rate rise is a feasible goal for repaying the debt in full. Currently, the CARD Act of 2009 mandates credit card companies to inform consumers about interest rate changes at least 45 days in advance, but the 45-day notice does not apply when a low introductory interest rate is expiring. Furthermore, 45-days may fall within the *near future* for many consumers and therefore not be sufficient lead-time to motivate a consumer with a large balance on her card. Instead, money management apps that interface with consumers could facilitate the motivating role this information plays by setting calendar reminders months before these changes will occur. These apps could calculate the ideal timing of such a reminder based on users' financial situations (debts, incomes and expenditures) such that the rate rise time falls within the *more distant future*. These reminders could encourage consumers to plan payments ahead, when the rate-rise event is far enough away to prompt action. Given data currently shared with money management apps, these apps could help consumers set up feasible goals in conjunction with rate rises, as setting a specific goal increases commitment to that goal (Wright & Kacmar, 1994).

As tested in our studies, a rate rise in the more distant future can encourage consumers to

repay faster than their default repayment plan. Since most credit card companies allow consumers to set up an autopay with a fixed amount, following the motivating reminder of rate change, budget planning tools could recommend feasible repayment plans to those consumers and give easy-to-follow instructions to help them set up autopay on their credit cards, thereby helping consumers to save on interest costs.

The above implications are applicable for situations in which paying the debt before rate increase is still feasible. However, if such a goal were already infeasible for the individual, then focusing on the timing of rate change would not be helpful in motivating repayments. Instead, the reminder should focus on explaining the consequences of the higher interest rate, encouraging consumers to set up plans to repay as soon as possible.

Implications for Marketers

Findings reported here could help marketers improve customer satisfaction and establish a socially responsible brand with associated benefits for the company's performance and reputation (Porter & Kramer, 2006). Many companies currently use low introductory rates as a method for attracting customers. Cards with these rates are so popular that entire sections of sites helping consumers choose credit cards are dedicated to those with temporarily low introductory rates (e.g., creditkarma.com, lowcards.com). Rather than leveraging changes in interest rates as hidden complexity intended to deceive consumers, lenders can use explicit changes in rates to encourage timely repayment. To maximize this possibility, this low-interest introductory period should be accompanied by explicit reminders of the pending rate increase, rather than shrouding upcoming changes in rates. However, our research shows that this reminder must come with sufficient advance warning to be effective in helping consumers repay their loans. For example, if companies provide a notification that the rate will return back to normal next month, this may

not make a difference in cases where repaying the loan in advance of the short-term change is perceived as infeasible for their customers.

Providing this reminder with sufficient advance warning could motivate customers to prioritize repayment of that particular loan over other obligations. This advance notification would ultimately help ensure repayment of the loan, which could promote customer loyalty and encourage repeat borrowing for all types of loans. Furthermore, explicit reminders of upcoming changes in rates would signal transparency and concern for consumers broadly, a message that could then be incorporated into communication about the company and corresponding branding efforts.

The current research may also be useful for companies that offer loans to its customers, such as companies that provide loans for cars, financing for large appliance purchases, or credit cards for department stores. To the extent that explicit reminders of increasing rates encourage customers to prioritize repayment of that particular loan, these reminders may also have consequences for repeat sales consistent with principles of mental accounting and perceptions of budgetary slack (e.g., Heath & Soll, 1996; Zauberman & Lynch, 2005). Specifically, if a person has a fixed budget for a particular type of purchase and has been able to repay a loan, she may then feel that she has flexibility in her budget to make additional purchases. Rather than being used for spending across categories, this additional slack may be associated with spending from a specific account tied to a similar product or store and be used towards additional purchases from that store.

Conclusions and Future Research

This research examines consumers' motivation to repay outstanding debt. It demonstrates that consumers will use an upcoming rate change as a deadline that generates motivation to repay

in cases where the goal of repayment by the deadline is feasible. A better understanding of specific elements of consumer repayment behavior can help us leverage this new understanding to improve consumer welfare further. For example, while relevant repayment decisions are made in multiple iterations and across several months, our examination focuses on consumers' decisions at a single point in time. Thus, future research should examine how consumers' repayment behavior and motivation shifts across time. Furthermore, consumers may set up an informal plan to repay a given debt before a rate increase occurs, and begin to make payments according to the corresponding timeline. As time passes and the rate increase gets closer, they might lack the self-control to stick to their plans (Gathergood, 2012; Soman & Cheema, 2004). If this is the case, our research suggests that consumers would benefit from setting up an automatic plan to repay their loan with minimal attention or effort. They could initiate this plan at the time when they first set their goals and the rate change is still months away to help them follow through with their intentions. However, consumers may become more motivated to pay off their debt as the deadline approaches, conditional on being on track to achieve their goal (cf. Kivetz, Urminsky & Zheng, 2006), making an automatic payment plan unnecessary.

Existing literature has shown that goal setting can bring both good and bad consequences. For example, challenging goals lead to a higher level of performance than do easy goals, but anticipated failure to attain a goal results in demotivation in the subsequent goal pursuit (Locke & Latham, 2006). Therefore, overly aggressive goals might backfire once consumers fail to reach their saving goals (Soman & Cheema, 2004) and the "what the hell" effect might lead them to spend more and end up worse in their finance situations. While the current research has shown that a future rate increase can lead to either of these patterns, depending on the timing of the rate increase, we are unable to identify specific parameters for a given consumer. Additional research

that is tailored to individual financial circumstances with predictions for temporal boundaries given specific amounts of debt outstanding would help financial institutions and budgeting programs implement strategies to assist in alleviating the expediting effect.

In addition to influencing repayment behaviors, our findings suggest that changing rates may also affect consumer spending. For example, imagine that a furniture store offers 0% financing for six months. Consumers may view the time when the rate increase occurs as a target by which to repay the debt. Consequently, a consumer may aim to spend approximately what she can afford to repay during this period. This could potentially lead to lower or higher spending on the part of the consumer, depending on her initial furniture budget. However, if the interest free financing lasted only one month, this promotion might not send the same signal. If she would not be able to repay the cost of any reasonable furniture purchase over a single month, she may instead ignore the timing of the rate change and spend as she otherwise would. Future research is needed to address this question directly.

This research has provided evidence that consumers will look to changing rates as a deadline, and that perceptions of goal feasibility can help explain when we turn to this external cue for motivation. These insights should be used to help consumers improve their financial behaviors, encouraging them to identify relevant and feasible external goals for themselves.

Appendix 1: Tables

Table 1: Results from Study 2, Chapter 1

	No Discount	One Discounted	Three Discounted
Peaches Purchased (Mean/SD)	4.37 (1.48)	5.14 (2.34)	3.38 (1.40)
Total Purchase Amount (in RMB)	30.59 (10.34)	33.00 (16.35)	15.38 (8.95)
Per-Unit Purchase Price (in RMB)	7.00	6.26	4.34
Likelihood of Peach Purchase	15.57%	16.83%	16.67%
Likelihood of Peach Buyers Buying Other Fruits	77.59%	76.47%	73.08%

*The total purchase amount and the per-unit purchase price were calculated assuming the pre-discount average price per peach was 7 RMB, consistent with a standard sized peach.

Table 2: Factor Analysis Table from Study 5, Chapter 2

	Loadings		
	Factor 1: Goal/Feasibility	Factor 2: Reference Rate	Communality
Goal Setting	**0.834**	0.016	0.697
Feasibility	**0.827**	0.265	0.754
Sense of Control	**0.862**	0.246	0.803
Determination	**0.893**	0.031	0.798
Regret	**0.688**	-0.182	0.507
Rate Perception	0.379	**-0.677**	0.602
Reference Point	-0.113	**0.793**	0.642
Eigenvalue	3.550	1.252	
% of Total Variance	50.718	17.889	
Total Variance		**68.607%**	

Appendix 2: Figures

Figure 1: Predicted Quantity Purchased as a Function of Quantity of Discounted Units, Chapter 1

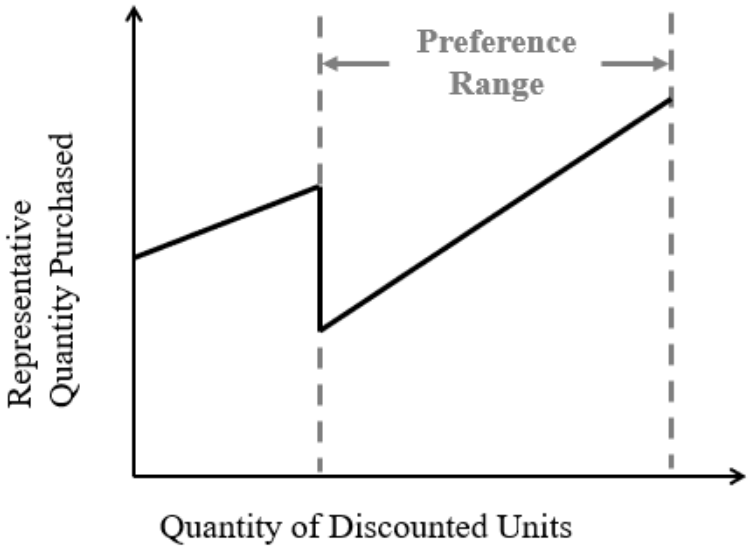


Figure 2: Results from Study 1, Chapter 1

Average number of chocolates purchased as a function of discount condition (error bar represents ±1 SEM).

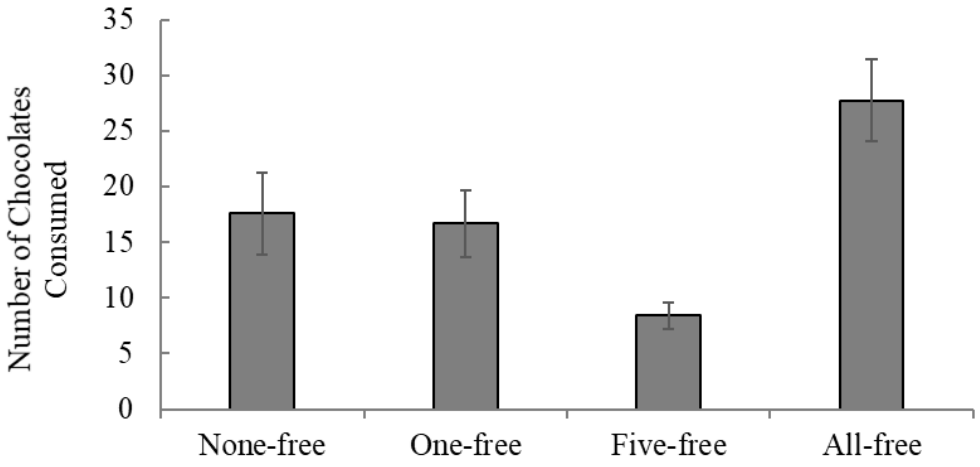


Figure 3: An Example of the Promotion Displays in Study 2, Chapter 1

The price tag (in yellow) reads “Feng Hua Peaches (Sweet and Fresh), 13.8 RMB per half kg” and the promotion post (in white) reads “3RMB off each of the first three peaches.”

Figure 4: Histogram of Purchase Quantity from Study 2, Chapter 1

Histogram indicating the number of people purchasing a given quantity of peaches as a function of discount condition.

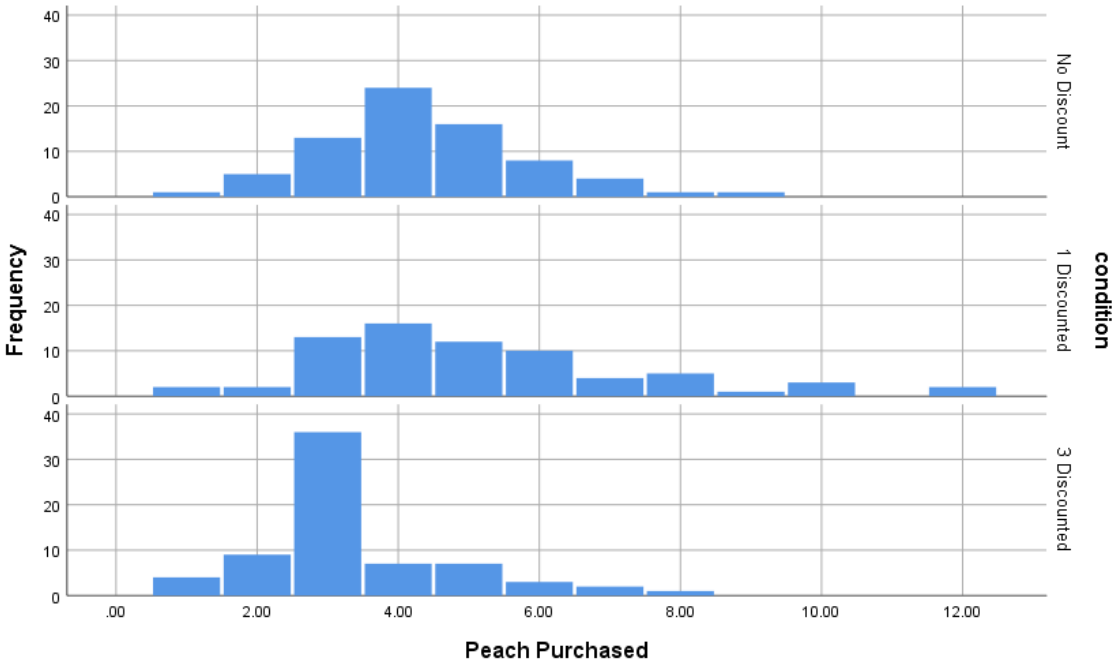


Figure 5: Results from Study 3, Chapter 1

Average number of museum visits purchased as a function of discount condition (error bar represents ±1 SEM).

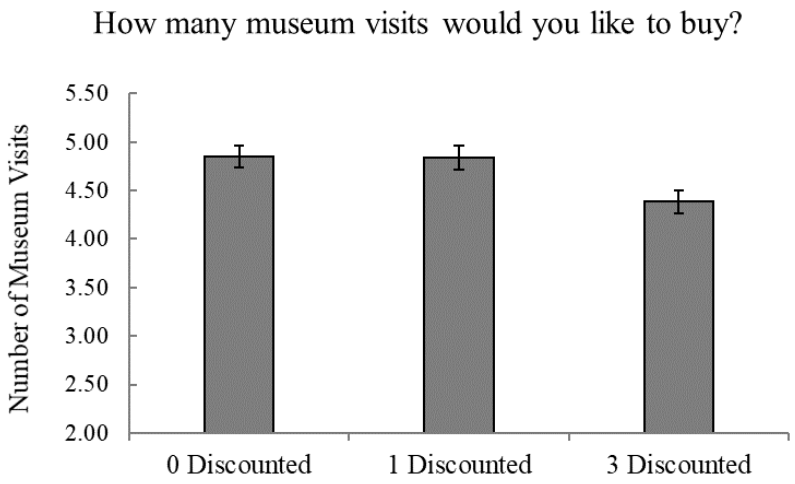


Figure 6: Results of Mediation Analysis from Study 3, Chapter 1

Acceptability mediates the effect of a price increase on purchase quantity in a mediation model simultaneously including acceptability and the alternative explanations. (*p<.05; **p<.01; ***p<.001.)

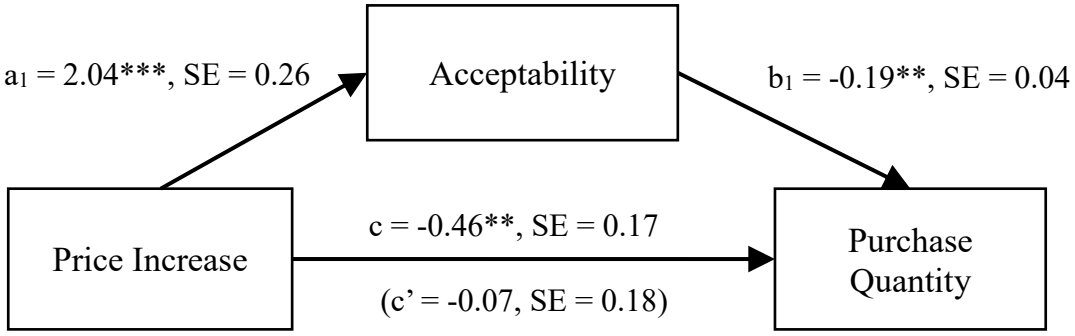


Figure 7: Results from Study 4, Chapter 1

Average number of bottles of wine purchased as a function of price discount and reasonable range. (Error bar represents ±1 SEM.)

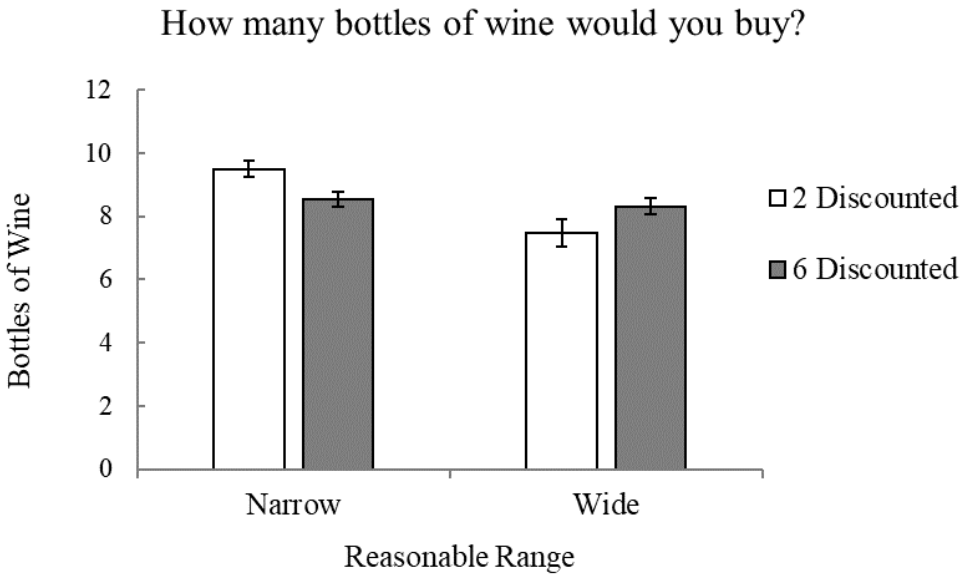


Figure 8: Results from Study 5, Chapter 1

Average willingness to spend on a sofa set as a function of price increase and reasonable range. (Error bar represents ±1 SEM.)

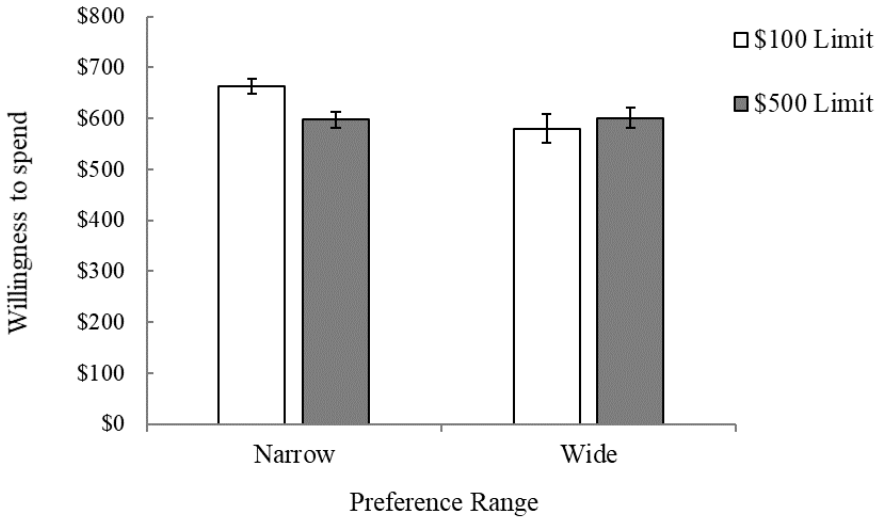


Figure 9: An example of the credit card statement in Study 3, Chapter 2

Account Ending 9-298840

New Balance	**$3,860.00**
Minimum Payment Due	**$35.00**
Payment Due Date	**02/20/19**

Late Payment Warning: If we do not receive your Minimum Payment Due by the Payment Due Date listed above, you may have to pay a late fee of up to $38.00 and your Purchase APR may be increased to the Penalty APR of 27.24%

Account Summary

Previous Balance	$3,895.00
Payments/Credits	-$35.00
New Charges	$0.00
Fees	$0.00
Interest Charged	$0.00
New Balance	**$3,860.00**
Minimum Payment Due	**$35.00**

Interest Charge Calculation

	Transactions Dated From	To	Annual Percentage Rate	Balance Subject to Interest Rate	Interest Charge
Purchases	09/25/2018		11.24%(v)	$0.00	$0.00
Cash Advances	09/25/2018		21.24%(v)	$0.00	$0.00
Introductory Purchase Rate Expires 03/25/2019 then goes to 11.24%	09/25/2018		0.00%	$3,860	$0.00
Total					$0.00

Figure 10: An example of repayment plan options in Study 3, Chapter 2

Below are the repayment plan options presented to participants in the rate-increased condition in Study 3.

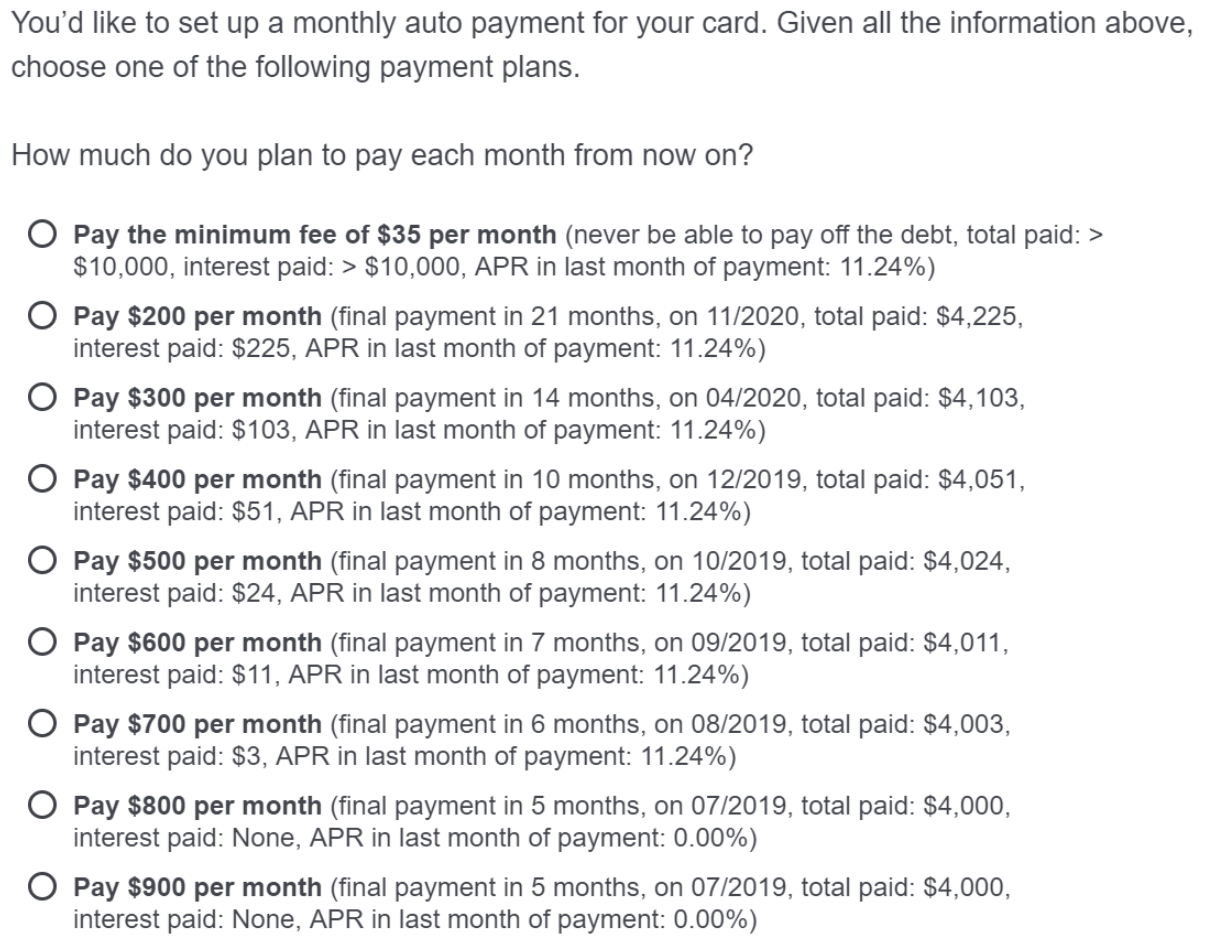


Figure 11: Results from Study 4, Chapter 2

Average time to repay (in months) as a function of rate increase time and the nature of the event. (Error bar represents ±1 SEM.)

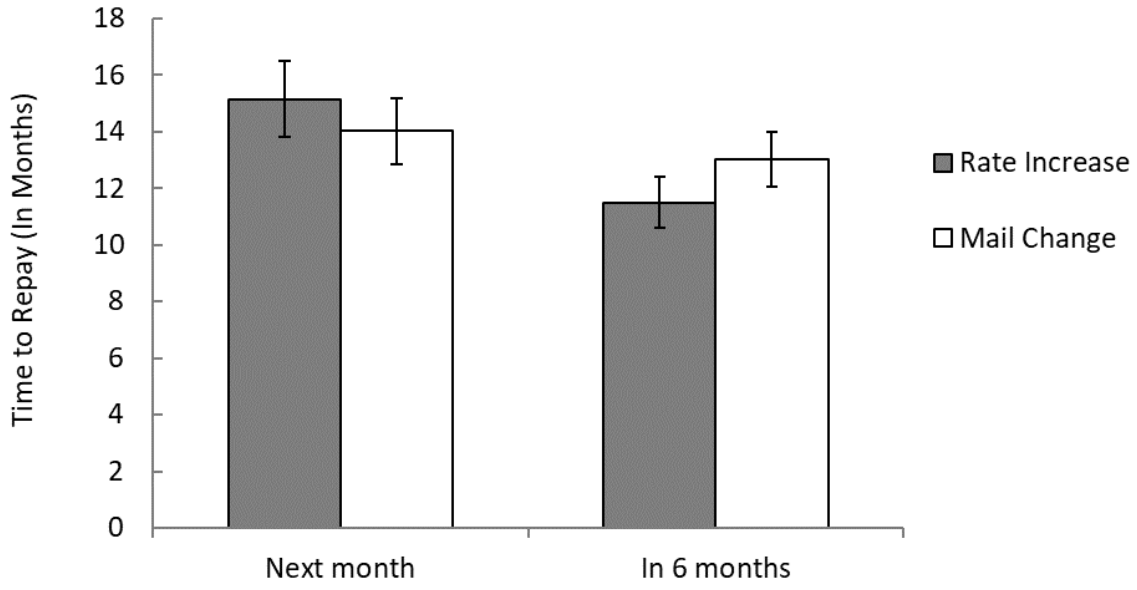
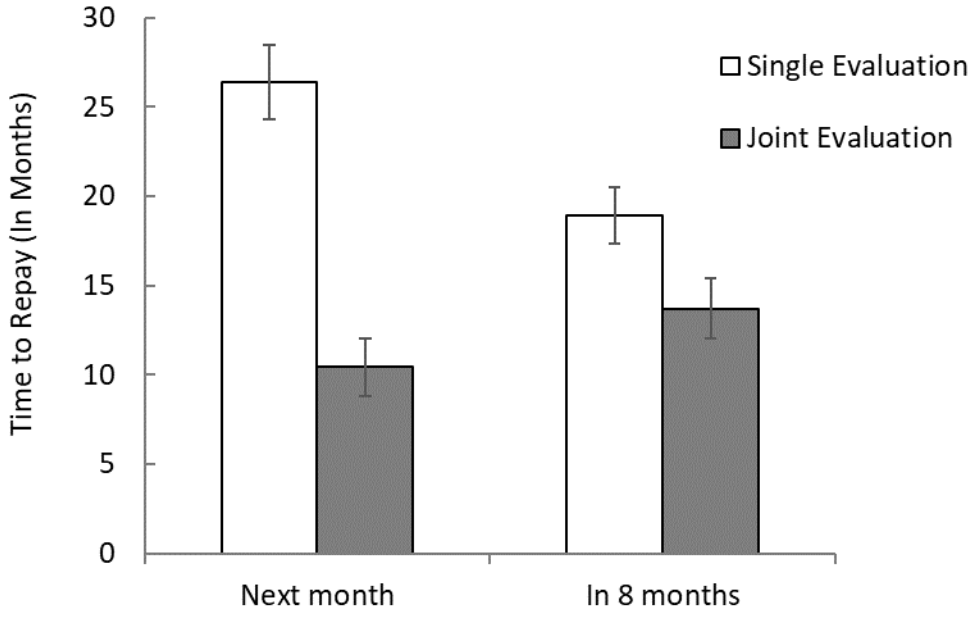


Figure 12: Results from Study 6, Chapter 2

Average time to repay (in months) as a function of rate increase time and type of evaluation. (Error bar represents ±1 SEM.)



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