Don't Break the $100 Bill: Large Bills Promote Savings Behavior

Abstract

This research examined how large denomination bills affect consumer willingness to make discretionary purchases. The first experiment examined consumer perception of large denominations as an effective tool for monitoring spending and reducing discretionary consumption. A second experiment showed large denominations can act as spending deterrents, with the reported likelihood of purchasing a discretionary item reduced when the purchase would require breaking a large denomination bill that could otherwise remain unbroken. Experiment 3 compared fungibility, processing fluency, and partitioning explanations for the effect, finding the strongest support for a partitioning based explanation.

Introduction

Portioning can significantly improve self-control and reduce consumption of certain goods. Cheema and Soman (2008) found that partitioning packages with colored dividers significantly reduced consumption. Wansink, Rozin, and Geiger (2005) similarly found that participants ate fewer chips when every 7th chip in the tube was dyed red, acting as a partition. Cheema and Soman (2008) also found that when tickets for gambles were placed into 1, 4, or 10 separate sealed envelopes, partitioning the tickets reduced overall gambling, with participants in the 10 partition condition gambling least of all. Partitioning cash wages into multiple envelopes also reduces consumption and increases savings (Cheema & Soman 2010).

In a potentially parallel phenomenon, consumers tend to spend less when an equivalent amount of money is in the form of a large bill rather than smaller denominations (Mishra, Mishra, & Nayankuppam, 2006; Raghubir & Srivastava, 2009). Previous researchers have suggested two possible explanations for this denomination effect. The first explanation is that the effect is driven by processing fluency, with large bills processed more easily than small bills. This ease of processing elicits more positive affect, creating a preference for the single large bill. (Mishra, Mishra, & Nayankuppam, 2006). The second explanation focuses on perceptions of fungibility, with large bills perceived as less fungible than smaller bills. (Raghubir & Srivastava, 2009). This perception of large bills as less fungible presumably leads consumers to believe they are less easily spent, and are therefore attractive as devices to regulate spending. In the current studies, however, we test an alternative account of the denomination effect -- specifically that it is driven by partitioning.

The current experiments use hypothetical scenarios to investigate whether large denomination currency can function as a partitioning device and hence be useful in curbing unwanted spending behavior and increasing savings. Experiment 1 investigates consumers' beliefs about the effects of currency denomination on savings. Experiment 2 examines whether $100 bills act as decision points that create a barrier to unnecessary discretionary spending. Experiment 3 compares large denomination bills, envelopes, and gift cards to provide evidence that large bills are viewed as monetary partitions.

Experiment 1

Dividing cash or tickets for monetary gambles into envelopes has been shown to reduce spending and increases savings. In those experiments, however, the divisions were created artificially by the experimenters, and not the consumers themselves. While consumers may not be likely to divide their paychecks up into envelopes, other simple actions may have a similar effect on savings. The current experiment investigates consumer beliefs about the effectiveness of choosing large denomination currency as a method for spending control.

Methods

In exchange for a small piece of candy, 60 participants at a Rutgers University bus stop completed a paper-and-pencil study with a hypothetical scenario describing two women, Sally and Jane, who were each getting money out of an ATM. The scenario explained that both were saving for a down payment for a used car, and both withdrew $400 for use over the next two weeks. The women differed only in the denominations of bills they withdrew. Sally withdrew three $100 bills and five $20s, while Jane withdrew twenty $20 bills. Subjects were then asked

to rate which woman was more likely to (1) successfully save money, (2) buy extra items she does not really not need and (3) have an easier time monitoring her spending, each using a 7 point rating scale from "Definitely Jane" to "Definitely Sally."

Results & Discussion

The results indicate that consumers believe that currency denomination can impact spending and savings choices. Single sample t-tests revealed that Sally (three $100s) was rated as significantly more likely to successfully save money, $t(59)=3.53$ $p=.001$, and to have a significantly easier time monitoring her spending, $t(59)=3.21$, $p=.002$. Jane (all $20s) was rated as significantly more likely to buy extra items she did not really need, $t(59)=-4.12$, $p<.001$ (Figure 1a). These results suggest that consumers may be viewing large denominations as a partition, creating a decision point similar to opening a new envelope of lottery tickets or eating past the red potato chip. The rating of Sally as more easily able to monitory her spending suggests that at least some of the savings effect may be the result of fewer, larger, bills making it easier to track the current amount of money held. Additionally, $20 bills are broken frequently in daily transactions, which may lead to a reduced sensitivity to the bills as partitions.

Experiment 2

The purpose of Experiment 2 was to test the hypothesis that large denomination bills can act as partitions, reducing the likelihood of making an unnecessary purchase of a discretionary good. This study used a specific scenario situation rather than the more global ratings assessed in Experiment 1.

Methods

One hundred and nineteen participants were recruited at a Rutgers University bus stop and given a piece of candy for completing a brief questionnaire with one of two versions of a hypothetical scenario about purchasing an $18 prescription at a pharmacy.

A picture showed the bills participants hypothetically had in their wallet. Participants in the forced-break condition had $117: one $100 bill, one $10 bill, one $5 bill, and two $1 bills. Those in the optional-break condition had $119, consisting of the same bills with two additional $1 bills. Participants were instructed to circle the bills they would use to pay for their $18 prescription. In the forced-break condition, participants needed to pay with the $100 bill whereas those in the optional-break condition could pay with smaller bills and keep the $100 intact.

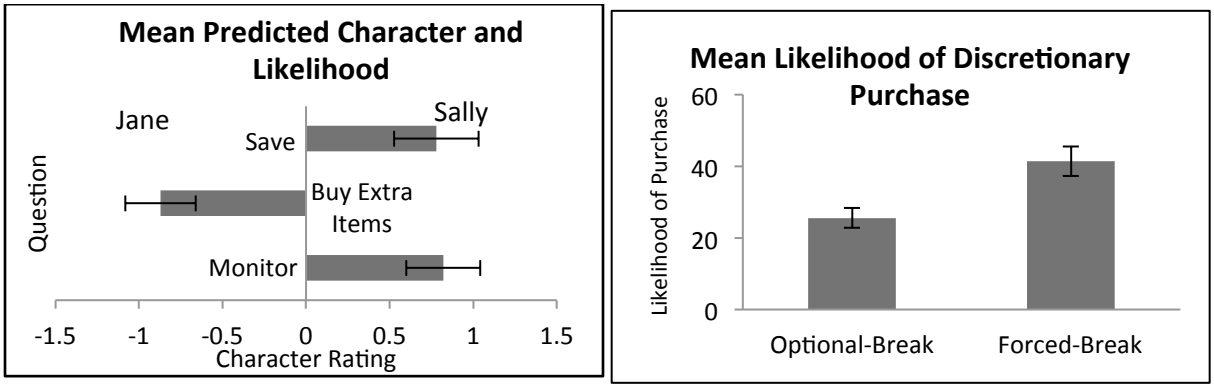
The scenario then introduced an optional discretionary purchase of a DVD, and participants were asked to rate how likely they were to buy the DVD on an 11-point scale from 0% (definitely will not) to 100% (definitely will).

Results and Discussion

Consistent with our hypothesis, subjects were significantly less likely to purchase the discretionary item in the optional-break condition than in the forced-break condition, $t(118)=3.19$, $p=0.002$, (Figure 1b) presumably because in the latter case participants already needed to break the $100 bill to pay for the prescription. That is, participants were significantly less likely to purchase the discretionary DVD when doing so would force them to break a large denomination bill that would otherwise remain intact. This finding suggests that the large bill was effectively acting as a partitioning device creating a boundary participants did not want to

cross unless necessary. The partition was so effective, that participants in the optional-break condition were less likely to purchase the DVD, even though they were $2 richer than their counterparts who were forced to break the bill.

Figure 1: (a) Mean predicted character and likelihood for the three items in Experiment 1. (b) Mean reported likelihood of purchasing the discretionary item in Experiment 2. Error bars depict standard error of the mean.



Experiment 3

We hypothesized that the decrease in discretionary spending found to occur with the holding of large denominations was due to the effect of partitioning. Experiment 3 tested this hypothesis by comparing the effect of holding hundred dollar bills, envelopes of bills, and hundred dollar gift cards relative to small bills. Envelopes, of course, serve as explicit partitions. We hypothesized that hundred dollar bills would function similarly, such they both large bills and envelopes would be perceived as decreasing discretionary spending and increasing savings, while gift cards would not show such an effect. Large denomination bills and envelopes both are physically altered when the partition is broken. After breaking a large denomination bill, a consumer no longer has the single bill, but instead a mixture of smaller bills and change. When

an envelope is opened, it also is no longer is a single unit, but is instead a mixture of the bills inside and change from any purchase that was made. A gift card, however, is not physically changed when spending occurs. The gift card continues to exist in the same physical form, and the consumer still actually holds the same gift card; it is only the value for which it can be exchanged that is altered. We believe that the physical loss of the original item, the large bill or the envelope, is what makes an effective partition, and therefore the envelopes and hundred dollar bills will act as successful partitions, while the gift card will not.

Methods

Two hundred sixty-eight undergraduates were recruited at Rutgers University bus stops and given a piece of candy in exchange for filling out a brief pencil-and-paper questionnaire. The design was similar to that used in experiment 1. A hypothetical scenario was presented in which two women, Sally and Jane, went into a bank to withdraw $300 for the next two weeks. Both women were saving up for a used car. In each condition Jane withdrew the $300 as 15 twenty dollar bills. In condition 1 Sally received her money as 3 one hundred dollar bills. In condition 2 Sally received her money as 3 envelopes each containing 5 twenty dollar bills, and in condition 3 Sally received 3 one hundred dollar American Express gift cards. Participants answered the same questions and used the same scale as in experiment 1.

Results and Discussion

To increase the ease of comparison across the three conditions, we created a single omnibus scale by combining the three ratings (after reverse-coding the item about buying things

one doesn't really need), Cronbach's α = 0.82. Eighteen subjects were removed from the analysis because they reported having taken part in a similar pilot study. A one-way ANOVA on this measure revealed significant differences among the three conditions, $F(2,247)= 10.42$, $\eta^2 = .08$, $p<.0001$. Pairwise comparisons showed that the envelope condition yielded higher ratings than the hundred dollar bill condition, F(1,247)=6.18, p=0.01 and that the hundred dollar bill condition in turn yielded higher ratings than the gift card condition, F(1,247)=3.92, p=0.049. Furthermore, mean ratings for the hundred dollar bill condition were significantly larger than the scale midpoint, t(79)=2.05, p<.04, as were ratings for the envelope condition, t(86)=6.71, p<.0001, while those in the gift card condition were not, t(85)-0.51, p=0.61. These results supported our hypothesis that partitioning drives the findings of reduced spending when holding large denomination currency. Participants reported both cash partitioned into envelopes and cash partitioned through large denominations as leading to saving and ease of monitoring compared to multiple smaller unpartitioned bills. Furthermore, the envelopes were more effective partitions than the large bills. As expected, gift cards did not show any denomination effect.

The use of gift cards does not require partitions to be broken; after using a gift card one is left with the same item as before its use, although with a reduced value. The gift card condition serves as a useful control because it differs from the hundred dollar bill and envelope conditions in terms of partitioning, but is similar to them in terms of the number of items the consumer is holding. For example, someone with 15 twenty-dollar bills holds more bills than someone with three hundred-dollar bills, despite the equivalent monetary value. Perhaps holding more bills makes a person feel more flush and thus more willing to spend. This alternative to the partitioning account is ruled out the by the gift card condition, however, because three hundred-

dollar gift cards represents the same number of units as three hundred-dollar bills and yet does not have the same restraining effect on spending.

Although both the hundred-dollar bills and the envelopes serves as effective partitions relative to twenty-dollar bills, the envelopes were a more effective partition. We speculate that this may be the case both because breaking large bills is less rare than opening envelopes of cash and because envelopes serve as a more explicit signal that the cash within is designated for a particular purpose.

Figure 2: Mean combined measure of saving for three experimental conditions (each compared to $20 bills) in Experiment 3 Error bars represent standard error of the mean.

General Discussion

The current studies demonstrate that decision makers believe that carrying large denomination bills will inhibit impulsive spending (Experiment 1), that this inhibition is driven by the effects of partitioning (Experiment 3), and that once a large bill is broken, discretionary purchases are more likely (Experiment 2). If carrying large denomination bills helps to decrease

impulsive spending, it might be a successful means of promoting short term savings behavior. Saving for short term purchases requires repeated acts of self control as the saved money accrues, and tempting items must repeatedly go unpurchased. If carrying large denomination currency acts as a method of monetary portion control, encouraging individuals who are attempting to limit their spending to carry large bills may be an easy-to-implement method of improving self-control.

Raghubir and Srivastava (2009) suggest that the denomination effect is a result of large bills being perceived by consumers as less fungible than smaller bills, and that consumers who wish to exert self control capitalize on this effect and strategically choose large denominations. Our results support the use of the denomination effect as a self regulation strategy, but there is no direct evidence that it is driven by fungibility. Indeed, our research suggests that this is not the case. Gift cards are less fungible than cash, as they are only accepted at limited locations (in the case of Experiment 3, only those locations that take credit cards) and cannot be exchanged for cash. If a perceived lack of fungibility were the underlying cause of the denomination effect, we would expect that the gift cards in experiment 3 would be perceived as more likely to reduce spending; however this was not the case. Instead, gift cards were perceived as no more effective in controlling spending than small denomination currency, suggesting that another mechanism is at work.

Mishra et al. (2006) suggest a processing fluency account, with large bills being processed more easily, leading to more positive affect for larger denominations. They found that a manipulation to increase fluency and one to increase familiarity both increased positive affect in the small bills condition, but not in the large bill condition (where affect was already high), and consequently these manipulations eliminated the denomination effect. If it is denomination

itself that drives fluency, however, hundred-dollar gift cards and hundred-dollar bills would presumably be equally easy to process compared to smaller bills, with envelopes containing five twenty-dollar bills each requiring more processing. Thus if processing fluency were at the root of the denomination effect, we would expect to find similar results in Experiment 3 for the gift cards and large denomination bills, both of which would be lead to decreased propensity to spend compared to envelopes or loose twenty-dollar bills. Experiment 3's results did not support this explanation.

The current results replicate previous demonstrations of the denomination effect and suggest that this effect is due to partitioning rather than previously hypothesized mechanisms. Thus, large bills represent a partition that decision makers are reluctant to cross. When this partition is breached, discretionary spending is increased.

References

Cheema, A. & Soman, D. (2008). The effect of partitions on controlling consumption. *Journal of Marketing Research,* 45, 665-675.

Cheema, A. & Soman, D. (forthcoming). Earmarking and Partitioning: Increasing Saving by Low-Income Households. *Journal of Marketing Research*.

Mishra, H., Mishra, A.. & Nayakankuppam, D. (2006). Money: A bias for the whole. *Journal of Consumer Research,* 32, 541-549.

Raghubir, P. & Srivastava, J. (2009). The denomination effect. *Journal of Consumer Research,* 36, 701 - 713.

Wansink, B., Rozin, P., & Geiger, A. (2005). Consumption interrupted and the red potato chip: Packaging ideas that help control consumption. Working paper 05-110, Cornell Food and Brad Lab, Ithaca, NY.