The Bottom Dollar Effect: The Influence of Spending to Zero on Pain of Payment and Satisfaction

ROBIN L. SOSTER
ANDREW D. GERSHOFF
WILLIAM O. BEARDEN

Spending that exhausts a budget is shown to decrease satisfaction with purchased products relative to spending when resources remain in the budget. Six studies, including those in which participants earn and spend real resources and evaluate real products, explore this bottom dollar effect. This research contributes to prior mental accounting research regarding how costs influence decision making (e.g., bundling, coupling, sunk costs) and to the satisfaction literature. Supporting the role of pain of payment in this process, we show that the bottom dollar effect increases as effort required to earn budgetary resources increases, decreases in the presence of windfall gains, and decreases when there is less time between budget exhaustion and replenishment. Mediation analyses further demonstrate the role of payment pain in the bottom dollar effect. Implications are discussed in the context of behavioral research, marketing promotions management, and public policy.

Consider a consumer who, once per month, allocates $50 to her entertainment budget. After her first purchase, say $10 spent on a movie ticket, there will be less remaining in her budget, but she will still have access to $40. As she makes additional purchases, resources in her budget continue to dwindle. Later in the month, she may spend an additional $10 to purchase another movie ticket. This $10 purchase further reduces her budget balance, which may now be approaching complete exhaustion. While both movie ticket purchases reduced her budget balance by the same amount (i.e., $10), might differences in her budget balance at the time of purchase affect her satisfaction with the movies she sees? We propose and find that, with price and product performance held constant, purchases from budgets approaching exhaustion (vs. budgets not approaching exhaustion) yield lower consumer satisfaction with the product itself. We call this phenomenon the bottom dollar effect.

Recent research has shown a number of ways in which resource depletion influences consumer behavior (Brady 2009; Huffman and Barenstein 2005; Kamakura and Du 2012; Mishra, Mishra, and Nayakankuppam 2010; Stilley, Inman, and Wakefield 2010b). For example, consumers are more likely to choose prevention-oriented products as the time since receiving their last paycheck increases and are more likely to choose scarce products when they feel as though they are financially deprived (Mishra et al. 2010; Sharma and Alter 2012). Findings also suggest that individuals spend fewer resources on nonessential products during times of both macro- and personal economic contraction (Brady 2009; Huffman and Barenstein 2005; Kamakura and Du 2012). Consumers also tend to think about expenditures...
and opportunity costs differently, depending on resource availability (Morewedge, Holtzman, and Epley 2007; Spiller 2011). Although these consumption patterns seem likely to influence consumer financial and material well-being, researchers have yet to examine whether they have implications for consumers’ satisfaction with the products that they do end up purchasing.

We contribute to this body of work by considering how consumers’ budgetary status at the moment of purchase influences postpurchase satisfaction. We hypothesize that consumers will be less satisfied with products and services purchased as resource availability dwindles because, as resources diminish, costs feel more painful. Consistent with the mental accounting literature (Prelec and Loewenstein 1998), this difference in the pain of payment should influence satisfaction. In other words, we propose that spending $10 to purchase a movie ticket becomes more painful as one’s entertainment budget gets closer to zero. This increase in the pain of paying diminishes satisfaction with the product itself.

Below, we review research related to the influence of resource availability (i.e., budgets) on consumer spending and cost consideration (Heath and Soll 1996; Morewedge et al. 2007; Spiller 2011; Stilley et al. 2010b). Next, we consider the relevant judgment and decision-making literature (Kahneman and Tversky 1979; Thaler 1980, 1985, 1999), which suggests that the reference point used to contemplate costs (e.g., a budget’s available balance) may influence the pain associated with this spending. We then draw on the pain of payment and satisfaction literatures (Johnson, Anderson, and Fornell 1995; Prelec and Loewenstein 1998) to support our argument that this difference in the pain associated with bottom dollar spending influences satisfaction with products purchased. Finally, we present a total of six studies that support our predictions, demonstrate moderators, and reveal boundary conditions.

THEORETICAL BACKGROUND

Budgets, Resource Availability, and the Use of Reference Points in Decision Making

Mental Budgets. The mental accounting literature suggests that consumers often code and categorize resource inflows and outflows into “buckets” or “accounts” (Thaler 1980, 1985, 1999). Further, while all monetary inflows—regardless of their source—increase the total amount of resources available for spending, individuals often behave as though resources are not fungible (O’Curry 1999; Shefrin and Thaler 1992; Thaler 1985). For example, people treat regular income (e.g., salary) differently than bonuses or windfall gains, which influences saving and spending decisions (Arkes et al. 1994; O’Curry and Strahilevitz 2001; Thaler 1985).

In addition, consumers often use mental accounts as budgets, allocating resources for specific costs, or categories of costs, before they are incurred (Bakke 1940; Cheema and Soman 2006; Heath and Soll 1996; Soman and Cheema 2011; Stilley, Inman, and Wakefield 2010a). These mental budgets influence how individuals spend resources. Even simple reminders of budget goals, such as money partitioned into separate envelopes or children’s photos on savings envelopes, have been shown to reduce consumers’ propensity to use that money for unplanned purchases, increasing savings (Cheema and Soman 2008; Soman and Cheema 2011).

Resource Availability. While the above findings suggest that consumers budget to plan and control spending behavior, additional research reveals that the amount of resources available influences purchase behavior. For example, individuals’ consumption levels increase upon receipt of paychecks and decline between paychecks (Huffman and Barinstein 2005), and over 40% of people stop spending on nonbill (i.e., discretionary) items 1–2 days after being paid (Brady 2009). Further, product preferences shift toward prevention-oriented goods as the time since receiving a paycheck increases (Mishra et al. 2010). Financially deprived individuals seek out and consume scarce products (Sharma and Alter 2012), and those with in-store grocery budget slack respond differently to promotions than those with no slack (Stilley et al. 2010b).

It seems possible that the above differences in consumption behavior may be related to the influence of resource availability on cost perceptions. For example, consumers with large (vs. small) resource pools perceive economically equivalent costs as smaller, are more likely to spend resources, and are less likely to consider opportunity costs (Morewedge et al. 2007; Spiller 2011). In other words, individuals may use budget balances (i.e., the availability of resources) as a reference point against which they consider expenditures.

Reference Points. The above findings suggest that individuals compare costs incurred to their budget balances when making consumption decisions. These differences due to resource availability are consistent with how reference points influence, or frame, perceived changes in quantity (Christensen 1989; Kahneman and Tversky 1979; Thaler 1980, 1985, 1999). According to prospect theory (Kahneman and Tversky 1979), changes from small-magnitude reference points are perceived to have more of an impact than identical changes from larger-magnitude reference points. For example, Tversky and Kahneman (1981) showed that individuals perceive saving $5 on a $15 product as more valuable than saving the same amount on a $125 product (evidenced by willingness to travel 20 minutes for the deal). Likewise, a $10 loss from $1,020 is perceived to be much smaller than a $10 loss from $20 (Thaler 1985).

Given that individuals may use a budget’s balance as a reference point when spending (Heath and Soll 1996; Morewedge et al. 2007; Spiller 2011), these budget balances likely influence perceptions of costs incurred. So as a budget approaches zero, costs may be perceived as larger and therefore more painful (cf. Prelec and Loewenstein 1998). As such, we next consider prior research regarding pain of payment and consumer satisfaction.
Pain of Payment and Satisfaction

Prelec and Loewenstein (1998) propose that, when consumers incur costs, they open a mental account, which links costs to their associated benefits. The stronger this link, the more consumers are driven to pursue the benefits associated with these costs (Gourville and Soman 1998; Prelec and Loewenstein 1998; Soman and Gourville 2001). This link is thought to influence the utility individuals derive from consumption, essentially creating a “double-entry mental accounting system,” whereby the pain of spending attenuates the pleasure from consumption and the pleasure of consuming buffers the pain associated with costs. This premise is consistent with research regarding the relationship between perceived value and consumer satisfaction (Johnson et al. 1995), which proposes that, with product performance held constant, increased costs reduce the perceived value of and, in turn, satisfaction with products purchased.

In addition, Prelec and Loewenstein suggest that a consumer’s “psychological burden of payment” (1998, 8) incorporates both actual costs and the individual’s personal marginal utility for resources spent. So any circumstance that increases the perceived marginal utility of money (e.g., earning minimum wage, devastating economic losses) yields a commensurate increase in pain of payment, or imputed cost. Since budget balances may serve as reference points against which consumers evaluate costs, we propose that variations in payment pain may be driven by fluctuations in budget balances. So a $10 expenditure when an individual’s budget balance is relatively low (i.e., a “small-magnitude” reference point) is likely perceived to be more painful than $10 spent from a high balance (i.e., a “large-magnitude” reference point). In this manner, cyclical increases and decreases in a consumer’s budget due to income or regular outflows (e.g., expenses) may influence the pain associated with identical purchases.

To summarize, we suggest that budget balances are used as reference points against which individuals evaluate their expenditures. We predict that resources spent when budgets have relatively low balances feel more painful than economically equivalent costs incurred when budget balances are high. While increases in pain of payment likely occur incrementally throughout the budgetary cycle (i.e., as balances decline), prior research suggests that this effect should intensify as resources approach zero (Kahneman and Tversky 1979; Thaler 1980, 1985, 1999; Tversky and Kahneman 1981). As such, the primary focus of this article is on purchases that exhaust (vs. do not exhaust) available resources and the resulting differences in payment pain, which in turn influence satisfaction. Specifically, when a purchase exhausts (vs. does not exhaust) a consumer’s budget, we predict that the pain associated with spending will be greater, attenuating satisfaction with the product purchased. Our theory suggests that two consumers engaged in otherwise identical transactions (i.e., purchasing the same product for the same price) might experience differences in satisfaction with the purchased product, based on their perceptions of payment pain, which is driven by their access to budgetary resources at the time of purchase.

Below we present six studies to provide support for our primary hypothesis that spending from budgets approaching exhaustion (vs. those that are well funded) attenuates satisfaction with products purchased because of higher pain of paying. Across the studies we manipulate pain of payment in three ways and provide evidence for the mediational influence of pain of payment. First, a pilot study considers the role of budgets as reference points, revealing that consumers are more averse to costs incurred as budgets approach exhaustion (i.e., bottom dollar spending) versus non-exhausting costs or costs not associated with an explicit budget. Then, in the main studies, participants provide satisfaction ratings for actual products purchased from declining budgets consisting of resources that have been endowed (studies 1 and 5) or earned (studies 2, 3, and 4). Study 1 shows that participants’ satisfaction with products is lower when budgets are exhausted relative to when they are not. Study 2 replicates this effect and, consistent with the proposed influence of payment pain, finds that the effect is moderated by participant-reported effort to earn budget resources. Study 3 manipulates the effort required by participants to fund budgets, again finding evidence that satisfaction is diminished when budgets are exhausted and that effort moderates the effect. Study 4 uses an alternative method to manipulate pain of payment, revealing that a windfall gain attenuates the bottom dollar effect for those approaching budgetary exhaustion. Finally, study 5 offers a third pain of payment manipulation: budget replenishment timing. The bottom dollar effect is replicated; however, consistent with the proposed role of payment pain, it is attenuated when resource replenishment is imminent. Furthermore, satisfaction with non–bottom dollar purchases is reduced if this replenishment is distant.

PILOT STUDY: AVERTION TO SPENDING FROM DECLINING BUDGETS

The purpose of the pilot study was to explore a necessary condition of our primary hypothesis: whether consumers perceive a greater “psychological burden” when spending from exhausting budgets. In this manner, this study examines whether consumers use budget balances as reference points, against which they consider spending decisions.

Design and Procedure

One hundred sixty-nine nonstudent adults recruited from Mechanical Turk (MTurk) participated in this Web-based study. This study used a 2 (budget: present vs. absent) × 2 (spending to zero: yes vs. no) between-subjects design, and participants were randomly assigned to conditions.

Participants in the budget present condition were told that they had withdrawn $130 from the bank, which served as their weekly budget. Next they were given a list of expenditures to date from the budget. Each expense showed what was purchased, how much was spent, and how much remaining resources at the time of purchase.
mained in the budget. For example, the first expense was a $12 purchase of shampoo that left $118 in the budget; the second expense was a $26 purchase of groceries that left $96 in the budget. Depending on spending condition, these expenses were manipulated to result in budget balances of $10 or $88. In the budget absent condition, participants were given no information about budgets or prior spending. They were simply told to imagine they had either $10 or $88.

All participants then reported how they would feel about purchasing a $10 movie ticket. That is, those in the spending to zero condition considered a purchase that would reduce a $10 balance to $0, while participants not spending to zero evaluated a purchase that reduced an $88 balance to $78. All participants indicated their agreement with three items, designed to measure their aversion to spending: “I will think carefully about whether I want to spend this $10.00,” “I ought to save this $10.00 and not spend it,” and “Spending this $10.00 right now is reasonable” (reverse coded). All items used 5-point Likert scales (1 = disagree, 5 = agree).

Results and Discussion

Spending Aversion. The three aversion to spending items were averaged (α = .84) and analyzed in a 2 (budget: present vs. absent) × 2 (spending to zero: yes vs. no) ANOVA. Main effects for both budget and spending factors were significant (F(1, 165) = 8.41, 3.99, both p < .05). These main effects were qualified by a two-way interaction (F(1, 165) = 13.02, p < .01; fig. 1). Planned contrasts revealed that, when an explicit budget was diminished, spending aversion was higher for those spending to zero (M = 4.23) than for those with money remaining after the purchase (M = 3.49; F(1, 165) = 15.61, p < .01). However, when no explicit budget was diminished, the effect attenuated. That is, no differences in aversion arose whether the $10 cost exhausted resources (M = 3.36) or not (M = 3.58; F(1, 165) = 1.31, p = .26; fig. 1).

Discussion. The results of the pilot study suggest that consumers’ aversion to spending resources is greater for costs that exhaust budgetary resources and that this effect diminishes if no explicit budget is present. This supports the notion that budget balances are used as reference points when considering expenditures, in turn influencing the psychological burden of paying.

To build on this finding, in the main studies, participants either are endowed with or earn resources, which fund budgets. From these budgets they make multiple purchases, reducing their available resources. As they do, they experience and evaluate satisfaction with purchased products. Across these studies, we compare satisfaction ratings between conditions in which budgets are exhausted and conditions in which resources remain after a purchase. We show support for the role of pain of paying through moderation (via three different factors) and measured payment pain, revealing its role as a mediator in the relationship between budget balances and satisfaction.

FIGURE 1

PILOT STUDY: AVERSION TO SPENDING $10

<table>
<thead>
<tr>
<th></th>
<th>Budget Absent</th>
<th>Budget Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Spending to Zero</td>
<td>3.58</td>
<td>3.49</td>
</tr>
<tr>
<td>Spending to Zero</td>
<td>3.36</td>
<td>4.23</td>
</tr>
</tbody>
</table>

n.s. = not significant; p < .01
ically, a product purchased with a budget’s final dollars will be evaluated as less satisfying than one purchased when ample resources remain. Study 1 was designed to test this prediction, using the context of an online film festival. In this study, participants were endowed with budgets, used to purchase films that they viewed. Film evaluations were compared between budget conditions.

Design and Procedure

One hundred seven nonstudent adults were recruited from MTurk to participate in study 1, which employed a two-cell design. All participants were told to imagine they had purchased credits (described as being worth $0.30 each) to spend on films that cost 10 credits each. Participants then purchased and watched three films. In the bottom dollar spending condition, participants’ budgets were initially funded with 30 credits ($9) so that the purchase of the third film resulted in exhausted budgets. In the non–bottom dollar condition, participants’ budgets were funded with 50 credits ($15) so that purchasing the third film did not exhaust budgets.

Before participants purchased each film, they were reminded of their current budget balance, the cost to purchase the film, and the balance that would remain after their purchase. This information was also visually depicted using a bar that incrementally changed from green to red (fig. A1). For each film purchase, participants were given a unique set of four titles from which to choose, allowing the task to mirror an actual consumer choice. After a title was chosen, participants were asked, “How much do you expect to like [film chosen]?” (1 = not at all, 9 = very much). Participants then watched the short (approximately 2-minute) film.

After seeing each film, participants were given an additional written and visual reminder of their 10-credit expenditure and the balance of credits now remaining in their budget. Participants then evaluated the film, responding to the following two measures: “Please rate your feelings about the film you just watched,” assessed on a 9-point bipolar scale (extremely dissatisfied or extremely satisfied); “I felt as though this film was a good value, given the amount of credits that it cost” (1 = strongly disagree, 9 = strongly agree). In the analysis below, and throughout the remainder of the article, we combine these two measures to reflect overall satisfaction with products purchased. For all studies, separate analyses using the single-item satisfaction measure revealed the same pattern of effects as this combined measure; however, the use of this two-item index is consistent with prior research, which suggests that overall satisfaction is based on both product performance and perceptions of value (Bolton and Lemon 1999; Fornell et al. 1996; Johnson et al. 1995; Oliver and Swan 1989; Zeithaml 1988).

The films in the study were drawn from an initial set of 14 2–3-minute art films deemed appropriate for general audiences. In a pretest, 75 individuals from the same pool, but who did not participate in the main study, provided liking ratings for these films. Five films whose liking ratings did not significantly differ from one another were used in the main study.

For each film purchase in the main study, to enhance the realism of the procedure, participants chose one film from four film titles offered. The selection of any of the four titles actually redirected participants to the same film. (Films were edited to remove any actual titles.) For example, regardless of whether a participant chose Paddington Station, Pence, Keeping Score, or Almost Brilliant, he was redirected to the same short film (with the actual title Short Changed). In this manner, each participant selected, purchased, viewed, and evaluated three different films, randomly presented from the pool of five films used in the study. Note that while we randomized presentation order and included variables in our analysis to control for the actual film viewed and the order in which the three films were watched, subsequent studies hold viewing sequence constant. That is, across studies, we offer both approaches for robustness.

Results and Discussion

The analysis below is based on the 105 respondents ($M_{\text{age}} = 28.2; 47$ females) remaining after eliminating two participants who indicated that English was not their primary language.

Satisfaction. The two dependent measures (i.e., satisfaction with and perceived value of the film) were averaged, forming a satisfaction index ($r = .87$) for the third film purchased and viewed (i.e., when half of the participants had completely exhausted budgets). A one-way ANCOVA was used to analyze satisfaction with the third film. Budget condition (exhausted vs. not exhausted) was the between-subjects factor. As noted above, participants responded to the dependent measures for three of five films, presented in random order. To control for the films viewed, 12 dummy variables were included in our analysis as covariates: four for the third film (our target film) plus, to control for the possibility that films seen earlier in the study might have influenced satisfaction with the third film, four for each of the two films viewed before.

The ANCOVA revealed significant differences in satisfaction with the third film depending on budget condition. As expected, individuals who had spent their last 10 credits to purchase the film were less satisfied ($M = 4.44$) than those with 20 credits remaining after the purchase ($M = 5.61; F(1, 91) = 4.83, p < .05; fig. 2).

To further test our hypothesis, we also examined satisfaction for the second film. Here, neither condition faced a depleted budget, so we expected less of a difference in satisfaction for this purchase. Again, we analyzed the two-item satisfaction index ($r = .88$) using a one-way ANCOVA, including covariates to control for the films seen (four representing the second film and four for the first). In contrast to the third film, viewed when half of the participants had an exhausted budget, no differences in satisfaction emerged between participants whose purchase reduced their available balance to 10 credits (i.e., the exhausting budget condition;
$M = 5.19$) versus 30 credits (i.e., the nonexhausting budget condition; $M = 5.45$; $F(1, 95) = .27, p > .60$; fig. 2).

Our primary hypothesis is that satisfaction is diminished when budgets are depleted and that this occurs because pain of paying increases. In this study, we observed the proposed decrease in satisfaction. However, a possible alternative explanation is that depleted budgets result in higher, yet ultimately unmet, expectations (Oliver 1980, 1997). To examine this, we again performed an ANCOVA analysis, using expectations for film 3 as the dependent measure, budget condition as the between-subjects factor, and eight dummy variables as covariates to control for possible variations in expectations due to the two films already viewed. This analysis revealed no difference in expectations for the third film whether participants were close to budgetary exhaustion ($M = 5.76$) or not ($M = 5.60$; $F(1, 95) = .21, p > .60$).

Discussion. In this study, we manipulated participants’ available resources to examine how spending that fully exhausts (vs. does not fully exhaust) one’s budget influences satisfaction with the product purchased. Our findings revealed that participants spending the last of their budget to purchase the third film were less satisfied than those who had resources remaining after the purchase. Follow-up analyses revealed no differences in satisfaction when all participants had resources remaining and no difference in expectations based on budget status.

These findings offer preliminary evidence that bottom dollar spending leads to decreased satisfaction. We note that no differences in satisfaction with the second film emerged, even though participants in the exhausting budget condition had fewer total resources available after the purchase (10 credits) than those in the nonexhausting condition (30 credits). In addition, while the purchase of the third film reduced all participants’ balances by the same amount (10 credits), satisfaction was attenuated only for participants whose purchase reduced their available balance to zero (i.e., those in the exhausting budget condition), not for participants whose balances were reduced to 20 credits (i.e., those in the nonexhausting condition). Our hypothesis is that these differences in satisfaction are driven by the pain associated with bottom dollar spending. As such, studies 2–5 examine the role of payment pain through both manipulation and measurement.

STUDY 2: MEASURED EARNING DIFFICULTY AND THE BOTTOM DOLLAR EFFECT

Although study 1 provided preliminary support for the notion that spending one’s bottom dollar decreases satisfaction, study 2 was designed to offer a more direct examination of our assertion that the pain of paying is a key driver in the effect. In study 1, participants were told to imagine that they had spent money to purchase credits for the film festival; however, prior research suggests that the difficulty ascribed to earning resources can influence the pain of spending (Bagchi and Block 2011). If, as hypothesized, pain of paying is associated with the bottom dollar effect, when a consumer finds it difficult to earn resources, the bottom dollar effect should be more pronounced than for those who perceive earning as easy. For study 2, participants performed work to earn credits for the film festival budgets and we measured earning difficulty.
Design and Procedure

Two hundred twelve nonstudent adults recruited through MTurk participated in study 2, a Web-based experiment employing a mixed design. Budget condition (exhausting vs. not exhausting) was manipulated between subjects; perceived earning difficulty was measured.

All participants were told that they would be able to purchase and watch movies as part of an online film festival and that they would first perform a number of tasks to earn credits, funding their film-buying budget. The tasks were designed and pretested to be moderately tedious. Each consisted of 20 item lists of nouns or phrases belonging to one of two different categories (e.g., animals or Simpsons episodes). Participants were required to click and drag each item into a box labeled with the appropriate category heading. Participants in the exhausting budget condition completed two of these sorting tasks (worth 10 credits each), funding a 20-credit budget, while those in the not exhausting condition completed three, funding a 30-credit budget. Prior to each task, participants were given depictions of how completing the task would increase their budgets (fig. A2). After each task, participants rated the task with three, 9-point, bipolar items (difficult or easy, frustrating or enjoyable, annoying or fun).

Next, as in study 1, all participants were introduced to the film festival in which they would spend their earned credits. Before and after each film purchase, participants were verbally and visually reminded of the credits remaining in their budgets (fig. A1). Participants were told that, when they had zero credits left, they would perform more tasks to earn more credits.

As in study 1, for each film purchase, participants chose from a set of four possible titles that were actually linked to the same film. After watching each film, participants responded to the two measures of satisfaction used in study 1, both assessed on 9-point scales. In contrast to study 1, film order was not randomized. That is, for each choice, all participants saw the same film. Participants in both budget conditions had credits remaining after purchasing the first film; however, those in the exhausting budget condition spent their last credits purchasing the second film, while participants in the not exhausting budget condition had 10 credits remaining after the purchase. This allowed for a direct comparison of satisfaction for the same film, but under different budgetary conditions.

Immediately after watching the two primary films of interest, participants whose budgets had not been exhausted watched a third film, while those in the exhausting budget condition performed one additional task and earned 10 more credits, which allowed them to purchase the third film. While we were not interested in ratings for this film, this allowed us to ensure that all participants, regardless of condition, spent about the same amount of time on the study. It also allowed us to collect difficulty ratings for the third task from those in the exhausting budget condition. Next, participants answered additional questions (e.g., demographics) and were paid.

Results and Discussion

The analysis below is based on the 208 respondents ($M_{age} = 34.0$; 125 females) remaining after the elimination of three participants indicating that English was not their primary language and one reporting he had already completed a variation of this study (i.e., study 1).

Pain of Payment and Satisfaction. First, the nine task difficulty items (three for each task) were reverse coded, averaged, and mean centered, creating a single measure of perceived task difficulty ($\alpha = .91$). Next, we examined the role of budget condition and task difficulty on satisfaction with the second film, when those in the exhausting budget condition had just spent to zero and those in the not exhausting condition had credits remaining. Indicator variables for budget condition (exhausting = −1, not exhausting = 1), perceived task difficulty (SD = 1.55, min = −2.08, max = 5.14), and the interaction of these two factors were regressed on the two-item satisfaction index for the second film ($r = .86$). Only the two-way interaction of budget and difficulty was significant, supportive of our predictions ($B = .24, SE = .10; t = 2.52, p < .05$). Of note, these variables were also regressed on satisfaction with the film preceding film 2 (i.e., when no budgets were exhausted). Here, only the main effect of task difficulty was significant ($B = −.32, SE = .10; t = −3.10, p < .01$); the interaction was not ($B = .09, SE = .10; t = .90, p = .37$).

Given that our proposed moderator (task difficulty) was continuous, arbitrary, and capable of producing a wide range of values, we decomposed the interaction using Johnson-Neyman points (1936), performing a floodlight analysis to examine the influence of resource availability on satisfaction across the entire range of difficulty perceptions, as recommended by Spiller et al. (2013). Using PROCESS model 1 (Hayes 2013) and the raw scores for perceived task difficulty (min = 1.00, max = 8.22), our analysis revealed that resource availability influenced satisfaction when task difficulty was perceived to be very high (i.e., 6.76; $B = .76, SE = .39$). Consistent with our theorizing, for those who ascribed this level of difficulty to tasks, the model predicted significantly lower satisfaction for those with exhausting ($M = 4.71$) versus not exhausting budgets ($M = 6.23; t = 1.97, p = .05$; fig. 3).

In addition to preliminary support for the proposed mechanism by which the bottom dollar effect arises (i.e., higher pain of payment), our findings revealed an unexpected increase in satisfaction when perceived difficulty was low (i.e., 2.28; $B = −.33, SE = .17$). When the earning task was perceived as easy, those with exhausted budgets reported greater satisfaction ($M = 6.55$) than those with credits remaining ($M = 5.89; t = −1.97, p = .05$; fig. 3).

Discussion. The results of this study replicated and extended those of study 1. Satisfaction with an identical product was influenced by whether or not purchasing the product exhausted the budget. To explore the role of pain of payment in this process, we measured the difficulty associated with earning resources (Bagchi and Block 2011). As expected,
for exhausting budgets, satisfaction was lower when earning was perceived to be difficult, but earning difficulty did not play a role in satisfaction for those with nonexhausting budgets. While the measure of perceived task difficulty led to results consistent with our hypotheses, using measured variables to make causal inferences has drawbacks. A more appropriate examination of the influence of pain of payment would be to manipulate earning difficulty through random assignment, directly measuring payment pain to assess its influence as a mediating variable.

Our findings in study 2 also revealed that, when participants perceived earning credits to be very easy, satisfaction was greater in the exhausted budget condition than in the nonexhausted condition. Although we did not predict this reversal, it is consistent with the idea that consumers evaluate costs differently as budgets approach exhaustion. While we pretested the tasks to be moderately tedious, we speculate that some participants’ perceptions of the tasks as extremely easy contributed to this reversal. Indeed, across conditions, the average difficulty rating was significantly below the scale midpoint of 5.00 ($M = 3.08$; $F(1, 207) = -17.92$, $p < .001$).

On the basis of the findings from study 1, where all participants were endowed with credits, performing no earning tasks, we may have expected the bottom dollar effect to also arise for study 2 participants who perceived earning credits to be easy (i.e., performing no earning tasks may be comparable to performing very easy tasks). However, study 1 participants were instructed to assume that they had purchased the credits and were not given any information regarding the possibility of budgetary replenishment, while study 2 participants had earned credits during the study and were explicitly told they would be required to complete additional tasks to replenish exhausted budgets. Although these two differences increased external validity (i.e., people do usually replenish their budgets through earning), the finding that replenishment opportunities might influence the pain of bottom dollar spending is not inconsistent with our theory. That is, the pain associated with budgetary exhaustion and the bottom dollar’s influence on satisfaction might be expected to attenuate if exhausted budgets are readily replenished.

Study 3 addresses the above concerns, again using task difficulty as a moderator, but by randomly assigning participants to perform either easy or difficult tasks (all of which were designed to be more difficult than the tasks used in
Study 2) and telling all participants that, once their budget is exhausted, they will be unable to replenish it. Finally, instead of using task difficulty as a proxy, we elicit a direct measure of pain of payment to examine its mediating influence. Studies 4 and 5 examine other circumstances that may affect perceived payment pain and, in turn, satisfaction with products purchased using bottom dollars. Study 4 tests whether a windfall reduces payment pain, while study 5 considers replenishment timing. Both influence perceived pain of payment, moderating the bottom dollar effect.

**STUDY 3: MANIPULATED EARNING DIFFICULTY AND THE BOTTOM DOLLAR EFFECT**

Study 3 had three purposes. First, we wanted to explore the role of pain of payment in the bottom dollar effect by directly manipulating earning difficulty. Second, while prior research has argued that earning difficulty influences pain of payment (Bagchi and Block 2011), we wanted to include a direct measure of payment pain rather than relying on reported earning difficulty as a proxy for this variable. Finally, in contrast to study 2, participants were told that, once their budgets were exhausted, there would be no more opportunities to earn and spend. This ensured that participants evaluating a film would not be influenced by the perceived ease of budget replenishment. Note that we explicitly manipulate replenishment in study 5.

**Design and Procedure**

Two hundred one nonstudent adults, recruited through MTurk, completed this Web-based experiment. The study used a 2 (budget: exhausting vs. not exhausting) × 2 (earning task: easy vs. hard) between-subjects design. All participants were told that they would be purchasing and viewing short films after first performing tasks to earn credits. As in study 2, these tasks involved sorting lists of items into categories to earn 10 credits; however, for this study, all tasks used four categories (e.g., animals, Simpsons episodes, cities, or diseases). Those assigned to complete the relatively easy tasks sorted only four items into the four categories, while those assigned to the hard condition sorted 28 items. To reinforce the manipulation, prior to random assignment, participants were told about both possibilities (four- or 28-item tasks). Prior to completing each task, budget information was relayed verbally and visually (fig. A2). Participants in the exhausting budget condition completed three tasks so that purchasing the third film would exhaust their budget. Those in the non exhausting condition completed four tasks, so that the purchase of the third film would not fully deplete their budgets.

As in study 2, participants were reminded of their budget status before and after each film purchase (fig. A1) and chose films by selecting from four titles, which were actually all linked to the same film. In contrast to study 2, participants were told, “When you run out of credits, you will not have the opportunity to earn any more, and you will be unable to watch any more films.”

Across conditions, participants saw the same three films, in the same order, responding to two satisfaction measures for each: a direct measure of satisfaction using a 9-point bipolar scale (extremely dissatisfied or extremely satisfied) and an evaluation of the film’s “overall value for what I paid” (1 = extremely low, 9 = extremely high). As in prior studies, the focal dependent variable was the two-item satisfaction index for the third film (i.e., when half of the participants had fully exhausted their budgets). Next, to directly measure pain of payment, we adopted a measure from prior research (Thomas, Desai, and Seenivasan 2011). Participants used a sliding bar positioned beneath an image of a face (1 = extremely low, 3 = neutral, 5 = extremely high) in response to “Sometimes, a payment policy can influence how consumers feel about spending money. How did you feel about spending 10 credits to purchase this film?”

Those with credits remaining watched a fourth film, while those with exhausted budgets completed an additional task and watched the final film in order to maintain equal time durations across conditions for compensation purposes. As a manipulation check, at the end of the study, all participants rated the sorting tasks they had performed. First, participants responded to three 9-point bipolar scale items (difficult or easy, frustrating or enjoyable, annoying or fun). Next, they responded to an additional assessment of difficulty: “Compared to other people that participated in this study, I feel as though the jobs I completed were” (1 = much harder, 9 = much easier). Finally, demographic items were collected and participants were compensated.

**Results and Discussion**

Prior to analysis, seven participants were removed because of prior participation (n = 2) or the indication that English was not their primary language (n = 5). Thus, the analysis that follows includes the remaining 194 participants (M_age = 33.5; 93 females).

**Manipulation Check.** Responses to all task difficulty items were reverse coded, and the first three were averaged to form an index (α = .79). Participants who had performed easy tasks (i.e., sorted four items) indicated that their tasks were significantly less difficult (M = 2.09) than those sorting 28 items (i.e., hard tasks; M = 3.42; F(1, 192) = 35.16, p < .001). When their tasks were compared to those of others, similar differences emerged (M_easy = 2.44 vs. M_hard = 4.63; F(1, 192) = 84.88, p < .001), suggesting that the manipulation was effective. There was no significant difference based on budget condition, nor the budget by task interaction for either measure (all p > .15).

**Satisfaction.** The two satisfaction items were averaged to create an index (r = .85), which was analyzed in a 2 (budget: exhausting vs. not exhausting) × 2 (earning task: easy vs. hard) ANOVA. Only the two-way interaction was significant (F(1, 190) = 4.47, p < .05; fig. 4).
In support of our hypotheses, planned contrasts revealed that, when earning was difficult, those who had exhausted their budgets were less satisfied ($M_{exhausted} = 4.87$) than those who had not ($M = 6.01$; $F(1, 190) = 6.03$, $p < .05$). However, when earning was easy, no differences in satisfaction emerged on the basis of budget status ($M_{exhausted} = 5.86$ vs. $M_{not} = 6.01$; $F(1, 190) = .603$, $p > .05$)

In addition, when budgets were exhausted, those in the difficult earning condition were less satisfied ($M = 4.87$) than those in the easy condition ($M = 6.09$; $F(1, 190) = 7.05$, $p < .01$). When budgets were not exhausted, there was no difference in satisfaction based on earning condition ($M_{hard} = 6.01$ vs. $M_{easy} = 5.86$; $F(1, 190) = .11$, $p = .74$; fig. 4). As in study 2, we performed the same analysis for the film viewed just prior to film 3 (i.e., when no participants had exhausting budgets). No differences in satisfaction emerged for the second film based on task difficulty, budget condition, or the interaction (all $p > .12$).

**Conditional Process Analysis.** We used PROCESS model 8 (Hayes 2013) to examine the relationships between budget condition, earning difficulty, pain of payment, and satisfaction with the third film. The model included budget condition as the independent variable, earning difficulty as the moderator, the budget $\times$ difficulty interaction, pain of payment as the proposed mediator, and the two-item satisfaction index as the dependent variable (fig. 5). The budget $\times$ difficulty interaction had a significant effect on pain of paying ($a_{1} = -.19$, $SE = .09$, CI $[-.36, -.02]$) and pain of payment influenced satisfaction ($b = -1.33$, $SE = .10$, CI $[-1.52, -1.14]$). Furthermore, the inclusion of pain of payment in the model reduced the influence of budget $\times$ difficulty to insignificance ($c'_{1} = .09$, $SE = .12$, CI $[-.14, .32]$). A bias-corrected, 95% confidence interval based on 10,000 bootstrap samples revealed that the budget $\times$ difficulty interaction had an indirect effect on satisfaction through the proposed mediator, pain of payment ($a_{2}b = .25$, $SE = .12$, CI $.03, .48$; fig. 5). This finding supports our hypothesized process by which the bottom dollar effect arises. That is, pain of payment mediated the relationship between budgetary exhaustion and satisfaction.

**Discussion.** In study 3, we manipulated budget status and earning difficulty. Our findings reveal that, when the purchase of a product exhausts an individual’s budget, his pain of paying increases, which decreases satisfaction with the product purchased. This pattern did not arise when the purchase did not exhaust participants’ budgets. This support for the process by which the bottom dollar effect arises would be further bolstered if manipulations reducing payment pain attenuated the effect. To explore this, studies 4 and 5 move beyond earning effort, considering alternative influences on the pain of paying: windfall gains and replenishment timing.

**STUDY 4: WINDFALL GAINS AND THE BOTTOM DOLLAR EFFECT**

Study 4 explored a second factor expected to influence the pain of payment. In this study, all participants performed the same (moderately difficult) task to earn credits, funding a budget with which they purchased films. Next, participants either did or did not receive an unexpected windfall gain in the form of “free” credits just prior to the target purchase. We predicted that, for those in the exhausting budget condition, this receipt of free credits at the point of purchase
would decrease the pain of paying by temporarily delaying budget exhaustion, attenuating decreases in satisfaction vis-à-vis those not receiving the windfall. However, for those not facing budgetary exhaustion, this windfall was expected to have less impact, yielding no differences in satisfaction whether it was received or not.

Design and Procedure

One hundred seven undergraduate business students at the University of Arkansas completed this Web-based experiment for partial course credit and were randomly assigned to conditions in this 2 (budget: exhausting vs. not exhausting) × 2 (windfall: present vs. absent) between-subjects design. The procedure was similar to studies 2 and 3: participants completed sorting tasks to earn credits, used to purchase films. Those in the exhausting budget condition performed two tasks, earning 20 credits, enough to purchase two films; those in the non-exhausting condition performed three tasks, earning 30 credits, enough for three. All participants were provided with visual depictions of their budget balances prior to completing each task (fig. A2) and before and after purchasing each film (fig. A1). As in studies 2 and 3, participants then chose, purchased, and viewed the first film. They indicated satisfaction with the film using one 9-point bipolar item (extremely dissatisfied or extremely satisfied).

Just before choosing the second film (i.e., when those with exhausting budgets were about to spend their last credits), all participants were told that the film festival organizers had randomly chosen people to whom they would give more credits. Next, those in the windfall present (absent) condition were told that they had (had not) received 10 additional credits and were again provided with an illustration representing their current and postpurchase budget balances. After purchasing and viewing the second film, participants responded to satisfaction, perceived value, and payment pain items, provided demographic information, and were thanked for their participation.

Results and Discussion

The analysis is based on the 106 participants (\(M_{age} = 20.2; 53\) females) remaining after the elimination of one indicating prior participation in a similar study.

Satisfaction. The two satisfaction measures collected after participants viewed the second film were averaged to create an index of satisfaction (\(r = .76\)). This index was analyzed in a 2 (budget: exhausting vs. not exhausting) × 2 (windfall: present vs. absent) ANOVA. Only the two-way
The interaction was significant ($F(1, 102) = 5.99, p < .05$; fig. 6). As in prior studies, analysis revealed no differences in measured satisfaction for the film viewed just prior to film 2, when all participants had nonexhausting budgets (i.e., film 1; all $p > .15$).

Planned contrasts supported our predictions. First, in a replication of our earlier studies, when no windfall was received, participants whose purchase of the film exhausted their budgets were less satisfied ($M_p = 5.68$) than those with nonexhausted budgets ($M_p = 6.95$; $F(1, 102) = 5.11, p < .05$). However, when a windfall was received just prior to the purchase, no differences in satisfaction emerged between those in the exhausting ($M_p = 6.89$) and not exhausting ($M_p = 6.20$; $F(1, 102) = 1.46, p = .23$) conditions. Furthermore, for participants with exhausting budgets, the receipt of a windfall attenuated the bottom dollar effect ($M_p = 5.68$) compared to those who did not receive the windfall ($M_p = 6.89$; $F(1, 102) = 4.49, p < .05$). However, for those with nonexhausting budgets, no satisfaction differences emerged between those who received the windfall ($M_p = 6.20$) and those who did not ($M_p = 6.95$; $F(1, 102) = 1.78, p = .19$; fig. 6).

**Conditional Process Analysis.** Again, we used PROCESS model 8 (Hayes 2013) to consider the role of payment pain. The model included budget condition as the independent variable, windfall as a moderator, the budget × windfall interaction, pain of payment as a mediator, and the two-item satisfaction index as the dependent variable (fig. 7). The budget × windfall interaction influenced pain of paying ($a_x = .30, SE = .10, CI [.10, .51]$), and pain of paying had a significant effect on satisfaction ($b = -1.28, SE = .14, CI [-1.56, -.99]$). However, including payment pain in the model rendered the interaction’s direct effect on satisfaction insignificant ($c'_1 = -.10, SE = .16, CI [-.41, .21]$). Consistent with our hypothesized process, bootstrap analysis ($n = 10,000$; bias-corrected 95% confidence intervals) revealed that budget × difficulty had an indirect effect on satisfaction through the mediator, payment pain ($a,b = -.39, SE = .14, CI [-.68, -.13]$; fig. 7).

**Discussion.** The manipulation of budgetary exhaustion and the presence of a windfall gain provided additional support for our theory that budget-exhausting purchases result in lower satisfaction with products purchased due to increased payment pain. As expected, windfall receipt attenuated the bottom dollar effect’s influence on satisfaction for those in the exhausting budget condition. Further, conditional process analysis replicated our study 3 findings, showing that this result was mediated by pain of payment.

Considering that consumers’ purchases follow cyclical patterns, associated with the rise and fall of their available resources (Brady 2009; Huffman and Barenstein 2005), it is likely that individuals expecting imminent resource replenishment might experience less pain when making budget-exhausting purchases. For example, spending one’s last dollar on a Sunday may feel less painful if a paycheck is expected on Monday. Conversely, if replenishment is relatively far into the future, spending resources may be painful—even for those who have abundant resources. Note that this premise is related to the study 2 protocol in which the instructions may have led participants to believe there would be opportunities to replenish their budgets. In that study, participants who perceived budgetary replenishment to be very easy were more satisfied with a budget-exhausting (vs. not exhausting) purchase. We speculated that the per-
ceived ease of replenishment may have substantially decreased pain of paying. We further explore this in study 5, manipulating whether participants receive information about resource replenishment and whether that information reveals that replenishment will occur in the near or distant future.

STUDY 5: REPLENISHMENT TIMING AND THE BOTTOM DOLLAR EFFECT

Study 5 was designed to test whether replenishment timing moderates the bottom dollar effect by influencing payment pain. In addition, for robustness, this study was designed to be more realistic with respect to the resources in the budget. So in contrast to studies 1–4, budgets were not filled with credits, but dollars. Furthermore, in contrast to studies 2–4, participants did not earn and then spend resources as part of the experiment. Instead, similarly to the pilot study, participants were endowed with resources, which were diminished through a series of typical consumer purchases. These factors, coupled with our manipulation of budgetary replenishment (described below), led us to focus on adults of working age (18–65 years old) to ensure that both manipulations (i.e., spending dollars from a set budget and budgetary replenishment analogous to paycheck receipt) were perceived as realistic.

For this study, we made a series of predictions. First, for participants not given explicit information about budget replenishment timing, we predicted a replication of the bottom dollar effect: satisfaction will be lower for a purchase that exhausts (vs. does not exhaust) a budget. Second, for participants told that their budget will be replenished soon, pain of payment will be reduced for those facing budgetary exhaustion, attenuating the bottom dollar effect. That is, for those expecting quick budget replenishment, we predicted no differences in satisfaction whether the budget was exhausting or not. Note that this finding would be consistent with the attenuated bottom dollar effect for study 2 participants who perceived earning to be easy. Third, for participants told that their budget will not be replenished for a long time, pain of payment will be high, regardless of budget status. So, for these participants, satisfaction should be lower whether budgets are exhausting or not. Put another way, compared to those with no information (i.e., the control condition), participants with exhausting budgets should be more satisfied if told that replenishment will occur soon; those with nonexhausting budgets should be less satisfied if informed that replenishment is far away.

Design and Method

From MTurk, 302 nonstudent adults participated in this Web-based study, a 2 (budget: exhausting vs. not exhausting)
STUDY 5: SATISFACTION WITH THE LEGO FILM

Participants then indicated their satisfaction with the film using a 7-point, bipolar scale (extremely dissatisfied or extremely satisfied) and their agreement with describing the film as a “good value” (1 = strongly disagree, 7 = strongly agree). Consistent with studies 2–4, participants next indicated how spending $2 made them feel (i.e., payment pain). On a separate screen, those in the near- and far-future replenishment conditions responded to a manipulation check: “How long is it until you have more money added to your entertainment budget?” (1 = not a long time at all, 7 = a very long time). Participants provided demographic information and were thanked and compensated for completing the study.

Results and Discussion

The analysis is based on the 291 participants ($M_{age} = 31.32; 117$ females) remaining after the elimination of 11 participants who indicated either that English was not their primary language or that they were not of working age. Because of the differences in this study’s protocol (i.e., spending simulation, different film), participants were not asked about prior participation.

Manipulation Check. We analyzed responses to the manipulation check for those assigned to the near ($n = 95$) and far ($n = 93$) conditions. Those in the near-future condition indicated that they would receive more money significantly sooner ($M = 1.56$) than those in the far condition ($M = 4.82; F(1, 184) = 279.26, p < .001$), suggesting that the replenishment timing manipulation worked as intended. No significant differences emerged based on budget condition or the budget by replenishment timing interaction (both $p > .15$).

Satisfaction. As in prior studies, the responses to satisfaction and value were averaged, creating a two-item satisfaction index ($r = .64$), which was analyzed in a 2 (budget: exhausting vs. not exhausting) × 3 (replenishment timing: unknown vs. near future vs. far future) ANOVA. Only the two-way interaction emerged as significant ($F(2, 285) = 3.17, p < .05$; fig. 8).

Consistent with the predictions outlined above, we performed a total of seven planned contrasts, revealing that
replenishment timing influenced satisfaction consistent with our predictions. Specifically, for participants given no replenishment information (i.e., the unknown condition), the bottom dollar effect arose, replicating our prior findings. Participants with exhausting budgets were less satisfied ($M_{p} = 2.34$) than those with nonexhausting budgets ($M_{p} = 2.98$; $F(1, 285) = 5.77, p < .05$). For those with exhausting budgets, no differences in satisfaction arose whether replenishment timing was unknown ($M = 2.34$) or 6 days away (i.e., far future; $M = 2.54$; $F(1, 285) = .55, p = .46$). However, satisfaction was higher for those with exhausting budgets when they were told they would receive replenishment in the near future (i.e., tomorrow; $M = 2.87$) than for those for whom replenishment timing was unknown ($M = 2.34$; $F(1, 285) = 3.65, p = .057$). Finally, for those expecting near-future replenishment, the bottom dollar effect was attenuated; no differences emerged whether budgets were exhausting ($M = 2.87$) or not ($M = 2.68$; $F(1, 285) = .43, p = .51$; fig. 8).

Additional contrasts revealed the opposite pattern for participants with nonexhausting budgets. Satisfaction was the same whether replenishment timing was unknown ($M = 2.98$) or expected in the near future ($M = 2.68$; $F(1, 285) = 1.23, p = .27$). However, satisfaction was significantly lower for participants told that replenishment was far ($M = 2.33$) than for those given no replenishment information ($M = 2.98$; $F(1, 285) = 5.58, p < .05$). Indeed, for participants expecting replenishment in 6 days (i.e., far future), satisfaction was similar whether budgets were exhausting ($M = 2.54$) or not ($M = 2.33$; $F(1, 285) = .55, p = .46$; fig. 8).

**Conditional Process Analysis.** We next considered the relationships between budget status, replenishment timing, pain of payment, and satisfaction. Since our moderator, replenishment timing, had three levels (unknown vs. near future vs. far future), we used PROCESS model 10 (Hayes 2013), applying the steps recommended by Hayes and Preacher (2013) for multicategorical variable analysis. Specifically, dummy codes were created, representing comparisons between replenishment timing conditions: unknown versus near future (D1) and unknown versus far future (D2). Thus, the model included budgetary status (independent variable), two moderators representing replenishment timing (D1, D2), the budget × D1 and budget × D2 interactions, pain of payment (the proposed mediator), and the satisfaction index (dependent variable; fig. 9).

Our findings revealed that the budget × D1 interaction influenced payment pain ($a_{1} = .38, SE = .14, CI [.07, .69]$), while the budget × D2 interaction had a marginally significant effect ($a_{2} = .26, SE = .14, CI [-.05, .57]$). In addition, pain of payment influenced satisfaction ($b = -1.03, SE = .06, CI [-1.16, -.91]$). Furthermore, the
inclusion of pain of payment in the model reduced the significance of the budget \times D1 interaction ($a,b = -0.02$, SE $= 0.13$, CI $[-0.32, 0.28]$) and the budget \times D2 interaction ($a,b = -0.16$, SE $= 0.13$, CI $[-0.46, 0.15]$), suggesting mediation (table 1).

Since our proposed moderator was a three-level categorical variable, we followed the suggestion of Hayes and Preacher (2013, 13), using bias-corrected 97.5% confidence interval estimates (i.e., a Bonferroni adjustment for multiple hypothesis tests). Bootstrapping ($n = 10,000$) revealed that the indirect effect of budget \times timing on satisfaction was conditional on the mediator, payment pain, for those given no information about replenishment ($B = 0.27$, SE $= 0.09$, CI $[0.07, 0.48]$). However, the relationship was not conditional on pain of payment for those told replenishment would occur in the near ($B = -0.12$, SE $= 0.10$, CI $[-0.34, 0.10]$) or far future ($B = -0.001$, SE $= 0.11$, CI $[-0.26, 0.25]$), consistent with our predictions (table 2). As such, the influence of budget \times timing was conditional on our proposed mediator, pain of payment.

Discussion. In study 5, we manipulated budgetary exhaustion and information about replenishment timing to provide additional support for the bottom dollar effect and the process by which it arises. We extend our prior findings by examining a third moderator influencing pain of payment (beyond earning difficulty and windfall gains, considered in studies 2–4). Here we show that, when replenishment is revealed to be imminent, the bottom dollar effect is attenuated. That is, satisfaction evaluations are similar whether budgets are exhausted or not. In addition, our findings suggest that satisfaction may be lower for individuals with non-exhausting budgets if they perceive that budget replenishment will not occur until the distant future. More generally, this shows that pain of payment increases as budgets near exhaustion but that decreased satisfaction may also arise prior to bottom dollar spending when other factors increase payment pain. Conditional process analysis again supports the hypothesized role of payment pain in the relationship between bottom dollar spending and satisfaction with products purchased.

Finally, the findings from study 5 bolster our speculation regarding the attenuation of the bottom dollar effect for study 2 participants who perceived the earning tasks to be particularly easy. Taken together, these findings suggest that, when budgets are exhausting, perceptions of expedited replenishment will reduce the pain associated with spending one’s bottom dollar and increase satisfaction with the purchase.

### GENERAL DISCUSSION

A total of six studies show how satisfaction is influenced by consumers’ budgetary status at the time of product purchase. Our findings reveal that purchases made as budgets are exhausted (vs. not exhausted) yield decreases in satisfaction with the product purchased. First, the pilot study showed that aversion to spending is greater for those facing budgetary exhaustion, and, in support of the notion that individuals use budgets as reference points, this difference in aversion is predicated on the presence of an explicit budget. Next, study 1 showed that spending from an exhausting budget reduces satisfaction with the purchased product relative to spending from a nonexhausting budget. Study 2 provided preliminary support for the role of pain of payment

| TABLE 1 |
| STUDY 5: CONDITIONAL PROCESS MODEL COEFFICIENTS |

<table>
<thead>
<tr>
<th>Effects</th>
<th>Pain of payment ($M$)</th>
<th>Satisfaction ($Y$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Path</td>
<td>$B$</td>
</tr>
<tr>
<td>Budget ($X$)</td>
<td>$a_1$</td>
<td>-0.2606</td>
</tr>
<tr>
<td>Pain of payment ($M$)</td>
<td>$a_2$</td>
<td>-0.0720</td>
</tr>
<tr>
<td>Unknown vs. soon ($W$)</td>
<td>$a_3$</td>
<td>-0.1249</td>
</tr>
<tr>
<td>Unknown vs. far ($Z$)</td>
<td>$a_4$</td>
<td>0.3774</td>
</tr>
<tr>
<td>Budget \times “soon” ($WX$)</td>
<td>$a_5$</td>
<td>0.2620</td>
</tr>
<tr>
<td>Budget \times “far” ($XZ$)</td>
<td>$a_6$</td>
<td>0.3508</td>
</tr>
</tbody>
</table>

*Conditional on pain of payment mediator; 97.5% bias-corrected bootstrap estimates.

| TABLE 2 |
| STUDY 5: THE INFLUENCE OF BUDGET $\times$ TIMING ON SATISFACTION |

<table>
<thead>
<tr>
<th>Level of moderator(s)</th>
<th>Indirect effect*</th>
<th>Direct effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>SE</td>
</tr>
<tr>
<td>No information ($W = 0; Z = 0$)</td>
<td>0.2696</td>
<td>0.0928</td>
</tr>
<tr>
<td>Replenishment soon ($W = 1; Z = 0$)</td>
<td>-0.1208</td>
<td>0.0965</td>
</tr>
<tr>
<td>Replenishment far ($W = 0; Z = 1$)</td>
<td>-0.0014</td>
<td>0.1113</td>
</tr>
</tbody>
</table>
by measuring earning difficulty. In studies 3–5 we deployed multiple interventions, manipulating payment pain through earning difficulty, windfall gains, and replenishment timing and measuring participants’ perceived pain of payment. In this manner, our studies offer both moderation and mediation to support the hypotheses. These relationships between resource availability, payment pain, and satisfaction offer important extensions to mental accounting and satisfaction literatures, providing insights and opportunities for managers and researchers alike.

Theoretical Contributions

The present research adds to the growing body of literature that considers how consumers react to limited or declining resources. Prior work has focused on the relationship between resource availability and judgment and decision-making processes showing, for example, that resource availability influences consumer consideration of costs (Morewedge et al. 2007; Spiller 2011) and product preferences (Huffman and Barenstein 2005; Mishra et al. 2010; Sharma and Alter 2012). Here, we broaden these findings by showing that budgetary exhaustion can also influence product evaluations after consumption.

Our findings offer four substantive extensions to the mental accounting literature. First, while consumers create mental budgets in an effort to track expenditures (Heath and Soll 1996), we find that the pain associated with incurring economically equivalent costs may vary on the basis of the budget balance consumers use as a reference point. For example, while prior work has examined how budget balances influence consumer choice of planned versus unplanned items (Stilley et al. 2010b), we offer a glimpse of how exhausting balances influence individuals’ feelings about spending these remaining funds as well as the product purchased.

Our second contribution to this stream extends the work of Prelec and Loewenstein (1998), who described particular circumstances that might increase the marginal utility of money, in turn heightening the pain felt when costs are incurred. To the extent that consumers’ budget balances are cyclical, our findings suggest that increases in imputed costs and payment pain may be as well. Third, we offer a new perspective on “closing” mental accounts. We suggest that the pain associated with closing a mental budget (i.e., via bottom dollar spending) may result in lower satisfaction, beyond whether transaction-specific mental accounts close in the red or black (i.e., through the forfeiture or receipt of benefits; Prelec and Loewenstein 1998).

Finally, this article offers a unique empirical examination of the proposed relationships between mental accounting, payment pain, and the utility derived from consumption (Prelec and Loewenstein 1998; Thaler 1980, 1985, 1999). While the mental accounting literature has examined its propositions through the extensive use of judgment and decision-making experiments, we believe that ours is the first to empirically demonstrate these relationships in a setting in which participants purchase, consume, and evaluate actual products. These findings are both theoretically and managerially meaningful, offering a fertile foundation for future research.

Our findings also provide a contribution to the extant consumer satisfaction research. Prior work has shown that satisfaction may be influenced by multiple nonproduct characteristics including choice set size, perceived exchange fairness, ambiguity of expected reactions from others, and individual differences such as belief in karma or a predisposition to maximize outcomes (Heitmann, Lehmann, and Herrmann 2007; Kopalle, Lehmann, and Farley 2010; Oliver and Swan 1989). Our findings offer additional nonproduct attributes influencing satisfaction: budgetary status and the pain associated with spending. More pointedly, our research also adds to work considering the influence of budgetary expectations on satisfaction. In particular, Bolton and Lemon (1999) found that consumers’ expectations of usage and exchange equity can influence long-term satisfaction. If bottom dollar spending increases the pain of a transaction, consumers may perceive exchanges as less equitable, reducing future purchases.

Finally, research suggests that an individual’s ability to enjoy, or savor, positive outcomes influences overall well-being even more than the ability to achieve positive outcomes (Bryant 1989). Prior work in this area has focused on factors that may moderate an individual’s ability to savor. For example, Quoidbach et al. (2010) suggest that individuals with limited resources are more likely to savor outcomes than their wealthier counterparts, because they have access to fewer similarly positive alternatives (cf. Gilbert 2006). Additional findings suggest that individuals enjoy products and experiences more if they are consumed at the very end of a series or are tightly tied to a sense of finality (Kurtz 2008; O’Brien and Ellsworth 2012). In this manner, scarcity, based on either purchase ability or opportunity, is predicted to increase enjoyment. However, across multiple studies, we find the opposite effect. That is, for individuals with exhausting budgets, satisfaction with the final product in a series is lower. As such, it seems possible that mental accounting for costs might also moderate savoring ability. Specifically, if consumers do not consider the costs of obtaining products while consuming (e.g., if products are purchased, bundled, or free), they may be more likely to savor the product itself, which should enhance satisfaction. However, if costs are perceived as high (e.g., missed alternatives for the wealthy, greater pain of paying), consumers may savor their remaining resources more than the items purchased, attenuating satisfaction.

Managerial Implications

Since the status of consumers’ budgets (i.e., exhausting vs. not exhausting) may influence satisfaction, marketing managers might consider the timing of specific types of promotions to coincide with likely resource availability. For example, if a marketer’s goal is to attract new customers or generate word of mouth, initial satisfaction with trial is important. So, promotions of these types might be better timed...
at the beginning of the month, or immediately after consumers receive tax refunds, in order to ensure that budgets are not approaching exhaustion at the time of purchase. Conversely, toward the end of the month, when budgets are likely approaching exhaustion, or for consumers spending the last dollars left on a gift card, surprise coupon promotions might be more appropriate (Heilman, Nakamoto, and Rao 2002).

Of course, it is likely that consumers may construct their mental budgets differently on the basis of individual circumstances (e.g., college administrators may budget for the academic year, assistant professors may budget for the semester, college students may budget for the week). As such, marketing managers may be able to use our findings to differentially promote products on the basis of the extent to which their target markets’ budgets are more likely to be approaching exhaustion.

Future Research Opportunities

In the studies presented here, participants were exposed to generally positive consumption outcomes; however, consumers do experience both positive and negative outcomes in the marketplace. The consideration of how bottom dollar spending influences satisfaction with negative product performance episodes (cf. Bitner 1990) could be an important extension of the present research. It seems possible that negative product performance outcomes might yield even greater dissatisfaction for consumers who have spent their bottom dollar than for those who have not (Kahneman and Tversky 1979; Mittal, Ross, and Baldasare 1998). In line with the consideration of negative product performance outcomes, it is also possible that budgetary status influences a consumer’s zone of tolerance or the range of product performances that fall between “desired” and “adequate” performance levels (Zeithaml, Berry, and Parasuraman 1993). In other words, when a consumer’s product purchase exhausts his budget, the resulting zone of tolerance for product performance may shift and/or grow narrower. As such, he may perceive fewer outcomes as desired or adequate than a consumer whose purchase does not exhaust his budget. Considerations related to negative product performance or potential variations in zones of tolerance may be of particular interest to managers.

While our findings reveal that the bottom dollar effect is not necessarily due to wealth effects (i.e., satisfaction did not vary for nonexhausting purchases, regardless of the amount of resources participants started with or had remaining), it is certainly possible that income patterns could influence how often consumers experience the bottom dollar effect (Thaler 1999). For example, a laborer receiving wages on a daily basis might experience bottom dollar spending more often than someone receiving a set salary on a monthly or bimonthly basis. In a related manner, consumers may differ in the extent to which they use mental budgeting in their daily lives, perceive mental budgets to be malleable, or consider short- or long-term financial planning horizons (Antonides, de Groot, and van Raaij 2011; Cheema and Soman 2006; Lynch et al. 2010). It follows that those who tend to use budgets, who treat budgets as rigid, or who engage in short-term financial planning may experience budgetary exhaustion and commensurate fluctuations in satisfaction more often. Furthermore, while our theory and main studies focused on moments of complete budgetary exhaustion, it seems possible that payment pain gradually increases throughout the budgetary cycle (i.e., as budget balances decline). Future research may be able to further refine our understanding of this phenomenon by testing multiple combinations of costs and budget balances to determine whether the relationship between pain of paying and remaining budgetary resources is linear or nonlinear (e.g., on the basis of exponential or step functions). As such, our findings are relevant for researchers and policy makers examining impoverished or disadvantaged consumers as well as financial planning or decision making.

In addition, although we link this examination of the bottom dollar effect to financial costs, consumers also consider budgetary balances for other resources, such as time, food, and even cigarette smoking (Becker 1965; LeClerc, Schmitt, and Dubé 1995; Lynch et al. 2010; Morewedge et al. 2007; Platkin 2009; Rozensky 1974; Zauber and Lynch 2005). Given that “spending” these resources will eventually lead to budgetary exhaustion, it seems possible that a bottom “hour,” “snack,” or “smoke” effect might emerge. What is less clear is whether budgetary exhaustion for these resources would influence satisfaction. For instance, much like research revealing that different forms of payment may affect spending aversion (Soman 2001a), the extent time-money literature suggests that costs of time and money are thought about differently (Monga and Saini 2009; Okada and Hoch 2004; Saini and Monga 2008; Soman 2001b). As such, it is possible that the exhaustion of time-based budgets would not influence satisfaction. However, research has also shown that, under some circumstances, consumers do consider temporal budgets (Soster, Monga, and Bearden 2010) and that individuals may prefer products in which they have invested time (Norton, Mochon, and Ariely 2012). So for time-based budgets, a bottom “hour” effect might actually yield greater satisfaction with products.

Finally, as our studies focused on hedonic products with relatively short life spans, it seems possible that the bottom dollar effect might operate differently on the basis of what is purchased. For example, prior findings suggest that consumers may be more likely to experience dissatisfaction and/or positive disconfirmation if it is relatively easy to evaluate product quality (Anderson and Sullivan 1993). As such, future research should consider whether the bottom dollar effect is attenuated or exacerbated when consumers exhaust their budgets to purchase search (vs. experience) goods (Nelson 1970). In addition, prior work has shown that consumers prefer scarce or prevention-focused products if they are temporarily far from the receipt of their paycheck (Mishra et al. 2010; Sharma and Alter 2012). These preferences suggest that the effect might be less likely to arise when particularly unique or utilitarian goods are purchased (Chan and Mukho-
Finally, given that prosocial spending has been shown to increase consumer happiness (Aknin et al. 2013; Dunn, Aknin, and Norton 2008), it is possible that prosocial spending that exhausts budgets may increase the pain of spending. However, in this circumstance, a heightened sense of generosity could result, yielding increased consumer happiness from donation behavior.

DATA COLLECTION INFORMATION

All studies in this article were conducted via Qualtrics. The second author supervised data collection and analyzed the results from the pilot study during the spring of 2013. The pilot study was conducted with nonstudent adults recruited via Amazon Mechanical Turk (MTurk). The first author supervised data collection and performed the analysis for the five main studies. Study 4 data were collected during the spring of 2013 using the Behavioral Business Research Lab at the Walton College of Business (University of Arkansas); participants were undergraduate business students from the Marketing Department subject pool. Studies 1–3 (spring 2013) and 5 (fall 2013) were conducted with nonstudent adults recruited through MTurk. Results from all studies were jointly authored by the first and second authors and corroborated by the third. MTurk participants were compensated using the first author’s research budget (study 5), the second author’s research budget (pilot study), and a grant received by the first and third authors from the Moore School of Business (University of South Carolina; studies 1–3).

APPENDIX

FIGURE A1
EXAMPLE OF VISUAL REPRESENTATIONS OF BUDGETS IN STUDIES 1–4

![Diagram of budget visual representations](image-url)
FIGURE A2
EXAMPLE OF VISUAL REPRESENTATIONS OF EARNING IN STUDIES 2–4

<table>
<thead>
<tr>
<th>T1</th>
<th>Exhausting Budgets</th>
<th>Not Exhausting Budgets</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Available Now</td>
<td>Available Now</td>
</tr>
<tr>
<td></td>
<td>After You Complete this Job</td>
<td>After You Complete this Job</td>
</tr>
<tr>
<td></td>
<td>Film Buying Budget 0 CREDITS</td>
<td>Film Buying Budget 0 CREDITS</td>
</tr>
<tr>
<td></td>
<td>0 CREDITS</td>
<td>0 CREDITS</td>
</tr>
<tr>
<td></td>
<td>10 CREDITS</td>
<td>0 CREDITS</td>
</tr>
<tr>
<td>T2</td>
<td>Available Now</td>
<td>Available Now</td>
</tr>
<tr>
<td></td>
<td>After You Complete this Job</td>
<td>After You Complete this Job</td>
</tr>
<tr>
<td></td>
<td>Film Buying Budget 10 CREDITS</td>
<td>Film Buying Budget 10 CREDITS</td>
</tr>
<tr>
<td></td>
<td>10 CREDITS</td>
<td>10 CREDITS</td>
</tr>
<tr>
<td></td>
<td>20 CREDITS</td>
<td>0 CREDITS</td>
</tr>
<tr>
<td>T3</td>
<td>Available Now</td>
<td>Available Now</td>
</tr>
<tr>
<td></td>
<td>After You Complete this Job</td>
<td>After You Complete this Job</td>
</tr>
<tr>
<td></td>
<td>Film Buying Budget 20 CREDITS</td>
<td>Film Buying Budget 20 CREDITS</td>
</tr>
<tr>
<td></td>
<td>20 CREDITS</td>
<td>20 CREDITS</td>
</tr>
<tr>
<td></td>
<td>30 CREDITS</td>
<td>0 CREDITS</td>
</tr>
</tbody>
</table>

REFERENCES


Bakke, E. Wight (1940), Citizens without Work, New Haven, CT: Yale University Press.


