

MOTY AMAR, DAN ARIELY, SHAHAR AYAL, CYNTHIA E. CRYDER, and
SCOTT I. RICK*

When consumers carry multiple debts, how do they decide which debt to repay first? Normatively, consumers should repay the debt with the highest interest rate most quickly. However, because people tend to break complicated tasks into more manageable parts, and because losses are most distressing when segregated, the authors hypothesize that people will pay off the smallest loan first to reduce the total number of outstanding loans and achieve a sense of tangible progress toward debt repayment. To experimentally examine how consumers manage multiple debts, the authors develop an incentive-compatible debt management game, in which participants are saddled with multiple debts and need to decide how to repay them over time. Consistent with the hypothesis, four experiments reveal evidence of *debt account aversion*: Participants consistently pay off small debts first, even though the larger debts have higher interest rates. The authors also find that restricting participants' ability to completely pay off small debts, and focusing their attention on the amount of interest each debt has accumulated, helps them reduce overall debt more quickly.

Keywords: financial decision making, debt repayment, debt consolidation, goals, credit cards

Winning the Battle but Losing the War: The Psychology of Debt Management

According to the Federal Reserve (2009), the total outstanding credit card debt carried by Americans reached an all-time high of \$976 billion in 2008, a figure that has remained high as more people reach for the plastic just to make ends meet. In addition, according to a recent Experian (2009) report, consumers who use credit already hold

more than five credit cards on average. As cautious lenders cut credit limits and force indebted consumers to find new sources of credit, the number of different debts consumers carry is likely to increase further.

When consumers carry multiple debts, how do they decide which debt to repay first? The question is relevant not only to consumer researchers and policy makers trying to nudge financial decision making in positive directions but to lenders as well. Lenders manage risk by assessing the likely speed at which their loans will be repaid, and to the extent that this depends on the loan portfolios that borrowers already have, it is important for financial institutions to understand where their loans stand in customers' repayment hierarchy. This article examines how consumers manage multiple debts and assesses whether those decisions are consistent with normative principles.

From a normative perspective, debt management is quite simple: To minimize the total amount of debt across loans, people should first pay the minimum payment for each debt (to avoid surcharges and penalties) and then use all available cash to pay down the loan with the highest interest rate. After this loan has been paid off, people should move to the loan with the next highest interest rate, and so on.

*Moty Amar is Assistant Professor of Marketing, School of Business, Ono Academic College (e-mail: mamar@ono.ac.il). Dan Ariely is James B. Duke Professor of Behavioral Economics, Fuqua School of Business, Duke University (e-mail: dandan@duke.edu). Shahar Ayal (corresponding author) is Assistant Professor of Psychology, New School of Psychology, Interdisciplinary Center (IDC) Herzliya (e-mail: s.ayal@idc.ac.il). Cynthia E. Cryder is Assistant Professor of Marketing, Olin Business School, Washington University in St. Louis (e-mail: cryder@wustl.edu). Scott I. Rick is Arnold M. & Linda T. Jacob Assistant Professor of Marketing, Ross School of Business, University of Michigan (e-mail: srick@umich.edu). The authors thank the reviewers, the associate editor, and participants at the First Annual Boulder Summer Conference on Consumer Financial Decision Making for valuable comments and Harel Levy for programming assistance. All authors contributed equally to this research, and author names are listed in alphabetical order. Suzanne Shu served as associate editor for this article.

From a psychological perspective, however, there is reason to suspect that consumers might stray from normative principles when managing debt (cf. Stango and Zinman 2009b; Stewart 2009), as they do in many other financial domains (Benartzi and Thaler 2007). Consumers tend to greatly underestimate how interest compounds over time, for both saving and debt accounts (e.g., Eisenstein and Hoch 2005; Stango and Zinman 2009a). If indebted consumers do not fully appreciate the implications of interest rates, they may not base their decision of which debt to repay on which debt has the highest interest rate. This is consistent with prior work demonstrating that difficult-to-evaluate attributes tend to receive less weight in decision making (Hsee 1996; cf. Denes-Raj and Epstein 1994; Gigerenzer and Hoffrage 1995; Pacini and Epstein 1999).

One way consumers might stray from normative principles when managing multiple debts is by treating debt repayment decisions like asset allocation decisions. Benartzi and Thaler (2001) find that many people faced with the decision of how to allocate their retirement contributions across saving plan funds seem to rely on a $1/n$ heuristic, dividing their contributions evenly across all the funds offered in the plan. If consumers find the decision of which debt accounts to repay first similarly complex, this naive diversification heuristic may generalize to the debt repayment domain.

While diversity is often sought in the domain of gains (Kahn and Ratner 2005; Read and Loewenstein 1995; Simonson 1990), other work suggests that diversity can be aversive in the domain of losses (e.g., Ayal and Zakay 2009; Thaler and Johnson 1990). If consumers cannot completely pay off their debts, spreading the limited money set aside for debt repayment across debts is likely to maintain diversity (i.e., distinct debts). Thus, it is questionable whether the $1/n$ heuristic would generalize to the domain of debt repayment. Instead, we propose that consumers saddled with multiple debts will primarily be motivated to reduce their total number of outstanding loans, rather than their total debt across loans, a phenomenon we refer to as “debt account aversion.”¹

Several psychological processes are likely to contribute to debt account aversion. First, when a superordinate goal is perceived as difficult, people often adopt subgoals that break the overall task into smaller, more manageable parts (e.g., Newell and Simon 1972). To the extent that becoming debt free is perceived as a difficult superordinate goal, consumers may adopt subgoals focused on paying off individual loans. The danger in such an approach is that focusing on and achieving subgoals can actually diminish the motivation to pursue superordinate goals (e.g., Amir and Ariely 2008; Fishbach and Dhar 2005; Fishbach, Dhar, and Zhang 2006; Heath, Larrick, and Wu 1999). Inexperienced

cab drivers, for example, tend to set daily income targets, working the least on the busiest days, which undermines their ultimate goal of maximizing lifetime income (Camerer et al. 1997).

Second, a large body of research on animal learning lends credence to the goal-gradient hypothesis, which posits that the motivation to complete a goal increases with proximity to the goal (e.g., Heilizer 1977; Hull 1932). Kivetz, Urminsky, and Zheng (2006; see also Nunes and Drèze 2006) demonstrate that even the illusion of progress toward a goal increases effort acceleration. For example, coffee shop customers who received a 12-stamp reward program card with two preexisting “bonus” stamps completed the ten required purchases faster than customers who received a standard 10-stamp card. Analogously, in the context of debt management, consumers may be more motivated to achieve goals that are proximal (e.g., paying off debts with small balances) than goals that are distal (e.g., becoming completely debt free).

Third, the shape of the prospect theory value function in the loss domain (Kahneman and Tversky 1979) also implies that consumers might be primarily motivated to reduce the number of debts as soon as possible. Because the convex loss function is steepest near zero, multiple losses (debts) should be more distressing than a single loss of equivalent total value (Thaler and Johnson 1990). Indeed, recent work on “diversity aversion” suggests that consumers are motivated to integrate losses even when this consolidation runs counter to rational considerations (Ayal and Zakay 2009). Furthermore, the steepness of the loss function near zero implies that paying off a small debt provides greater relief than making a similar reduction to a larger debt.

Taken together, the preceding research suggests that consumers are likely to manage multiple debts in ways that can ultimately impede their ability to rid themselves of debt. Although this might naturally seem like a cause for concern among those interested in protecting consumer welfare, some financial gurus actually endorse debt account aversion. For example, Dave Ramsey, one of the most popular personal finance gurus in the United States and author of the 2007 best-seller *The Total Money Makeover*, actively advocates what he calls the “snowball method” of debt repayment. Ramsey (2009) claims that although “the math seems to lean more toward paying the highest interest debts first,” consumers need “some quick wins in order to stay pumped enough to get out of debt completely.” The research discussed previously suggests that Ramsey may be preaching to the choir and further encouraging nonoptimal behavior driven by some basic human biases.

FIELD SURVEYS

We initially explored whether consumers were debt account averse in three field surveys. As an initial conservative test of debt account aversion, we conducted Field Survey 1 with a sample of financially knowledgeable consumers. Specifically, in the summer of 2009, we worked with CNBC, a financial news channel on cable television, to conduct a survey of viewers’ financial habits. A total of 171 viewers (29% female; mean age: 33) of *Squawk on the Street*, a business news program that airs weekdays from 9 A.M. to 11 A.M. Eastern Time on CNBC, logged onto the CNBC website to complete the survey. Their incen-

¹At first glance, it is difficult to reconcile debt account aversion with consumers’ tendency to hold multiple debts. The phenomena become easier to reconcile when considering that many consumers have no choice but to hold multiple debts. Some debts are naturally separate, such as car loans and mortgages that originate from different lenders. In addition, consumers who struggle to make ends meet may open multiple credit cards out of necessity when their existing cards have no more available credit. Beyond necessity, there are often compelling immediate benefits to opening a new credit card account, such as obtaining a retailer discount or a desired good.

tive for participating was receiving a report of the survey's results after it concluded. In the survey, we asked participants to imagine that they had two credit card accounts: a MasterCard account with a \$100 balance and a 10% annual percentage rate (APR), and a Visa account with a \$1,000 balance and a 15% APR. We also asked them to imagine that they had just received either a \$100 or a \$1,000 government stimulus rebate and that they had decided to use the entire rebate to repay debt. Finally, they indicated how much they would repay on each account.

Regardless of the size of the rebate, participants should use the entire rebate to pay down the high-APR (and high-balance) account. However, consistent with debt account aversion, participants repaid significantly more money on the low-APR (and low-balance) account when the rebate was \$100 than when the rebate was \$1,000 (\$32.41 vs. \$12.62; $t(169) = 3.35, p < .001$). In other words, eliminating participants' ability to completely pay off the high-APR account significantly reduced their willingness to repay money to that account. Instead, many participants in the \$100 rebate condition chose to completely pay off the low-APR account, presumably because of debt account aversion.²

Because the CNBC survey did not measure participants' actual credit card debt, these results cannot rule out the possibility that the desire to close out accounts is restricted to people who have limited debt management experience. Field Survey 2 addressed this limitation. The survey was conducted online, and participants were recruited through Amazon's Mechanical Turk, a website commonly used to recruit adult participants and validated by Buhrmester, Kwang, and Gosling (2011) and Paolacci, Chandler, and Ipeirotis (2010). A total of 177 U.S. adults (54% female; mean age: 34) participated in exchange for a small payment. All participants were presented with the \$100 rebate version of the debt repayment scenario and were later asked to report their household-level credit card debt.

We analyzed the data by participants' household-level credit card debt.³ Approximately 22% of participants reported that they did not use credit, 33% reported that they used credit but carried no revolving debt, and 45% reported that they used credit and carried revolving debt (median debt level: \$2,500–\$5,000). Indebted credit users reported that they would repay \$55.19 to the low-APR account. This was not significantly different from the low-APR repayment amount reported among nonusers (\$54.87; $t(116) < 1$), but it was significantly greater than the low-APR repayment amount reported among debt-free users (\$31.02; $t(136) = 3.08, p < .005$). Thus, we observe debt account aversion among credit users, particularly if they are carrying debt.⁴

²It is worth highlighting that the nonoptimal behavior observed in the \$100 rebate condition is primarily driven by participants' attempts to close out the low-balance account, rather than by reliance on a $1/n$ heuristic. Participants in the \$100 rebate condition were significantly more likely to completely pay off the low-APR card than to divide their rebate evenly across cards (29% vs. 2%; $\chi^2(1) = 23.19, p < .0001$).

³Overall, participants repaid \$47.06 on average to the low-APR account. This mean is considerably larger than the corresponding mean in Field Survey 1 (\$32.41), a difference that is likely attributable to differences in financial sophistication across the two samples.

⁴To help ensure that the evidence of debt account aversion observed in Field Surveys 1 and 2 was not optimal, we conducted a follow-up survey

Finally, in Field Survey 3, we examined whether consumers are debt account averse with respect to their real debts. A total of 390 people (58% female; mean age: 43.9) who had previously completed a spending survey posted on the *New York Times* website (for original survey details, see Rick, Cryder, and Loewenstein 2008) completed the survey. Participants indicated whether they currently carried credit card debt and, if so, how many of their credit cards carried debt. Participants with credit card debt also indicated the amount of each debt and how much they planned to pay on each debt in the next billing cycle.

Forty-three participants reported carrying debt on multiple cards. These multiple-debt holders carried debt on two to seven credit cards ($M = 3.3$) and carried between \$250 and \$65,000 in total debt across cards ($M = \$16,168$). For each multiple-debt holder, we computed the proportion of total debt accounted for by the smallest debt (D) and the proportion of total repayments to be allocated to the smallest debt (R). For example, if a consumer's Debt A is \$100 and Debt B is \$400, and the consumer plans to pay \$100 on Debt A and \$200 on Debt B in the next billing cycle, then $D = .20$ and $R = .33$. If $R > D$, consumers are devoting disproportionate effort toward closing the smallest debt, presumably because of debt account aversion. Indeed, consistent with debt account aversion, we found that R was significantly greater than D on average ($.27$ vs. $.16$; $t(42) = 3.91, p < .001$, paired t-test).⁵

These initial results suggest that debt account aversion is a common approach to managing multiple debts. However, many open questions remain regarding the generality of the phenomenon and its boundary conditions. For example, does this nonoptimal behavior persist when there are immediate monetary incentives to behave optimally? Does debt repayment behavior become more optimal in repeated decision settings? More important, how can we help consumers make more optimal debt repayment decisions? To address these questions, we developed an incentive-compatible debt management game for the laboratory.

OVERVIEW OF THE DEBT MANAGEMENT GAME

In the debt management game, participants were saddled with multiple debt accounts that varied in amount and annual interest rate (see Table 1).⁶ The basic game lasted

with 33 financial professionals (e.g., loan officers, bank vice presidents), who on average had six years of experience in their position. We gave them the \$100 rebate version of the debt repayment scenario and asked them how a typical consumer *should* behave. A significant majority (79%) indicated that the entire rebate should be used to pay down the high-APR card ($p < .001$, sign test), suggesting that debt account aversion is inconsistent with experts' predominant view of financially optimal behavior.

⁵A possible alternative account is that R will be greater than D when participants equally spread their repayments across all their debts (a $1/n$ heuristic). However, only five participants planned to pay the same amount to each debt, and the comparison remains significant when we exclude those participants from the analysis ($.25$ vs. $.14$; $t(37) = 3.31, p < .01$, paired t-test). Minimum payments are also unlikely to account for this phenomenon. If multiple-debt holders make only minimum payments, and different creditors use similar formulas to determine minimum payments, R should equal D (because larger debts have larger minimum payments).

⁶The initial order in which debts appeared in the Choose Debt drop-down box was counterbalanced across participants, but debts were always numbered from smallest to largest, which might have contributed to the

Table 1
THE INTEREST RATE AND INITIAL SIZE OF EACH DEBT

	Annual Interest Rate (%)	Initial Amount (\$)
Debt 1	2.50	3,000
Debt 2	2.00	8,000
Debt 3	3.50	11,000
Debt 4	3.25	13,000
Debt 5	3.75	52,000
Debt 6	4.00	60,000

for 25 rounds, and each round represented one year. In each round, participants received a \$5,000 cash allotment that they could use to pay down one or more of the open debt accounts. In addition, participants occasionally received cash bonuses that could also be used to pay off their debts (\$20,000 in round 6, \$15,000 in round 12, and \$40,000 in round 19). Participants repaid debts by typing in the amount they wanted to allocate to each debt account and then approving it. After participants approved their decision, the program presented the updated balance of each debt and a graph displaying the past and current standing of each debt (for sample screen shots, see Appendixes A and B; full game instructions and log-in information for the online game are available from the corresponding author on request).

A financially optimal player, who allocates all available cash in each round to the open debt with the highest interest rate, would first pay off Debt 6, then Debt 5, and then Debt 3 and then begin to repay Debt 4 (the game would end before Debt 4 could be completely repaid). The financially optimal player would never allocate any cash toward Debts 1 and 2 and would conclude the game with three open debts that sum to \$29,428 in total debt. In contrast, a debt-account-averse player, focused exclusively on paying off the smallest open debt, would first pay off Debt 1, then Debt 2, then Debt 3, then Debt 4, and then Debt 5 and then begin to repay Debt 6 (the game would end before Debt 6 could be completely repaid). The debt-account-averse player would conclude the game with one open debt and \$47,861 in total debt.

The game was incentive compatible. Participants were told that they would receive a bonus based on how low their total debt was at the end of the game. In addition to an \$8 show-up fee, players received a bonus between \$1 and \$4 based on their performance: Specifically, they received \$4 if their total debt was \$30,000 or less, \$3 if their total debt was between \$30,001 and \$35,000, \$2 if their total debt was between \$35,001 and \$40,000, and \$1 if their total debt was greater than \$40,000.

We built on this basic paradigm to conduct four experiments, each designed to shed light on different aspects of debt repayment behavior. Experiment 1 examined whether participants exhibited debt account aversion and whether this tendency was amplified when participants had the

opportunity to save some of their available cash. We then examined whether we could increase the optimality of debt repayment behavior by restricting participants' ability to close accounts. Specifically, we manipulated whether participants had enough money to completely pay off any individual debt (Experiment 2) and whether small debts were consolidated into one larger account (Experiment 3). Although the interventions in Experiments 2 and 3 created a setup that would hurt a financially optimal player who acted by focusing only on repaying the loan with the highest interest rate, each intervention should prove beneficial in practice if consumers are naturally focused on closing out debt accounts as soon as possible. Finally, in Experiment 4 we examined the effectiveness of a more practical intervention, which hurts neither financially optimal nor debt-account-averse players. Specifically, we examined whether changes in the display that highlight the actual amount of interest already accrued, or the amount that could be accrued in the future, helped participants appreciate the monetary implications of interest rates and thus focus on repaying the highest-interest debts first. We conducted all four experiments at the same private mid-Atlantic university, but laboratory software ensured that participants never completed more than one experiment.

EXPERIMENT 1: DEBT ACCOUNT AVERSION

Overview and Procedure

The primary purpose of Experiment 1 was to examine whether the debt account aversion observed in the field surveys replicates in an incentive-compatible context (the debt management game). The experiment included two between-subjects conditions to explore whether eliminating participants' ability to save money increases the optimality of their debt repayment decisions. In the no-saving condition, participants in each round were required to allocate all of their available cash to one or more of the open debt accounts before proceeding to the next round. In the saving-allowed condition, participants could choose how much of their available cash they wanted to use to repay debts. Any unused available cash was stored in their "checking" account and accumulated interest at an annual rate of 2%. Any cash stored in the checking account could be used to repay debts in later rounds. Thus, if participants in the saving-allowed condition realized that they made a mistake by saving money, they could partly undo it by using that money to repay debts in subsequent rounds. At the end of the game, total debt was automatically reduced by the amount of cash remaining in the checking account (if any). Importantly, because the interest rate on savings in the saving-allowed condition was less than or equal to the interest rates of all the debts (all debt interest rates were 2% or greater), participants should not save in the saving-allowed condition. Thus, the total debt of a financially optimal player at the end of the game should be \$29,428 in both conditions.

Note that the saving-allowed condition partly reflects how debts are repaid outside the lab; after minimum payments have been made, people must decide what share of their remaining income to allocate to repaying debt and how much to save or use for other purposes. However, if achieving subgoals can demotivate people from pursuing superordinate goals (e.g., Amir and Ariely 2008; Fishbach

debt account aversion observed in our experiments (if participants interpreted the debts' numbers as suggestions for which debts to pay off first). However, we also observed debt account aversion in our field surveys, suggesting that debt account aversion is not an artifact of our experimental procedures.

and Dhar 2005), people who pay off a debt in a given round may believe they have done enough for that round, saving the rest of their cash (as opposed to using that cash to pay down another debt). In addition, although that money can be used only to pay down debt, people might have difficulty overcoming the inclination to keep some cash on hand, perhaps for additional flexibility (Shin and Ariely 2004). Thus, we predicted that total debt at the end of the game would be greater in the saving-allowed condition than in the no-saving condition. One hundred sixty-two undergraduate students (56% female; mean age: 21.5) participated in the experiment.

Results and Discussion

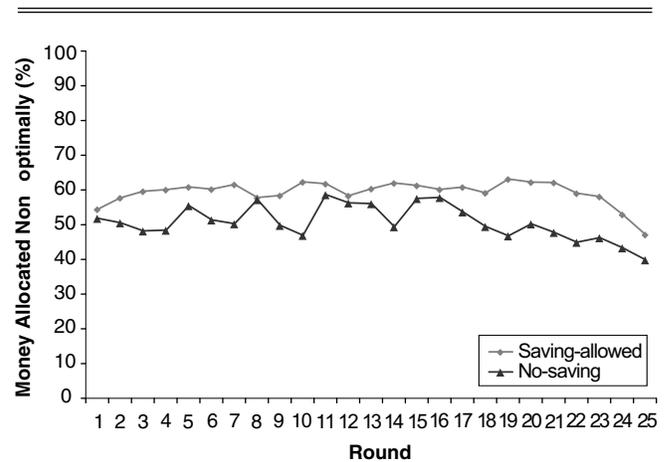
Mean total debt in both conditions was significantly greater than the total debt of a (hypothetical) financially optimal player (both $ps < .001$). Across both conditions, the average participant lost \$12,051 because of nonoptimal debt repayment decisions. Next, we examine treatment differences and the magnitude and frequency of nonoptimal behavior across rounds. Finally, we examine whether behavior more closely resembles that of a financially optimal player or a debt-account-averse player.

Treatment differences. Total debt in the saving-allowed condition was significantly larger than total debt in the no-saving condition (\$44,513 vs. \$38,371; $t(160) = 4.29$, $p < .001$). This difference is not driven by treatment differences in which debts were repaid; there was no significant difference between conditions in the probability of closing any of the six debts (all $ps > .10$). Rather, the difference seems to be driven largely by some people in the saving-allowed condition retaining some money in their checking account. Forty-four percent of participants in the saving-allowed condition saved at least some portion of their available cash in each round. These participants were significantly more likely to pay off small accounts than saving-allowed participants who did not always save. For example, the probability of completely paying off the smallest four debts (Debts 1–4) was 64% among the former group and 37% among the latter group ($\chi^2(1) = 5.86$, $p < .025$).

Magnitude and frequency of nonoptimal behavior. Although participants were explicitly informed about the different interest rates and saw how those rates influenced the size of their debts each round (see Appendixes A and B), not even one participant consistently demonstrated financially optimal behavior. That is, no participant consistently repaid, in each round, all his or her available cash to the open debt account with the highest interest rate. This pattern largely held even when we used a more relaxed definition of financially optimal behavior: Only 5 of the 162 participants (3%) repaid at least 90% of their available cash to the open debt account with the highest interest rate in each of the final ten rounds of the game.

To further explore and quantify repayment behavior, we define any money that was not allocated to the open debt account with the highest interest rate (including any money saved in the saving-allowed condition) as “nonoptimally allocated money.” The open debt account with the highest interest rate was assessed for each participant in each round (most often Debt 6, but a different debt if that participant had already closed Debt 6). Figure 1 displays the percentage of money that was allocated nonoptimally in each round (pooling across participants). In the no-saving condition,

Figure 1
NONOPTIMAL BEHAVIOR OVER TIME (EXPERIMENT 1)



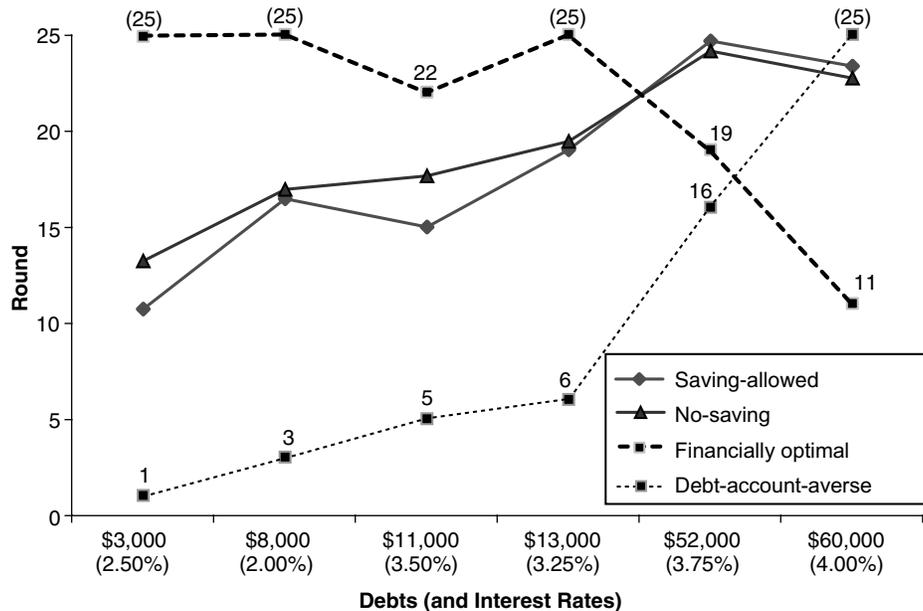
Notes: The figure displays the mean proportion of money allocated nonoptimally by round. Note that in rounds 6, 12, and 19, participants received extra money (bonuses) to repay debts. For a debt-account-averse player, the bonuses are never large enough to completely pay off the open debt with the highest interest rate, which may be why the bonuses did not produce large increases in optimal behavior.

approximately half the available cash was allocated nonoptimally in each round ($M = 51\%$, $SD = 13\%$). The opportunity to save cash significantly increased the percentage of money that was allocated nonoptimally ($M = 59\%$, $SD = 17\%$; $t(160) = 3.50$, $p < .005$). A repeated measure analysis of variance treating the mean proportion of nonoptimally allocated money as the dependent measure and condition and round as the independent variables revealed a significant main effect of condition ($F(1, 160) = 12.15$, $p < .005$) and a significant main effect of round ($F(24, 3840) = 3.08$, $p < .001$), indicating that less money was allocated nonoptimally as the game progressed. Pooling across conditions, the average percentage of nonoptimally allocated money decreased somewhat between rounds 1–5 and rounds 21–25 (55% vs. 50%; $t(161) = 1.87$, $p < .10$), presumably reflecting modest learning over time.⁷

Comparing behavior with financially optimal and debt-account-averse benchmarks. A financially optimal player will begin the game by paying off the debt with the highest interest rate (Debt 6) and will close this debt in round 11. In contrast, a debt-account-averse player will begin the game by paying off the smallest debt (Debt 1) and will close this debt in round 1. Pooling across conditions, no participant had closed Debt 6 in round 11, but 12% had closed Debt 1 in round 1, indicating that participants were significantly more likely to begin the game as debt-account-averse players than as financially optimal players ($\chi^2(1) = 20.18$,

⁷Because the game changes over time (e.g., allocating money nonoptimally in early rounds reduces the opportunity to do so in later rounds), note that increases in optimal behavior over time could be driven by two factors: learning and reduced opportunities to behave nonoptimally. Future research could more definitively address learning by examining knowledge transfer (e.g., by manipulating whether participants initially play the current debt management game and then letting everyone play a new debt management game, with different debts and interest rates).

Figure 2
AVERAGE ROUND EACH DEBT WAS CLOSED, COMPARED WITH FINANCIALLY OPTIMAL AND DEBT-ACCOUNT-AVERSE BENCHMARKS (EXPERIMENT 1)



Notes: (25) represents debts that should remain open at the end of the game.

$p < .0001$). In addition, participants were significantly more likely to completely pay off Debt 1 by the end of the game than to completely pay off Debt 6 by the end of the game (70% vs. 40%; $\chi^2(1) = 29.97, p < .0001$).

We also categorized participants according to whether they completely paid off the debts that a financially optimal player would pay off (Debts 3, 5, and 6) or whether they completely paid off the debts a debt-account-averse player would pay off (Debts 1–5). Participants were significantly more likely to close the debts that a debt-account-averse player would close than to close the debts that a financially optimal player would close (11% vs. 4%; $\chi^2(1) = 5.66, p < .025$).

Although the absolute magnitude of pure debt account aversion is low, it is worth noting that debt-account-averse consumers may be focused on closing small loans rather than the smallest of several loans. For example, after a pure debt-account-averse player begins the game by closing Debts 1–4 (all below \$15,000), he or she is then confronted with two debts that are each above \$50,000. Debt 5 is the smallest of the two remaining debts at that point, but the debt may not be considered “small” in absolute terms. If we focus only on the debts that are likely to be considered small in absolute terms (Debts 1–4), the magnitude of debt account aversion increases; pooling across conditions, 46% of participants completely paid off Debts 1–4.

Figure 2 presents the average round each debt was closed by condition, as well as the round in which the debts would be closed by a financially optimal player and a debt-account-averse player. (Debts that remained open at the end of the game were assigned a value of 26.) Although the difference between conditions is small, behavior in both

conditions differs markedly from that of a financially optimal player. The slopes of the saving-allowed, no-saving, and debt-account-averse lines are all positive, while the slope of the financially optimal line is negative. The difference between actual behavior and the financially optimal benchmark is most pronounced for the debt with the highest interest rate (Debt 6). Pooling across conditions, we found that Debt 6 was closed on average in round 23. In contrast, a financially optimal player would close Debt 6 in round 11. The difference between when Debt 6 was actually closed (by participants) and when Debt 6 should have been closed (by a financially optimal player) was significant (round 23 vs. round 11; $t(161) = 36.49, p < .0001$, paired t-test). Analogously, the debt with the lowest interest rate (Debt 2) was closed, on average, in round 17. Normatively, Debt 2 should still carry debt at the end of the 25 rounds (i.e., never close). Thus, participants deviated markedly from financial optimality, in a direction consistent with debt account aversion.

EXPERIMENT 2: SHORT ON CASH

Overview and Procedure

The field surveys and Experiment 1 suggest that debt account aversion is a common response to multiple debts. We have proposed that the tendency to break complicated tasks into smaller, more manageable pieces (subgoals) contributes to debt account aversion. Becoming debt free is often a long and costly journey that might seem less daunting by focusing on closing individual debts. Previous work suggests that pursuit of superordinate goals can be improved by preventing people from achieving, or attending to their achievement, of subgoals (e.g., Amir and Ariely

2008; Fischbach, Dhar, and Zhang 2006). Accordingly, in Experiment 2 we examine whether preventing participants from closing small debts in the debt management game improves their overall performance. Specifically, we manipulate whether participants have enough money to completely pay off their smallest debt (for this experiment, we created a set of one-shot decisions, rather than using a repeated game). We predicted that blocking participants' ability to completely pay off any of their debts would force them to abandon their intuitive approach to debt management and ultimately help them reduce overall debt more quickly.

Participants began the experiment by playing ten rounds of the debt management game, to help them understand how debt account interest compounds over time. All participants played the game in a format identical to the no-saving condition in Experiment 1. Next, we presented all participants with two debt portfolios. Each portfolio had a high-cash and low-cash version, for a total of four one-shot decisions (see Table 2). Each participant completed all four decisions (a within-subject design), and the order in which the decisions were presented was counterbalanced across participants. In half the decisions (high-cash condition), participants received enough cash to be able to completely pay off their smallest debt. In the other half (low-cash condition), the same participants did not receive enough cash to be able to completely pay off their smallest debt. Thus, in the low-cash condition, participants needed to decide which debt account(s) they wanted to reduce without having the ability to close any of them. In addition to the four decisions of interest, we included two filler decisions (in which participants had enough money to completely pay off the largest debt in two portfolios) to obfuscate the purpose of the experiment.

Sixty-five undergraduate students (50% female; mean age: 22) participated in the experiment in exchange for a show-up fee of \$8. In this experiment only, participants were not paid based on their decisions.

Results and Discussion

We pooled data across portfolios. Consistent with debt account aversion, the mean percentage of nonoptimally allocated money was significantly greater in the high-cash condition than in the low-cash condition (53% vs. 43%; $t(64) = 3.58, p < .01$, paired t-test). In addition, we found that the percentage of available cash allocated to the smallest debt was significantly greater in the high-cash condition than in the low-cash condition (13% vs. 5%; $t(64) = 2.44, p < .025$, paired t-test). The results suggest that eliminating participants' ability to completely pay off their smallest debt helps shift their focus toward the overarching goal of reducing overall debt, thus increasing the optimality of their repayment behavior.

EXPERIMENT 3: THE BENEFITS OF (COSTLY) DEBT CONSOLIDATION

Overview and Procedure

Experiment 2 suggests that the harmful effects of debt account aversion can be reduced by eliminating participants' ability to completely pay off small debts. However, the "intervention" used in Experiment 2 (restricting the amount of available cash consumers have on hand) would obviously not be something policy makers or creditors could implement. Thus, in Experiment 3 we examined whether a common intervention—debt consolidation—could be similarly effective. By consolidating several small loans into one larger loan, we distance participants from achieving subgoals focused on paying off individual loans and potentially shift their attention toward the overarching goal of reducing total debt (cf. Amir and Ariely 2008). Indeed, if debt-account-averse consumers are focused on closing small loans rather than simply the smallest of several loans, consolidating several small loans into a large loan may completely eliminate their ability to achieve their natural subgoals.

The experiment consisted of two between-subjects conditions. The control condition was identical to the no-saving condition in Experiment 1. In a debt consolidation condition, Debts 5 and 6 remained the same as in the control condition, but the four smallest debts (Debts 1–4) were integrated into one consolidated loan (\$35,000 at a 3% interest rate). The interest rate of the consolidated loan was slightly larger than the weighted average of the interest rates of the smaller individual loans [$\sum_{i=1}^4 (\text{Debt}_i / \sum_{i=1}^4 \text{Debt}_i) \times \text{Interest Rate}_i = 2.98\%$]. This increase captures the notion that debt consolidation often comes at a cost (e.g., in the form of balance transfer fees). Critically, this increase also implies that a financially optimal player will conclude the game with slightly more debt in the debt consolidation condition than in the control condition (\$29,939 vs. \$29,428). However, if consumers are naturally inclined to pay off small loans, total debt should be greater in the control condition than in the debt consolidation condition. One hundred two undergraduate students (60% female; mean age: 21.8) participated in the experiment.

Results and Discussion

Mean total debt in both conditions was significantly greater than that of a financially optimal player (both $ps < .001$), and more important, mean total debt was marginally greater in the control condition than in the debt consolidation condition (\$38,649 vs. \$37,063; $t(100) = 1.83, p < .07$). Thus, there was a large amount of suboptimal debt repayment behavior in both conditions, but decreasing the temptation to close accounts by increasing distance to that subgoal (in the debt consolidation condition) reduced this nonoptimal behavior.

Table 2
THE FOUR DECISIONS OF INTEREST (2 PORTFOLIOS \times 2 CASH ALLOTMENTS) IN EXPERIMENT 2

	Debt 1 (\$) ($r = 2.50\%$)	Debt 2 (\$) ($r = 2.00\%$)	Debt 3 (\$) ($r = 3.50\%$)	Debt 4 (\$) ($r = 3.25\%$)	Debt 5 (\$) ($r = 3.75\%$)	Debt 6 (\$) ($r = 4.00\%$)	Available Cash (\$) (Low-Cash)	Available Cash (\$) (High-Cash)
Portfolio 1	4,572	11,213	19,751	20,750	22,339	20,876	3,500	6,000
Portfolio 2	3,040	9,694	12,793	5,108	27,410	47,003	2,200	4,000

We also examined the repayment of the small debts (Debts 1–4) versus the consolidated loan. A debt-account-averse player in the control condition would completely pay off Debts 1–4 by the end of round 6. Likewise, a debt-account-averse player in the debt consolidation condition would completely pay off the consolidated loan by the end of round 6. Participants were significantly more likely to pay off Debts 1–4 by round 6 than to pay off the consolidated loan by round 6 (12% vs. 2%; $\chi^2(1) = 4.27, p < .05$), suggesting that the debt consolidation intervention discouraged people from focusing on closing out small loans. In addition, among those who closed either Debts 1–4 or the consolidated loan, control participants closed Debts 1–4 significantly sooner than debt consolidation participants closed the consolidated loan (on average, round 10 vs. round 16; $t(33) = 3.71, p < .001$).

The benefits of debt consolidation are usually thought to consist of the reduced interest paid on a consolidated loan relative to multiple loans, as well as the reduced transaction and monitoring costs required to manage a single loan. Experiment 3 suggests that debt consolidation can also reduce the harmful effects of debt account aversion. Although debt consolidation can be costly, both directly (e.g., in the form of balance transfer fees) and indirectly (by reducing perceived vulnerability to financial risks; Bolton, Bloom, and Cohen 2010), our results reveal that debt consolidation may be more beneficial than previously thought. Specifically, by eliminating consumers' ability to repay small debts, debt consolidation seems to help refocus attention on the overarching goal of reducing total debt.

EXPERIMENT 4: FOCUSING ATTENTION ON INTEREST

Overview and Procedure

In Experiments 2 and 3, we used interventions that helped debt-account-averse players but slightly harmed financially optimal players. In Experiment 4, we examined the effectiveness of a more practical intervention, which would harm neither financially optimal nor debt-account-averse players. Specifically, we examined whether routinely highlighting the actual dollar amount of interest accumulated by each debt, or the amount that could be accumulated in the next round, helped participants prioritize repayment of the highest-interest debts. Because consumers have difficulty understanding how interest accumulates over time (e.g., Eisenstein and Hoch 2005; Stango and Zinman 2009a), interest rates may play less of a role in repayment decisions than they should (see Hsee 1996). Translating abstract rates into a more tangible and familiar unit (dollar amounts) may increase the weight players place on interest rates (see Gigerenzer and Hoffrage 1995).

To some extent, existing elements of credit card statements are designed to help consumers translate interest rates into dollar amounts. The “Minimum Payment Warning” required since February 2010 to appear on U.S. credit card statements displays the total amount of money (principal plus interest) that will ultimately be repaid if only minimum payments are made each billing cycle. Credit card statements also include an Interest Charge Calculation section that displays the total amount of interest accumulated during the previous billing period. Thus, credit card statements highlight both prospective and retrospective monetary implications of interest rates.

Accordingly, Experiment 4 manipulated whether participants were focused on the amount of interest that could be accumulated in the future, the amount of interest accumulated to date, or neither. Although the debt management game interface displays how the balance of each debt changes over time, large period-to-period interest accumulations do not move the balance lines dramatically because of the scale of the graph. Thus, drawing attention more explicitly to the actual amount of interest paid may be beneficial.

We highlighted interest amounts with a pop-up box that appeared at the beginning of each round. The box included a table whose content varied across three between-subjects conditions (see Appendix C). Each table listed the debts that were still open, their amount, and their interest rate. In the control condition, the table contained no additional information. In the prospective condition, the table also reported “the amount by which each debt would increase from this round to the next round if you allocate no cash to that particular debt.” In other words, participants learned the maximum amount of interest each debt could accumulate in the next round. In the retrospective condition, the table reported the total amount of interest each debt has accumulated over the course of the game. Below the table, the box also indicated the total interest charges (across all debts) over the course of the game. In all conditions, participants could click “OK” at any point to remove the box and make their decisions for that round. Aside from the treatment differences in pop-up box content, all participants played the game in a format identical to the control condition of Experiment 3. Seventy-five students (55% female; mean age: 22.6) participated in the experiment.

Results and Discussion

Mean total debt was significantly greater than that of a financially optimal player in all conditions (all $ps < .001$). However, total debt was lower in the retrospective condition than in the control condition (\$36,089 vs. \$38,848; $t(47) = 1.89, p < .07$) and the prospective condition (\$36,089 vs. \$38,672; $t(49) = 1.78, p = .08$). Total debt did not differ significantly between the control condition and the prospective condition ($p = .91$).

We also examined which debts were paid off completely. Because of the minimal total debt difference between the prospective and control conditions, we pool across those conditions in this analysis. Participants in the prospective and control conditions were significantly more likely to close Debt 1 (the smallest debt) than to close Debt 6 (the debt with the highest interest rate) (76% vs. 48%; $\chi^2(1) = 8.32, p < .01$). However, participants in the retrospective condition were slightly less likely to close Debt 1 than to close Debt 6 (60% vs. 68%; $\chi^2(1) = .08, p = .77$).

Thus, although the retrospective intervention did not erase debt account aversion, it did help move repayment behavior in the direction of optimality. However, the prospective intervention did not produce any beneficial effects. One reason the retrospective intervention was more effective than the prospective intervention may have been that the interest figures were more alarming in the retrospective condition. For example, at the beginning of round 10, a debt-account-averse player in the retrospective condition will be told that Debt 6 (the debt with the highest interest rate) has already accumulated \$25,399 in interest. In contrast, at

the beginning of round 10 in the prospective condition, the debt-account-averse player will learn that the most interest Debt 6 could accrue in the next round is \$3,416. If this is the case, credit card statements could potentially be made more effective by reporting the total lifetime amount of interest accumulated on the current balance (as opposed to simply the amount of interest accrued since the previous billing cycle, as is the current practice).

GENERAL DISCUSSION

Many consumers hold many debts. The average U.S. credit user holds more than five credit cards, each with an average balance of at least \$1,000 (Experian 2009). Mortgages, car loans, and student loans complicate matters further. Understanding how consumers manage these debt portfolios could help inform interventions designed to help consumers repay debts more efficiently. Moreover, a better understanding of these decisions is likely to become increasingly important as consumers accumulate more debts during times of economic difficulty. Understanding debt repayment strategies is also important for financial institutions, which could better calculate the risk of unpaid loans by understanding how consumers manage multiple debts.

In this research, we provided consistent evidence of debt account aversion. In three field surveys and four experiments, consumers faced with multiple debts prioritized reducing the number of debt accounts over reducing the total amount of debt across accounts. That is, rather than repaying the debts with the highest interest rates more quickly (the financially optimal strategy), many consumers chose to repay the smallest debts as soon as possible. This suboptimal behavior was observed among students financially motivated to behave optimally, viewers of a financial news program, and consumers who have experience managing credit card debt.

We also examined ways to reduce debt account aversion. We found that eliminating participants' ability to completely pay off small debts actually improved their overall financial situation. Consumers were more likely to repay high-interest debts when they did not have enough money to fully repay any debt (Experiment 2) and when small debts were consolidated into one large account (Experiment 3). We also found that a display that highlighted the total amount of interest accumulated helped focus consumers on repaying high-interest debts (Experiment 4). Although none of these interventions should improve the financial situation of a financially optimal consumer (and the manipulations in Experiments 2 and 3 should slightly harm financially optimal consumers), they all improved the financial situation of the participants in our experiments by disrupting their natural tendency to focus on repaying small loans. It should be noted, however, that though our interventions improved the optimality of debt repayment decisions, in general the differences between conditions and the financially optimal benchmark were greater than the differences between conditions. Thus, although there may be ways to reduce the bias of repaying smaller loans first, fully extinguishing it may require more forceful intervention, perhaps one in which a consumer pays a central payment center, and this payment center allocates payments to the different loans.

Limitations

As with many laboratory paradigms, our paradigm is a simplified version of reality, designed to capture only the

most essential elements of debt management. To keep the game tractable and the results interpretable, several complexities present outside the lab are not reflected in the game. For example, players in our game could not accumulate new debt, and they never had to choose between repaying debt and making a new purchase. In addition, in real life transaction and cognitive costs normally accompany debts. In our game, repayment decisions for all debts are made simultaneously each round. Outside the lab, bills for different debts arrive at different times, with different payment due dates. Accordingly, closing small debts conveys simplicity benefits (e.g., reduced paperwork) that are not fully reflected in the game. Outside the lab, these simplicity benefits may strengthen debt account aversion.

Because our game is a vast simplification of the reality of debt management, it provides a relatively simple setting for people to behave optimally. The finding that people use repayment strategies that are far from ideal in our simplified game speaks to the intuitive appeal of debt account aversion and suggests that debt repayment behavior in the more complex world could be even more depressing. Indeed, our field surveys suggest that debt account aversion is a common response to multiple debts.

Is Debt Account Aversion Always a Mistake?

Although we have identified situations in which debt account aversion produces nonoptimal behavior, there may be other situations in which debt account aversion proves to be a useful heuristic. As we noted previously, there were necessarily no opportunities for outside purchases in the debt management game. When consumers must choose between repaying small debts and making a new purchase, debt account aversion may actually be beneficial, motivating consumers to forgo a new purchase in favor of repaying a small debt. In addition, after a small debt has been paid off, consumers may be more motivated to divert money from new purchases to repayment of large debts (Ramsey's snowball hypothesis).

It is also important to note that the size of debt accounts was positively correlated with interest rates in our game. In the domain of credit cards, such a situation can occur if consumers base their decision of which card to use on factors other than interest rates, such as spending rewards or available credit. It can also occur when credit card companies unexpectedly raise interest rates after purchases have already been made. Debt account aversion is only a mistake when the correlation between debt size and interest rates is positive. When the correlation is negative, debt account aversion may be a beneficial heuristic.

Open Questions and Future Directions

Future research should shed further light on the processes underlying debt account aversion. We have proposed that the phenomenon is multiply determined, and indeed, robust phenomena are often robust *because* they are multiply determined (Huettel and Payne 2009). In particular, we have hypothesized that the tendency to adopt subgoals when attempting to achieve a difficult superordinate goal (e.g., Newell and Simon 1972), the goal-gradient effect (e.g., Kivetz, Urminsky, and Zheng 2006), and the desire to avoid segregated losses (e.g., Thaler and Johnson 1990) are likely to contribute to debt account aversion. We leave the

important task of examining the relative strength of each component for future research.

Future work should also examine whether consumers believe that prioritizing repayment of low-balance, low-interest loans over high-balance, high-interest loans is a financially optimal strategy or whether they realize that doing so is objectively suboptimal but do it anyway because there are emotional benefits to paying off debt accounts. One way to address this question would be to compare the behavior of regular players in the debt management game with the behavior (suggestions) of advisers who are paid based on their advisees' ability to reduce total debt (cf. Cain, Loewenstein, and Moore 2005). If consumers believe that debt account aversion is a financially optimal strategy, there should be no difference between regular (nonadvised) players and advisers. That is, advisers should advise their clients to prioritize repayment of low-balance, low-interest loans. However, if closing small accounts delivers emotional benefits that advisers do not vicariously experience, advisers should behave more optimally.

It should be noted that debt account aversion is only one way consumers mismanage their debts. For example, recent work reveals that consumers tend to overweight minimum payment information when deciding how much to repay each month on their credit cards (Salisbury and Lemon 2010; Stewart 2009), that they can be insufficiently sensitive to interest rates when choosing between loans (Shu 2010),

and that they often fail to transfer balances from high-interest to low-interest debt accounts (Stango and Zinman 2009b). Future work should continue to examine the ways consumers manage (and mismanage) their debts.

Finally, beyond debt management, future work should also examine whether debt account aversion influences purchasing behavior. For example, if a consumer is deciding whether to put a new purchase on a credit card with no balance and a 5% APR or a credit card with a \$1,000 balance and a 10% APR, debt account aversion may lead the consumer to (nonoptimally) use the latter. More broadly, debt account aversion may influence the proportion of income consumers divert from new purchases (or savings and investments) to debt repayment.

Final Thoughts

Financial guru Dave Ramsey (2009) suggests that consumers who are struggling to manage multiple debts should pay off small debts first to achieve a sense of tangible progress toward becoming debt free. Our consistent evidence of debt account aversion suggests that many consumers share Ramsey's intuitive approach to debt management. While this heuristic is not always a mistake, our work reveals that debt account aversion can systematically lead consumers astray when larger debts have larger interest rates. Ultimately, debt account aversion might enable consumers to win the battle but lose the war against debt.

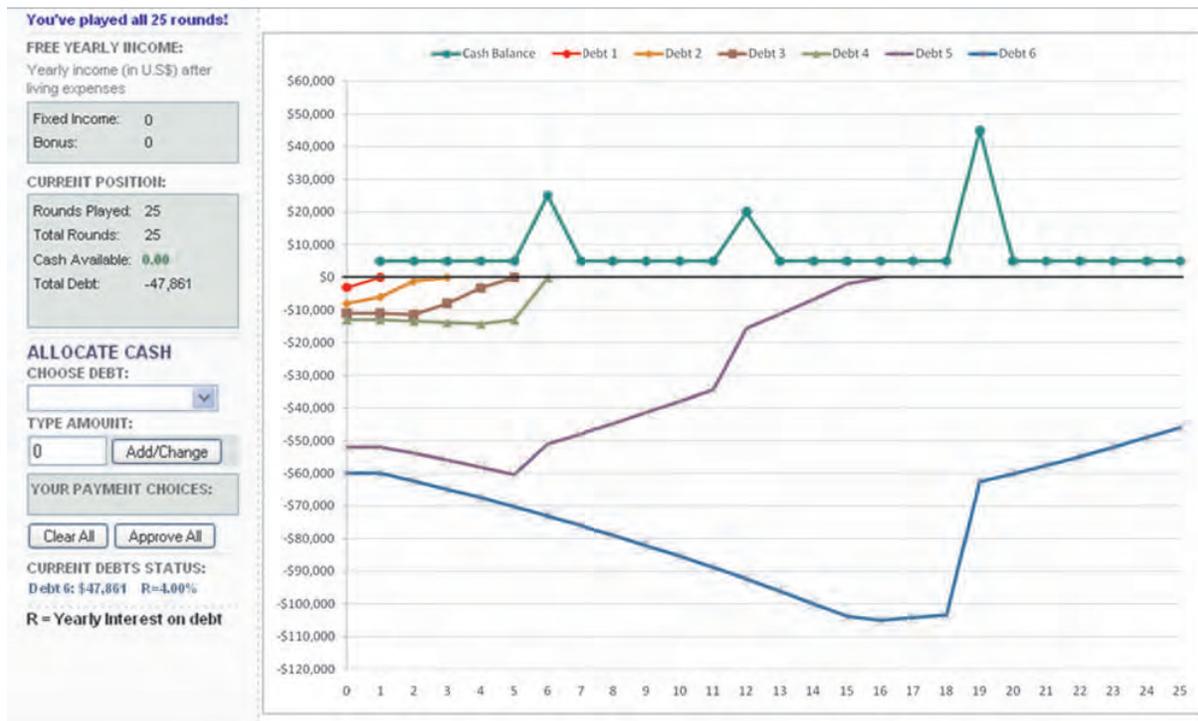
Appendix A

FINAL SCREEN OF DEBT MANAGEMENT GAME FOR A FINANCIALLY OPTIMAL PLAYER



Notes: This screen displays the behavior of a (hypothetical) financially optimal player, who in each round allocated all available cash to the open debt with the highest interest rate. In rounds in which a debt was closed, but the player still had cash remaining, the remaining cash was allocated to the debt with the next-highest interest rate. This game was played under the rules of the no-saving condition in Experiment 1 (identical to the control conditions of Experiments 3 and 4).

Appendix B
FINAL SCREEN OF DEBT MANAGEMENT GAME FOR A DEBT-ACCOUNT-AVERSE PLAYER



Notes: This screen displays the behavior of a (hypothetical) player focused exclusively on closing the smallest open debt as soon as possible. In each round, this player allocated all available cash to the open debt with the smallest balance. In rounds in which a debt was closed, but the player still had cash remaining, the remaining cash was allocated to the debt with the next-smallest balance. This game was played under the rules of the no-saving condition in Experiment 1 (identical to the control conditions of Experiments 3 and 4).

Appendix C
SAMPLE POP-UP BOXES FROM EXPERIMENT 4

These screens are what would appear for a financially optimal player at the beginning of round 2.

YOU HAVE PLAYED 1 ROUND OUT OF 25
CURRENT DEBTS AND INTEREST RATES

The table presents for each debt :
(1) Current Debt Amount ; (2) Interest Rate ;

Debt	Current Debt	Interest Rate
1	\$3,075	2.50%
2	\$8,160	2.00%
3	\$11,385	3.50%
4	\$13,423	3.25%
5	\$53,950	3.75%
6	\$57,200	4.00%

OK

Control Condition

Appendix C (Continued)
SAMPLE POP-UP BOXES FROM EXPERIMENT 4

YOU HAVE PLAYED 1 ROUND OUT OF 25
MAXIMUM DEBTS INCREASE INFO

The table presents for each debt:
(1) Current Debt Amount; (2) Interest Rate; (3) Max Increase - the amount by which the debt would increase from this round to the next round, if you allocate no cash to that particular debt.

Debt	Current Debt	Interest Rate	Max Increase
1	\$3,075	2.50%	\$77
2	\$8,160	2.00%	\$163
3	\$11,385	3.50%	\$388
4	\$13,423	3.25%	\$436
5	\$53,950	3.75%	\$2,023
6	\$57,200	4.00%	\$2,288

OK

Prospective Condition

YOU HAVE PLAYED 1 ROUND OUT OF 25
CURRENT DEBTS AND INTEREST CHARGES

The table presents for each debt:
(1) Current Debt Amount; (2) Interest Rate; (3) Interest Charges - accumulated interest charges for the debt.

Debt	Current Debt	Interest Rate	Interest Charges
1	\$3,075	2.50%	\$75
2	\$8,160	2.00%	\$160
3	\$11,385	3.50%	\$385
4	\$13,423	3.25%	\$423
5	\$53,950	3.75%	\$1,950
6	\$57,200	4.00%	\$2,200

Total interest charges (across debts) since beginning of game: \$5,193

OK

Retrospective Condition

REFERENCES

- Amir, On and Dan Ariely (2008), "Resting on Laurels: The Effects of Discrete Progress Markers as Subgoals on Task Performance and Preferences," *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 34 (5), 1158–71.
- Ayal, Shahar and Dan Zakay (2009), "The Perceived Diversity Heuristic: The Case of Pseudodiversity," *Journal of Personality and Social Psychology*, 96 (3), 559–73.
- Benartzi, Shlomo and Richard H. Thaler (2001), "Naive Diversification Strategies in Defined Contribution Savings Plans," *American Economic Review*, 91 (1), 79–98.
- _____ and _____ (2007), "Heuristics and Biases in Retirement Savings Behavior," *Journal of Economic Perspectives*, 21 (3), 81–104.
- Bolton, Lisa E., Paul N. Bloom, and Joel B. Cohen (2010), "Stuck in Debt: How Loan Marketing Affects Consumer Personal Finances," paper presented at the First Annual Boulder Summer Conference on Consumer Financial Decision Making, Boulder (June 27–29).
- Buhrmester, Michael D., Tracy Kwang, and Samuel D. Gosling (2011), "Amazon's Mechanical Turk: A New Source of Inexpensive, Yet High-Quality, Data?" *Perspectives on Psychological Science*, 6 (1), 3–5.
- Cain, Daylian M., George Loewenstein, and Don A. Moore (2005), "The Dirt on Coming Clean: Perverse Effects of Disclosing Conflicts of Interest," *Journal of Legal Studies*, 34 (1), 1–25.
- Camerer, Colin, Linda Babcock, George Loewenstein, and Richard H. Thaler (1997), "Labor Supply of New York City Cabdrivers: One Day at a Time," *Quarterly Journal of Economics*, 112 (2), 407–441.
- Denes-Raj, Veronika and Seymour Epstein (1994), "Conflict Between Intuitive and Rational Processing: When People Behave Against Their Better Judgment," *Journal of Personality and Social Psychology*, 66 (5), 819–29.
- Eisenstein, Eric and Stephen Hoch (2005), "Intuitive Compounding: Framing, Temporal Perspective, and Expertise," working paper, School of Business, Temple University.
- Experian (2009), "With Age Comes Wisdom... And a Higher Credit Score," Experian Marketing Insight Snapshot, (March), [available at <http://www.experian.com/business-resources/insight-form-agemisdom.html>].

- Federal Reserve (2009), "Consumer Credit November 2008," Federal Reserve Statistical Release, (January 8), [available at <http://www.federalreserve.gov/releases/g19/20090108>].
- Fishbach, Ayelet and Ravi Dhar (2005), "Goals as Excuses or Guides: The Liberating Effect of Perceived Goal Progress on Choice," *Journal of Consumer Research*, 32 (3), 370–77.
- , ———, and Ying Zhang (2006), "Subgoals as Substitutes or Complements: The Role of Goal Accessibility," *Journal of Personality and Social Psychology*, 91 (2), 232–42.
- Gigerenzer, Gerd and Ulrich Hoffrage (1995), "How to Improve Bayesian Reasoning Without Instruction: Frequency Formats," *Psychological Review*, 102 (4), 684–704.
- Heath, Chip, Richard P. Larrick, and George Wu (1999), "Goals as Reference Points," *Cognitive Psychology*, 38 (1), 79–109.
- Heilizer, Fred (1977), "A Review of Theory and Research on the Assumptions of Miller's Response Competitions Models: Response Gradients," *Journal of General Psychology*, 97 (1), 17–71.
- Hsee, Christopher K. (1996), "The Evaluability Hypothesis: An Examination for Preference Reversals between Joint and Separate Evaluations of Alternatives," *Organizational Behavior and Human Decision Processes*, 67 (3), 247–57.
- Huettel, Scott A. and John W. Payne (2009), "Integrating Neural and Decision Sciences: Convergence and Constraints," *Journal of Marketing Research*, 46 (February), 14–17.
- Hull, Clark L. (1932), "The Goal-Gradient Hypothesis and Maze Learning," *Psychological Review*, 39 (1), 25–43.
- Kahn, Barbara E. and Rebecca K. Ratner (2005), "Variety for the Sake of Variety: Diversification Motives in Consumer Choice," in *Inside Consumption: Consumer Motives, Goals, and Desires*, S. Ratneshwar and David Glen Mick, eds. New York: Routledge, 102–121.
- Kahneman, Daniel and Amos Tversky (1979), "Prospect Theory: An Analysis of Decision Under Risk," *Econometrica*, 47 (2), 263–92.
- Kivetz, Ran, Oleg Urminsky, and Yuhuang Zheng (2006), "The Goal-Gradient Hypothesis Resurrected: Purchase Acceleration, Illusionary Goal Progress, and Customer Retention," *Journal of Marketing Research*, 43 (February), 39–58.
- Newell, Allen and Herbert Simon (1972), *Human Problem Solving*. Englewood Cliffs, NJ: Prentice Hall.
- Nunes, Joseph C. and Xavier Drèze (2006), "The Endowed Progress Effect: How Artificial Advancement Increases Effort," *Journal of Consumer Research*, 32 (4), 504–12.
- Pacini, Rosemary and Seymour Epstein (1999), "The Interaction of Three Facets of Concrete Thinking in a Game of Chance," *Thinking and Reasoning*, 5 (4), 303–325.
- Paolacci, Gabriele, Jesse Chandler, and Panagiotis G. Ipeirotis (2010), "Running Experiments on Amazon Mechanical Turk," *Judgment and Decision Making*, 5 (5), 411–19.
- Ramsey, Dave (2009), "Get Out of Debt with the Debt Snowball Plan," *DaveRamsey.com*, (August 1), [available at <http://www.daveramsey.com/article/get-out-of-debt-with-the-debt-snowball-plan>].
- Read, Daniel and George Loewenstein (1995), "Diversification Bias: Explaining the Discrepancy in Variety Seeking Between Combined and Separated Choices," *Journal of Experimental Psychology: Applied*, 1 (1), 34–49.
- Rick, Scott I., Cynthia E. Cryder, and George Loewenstein (2008), "Tightwads and Spendthrifts," *Journal of Consumer Research*, 34 (6), 767–82.
- Salisbury, Linda C. and Katherine N. Lemon (2010), "Repay Now or Repay Later: Examining the Effects of Information Disclosure on Consumer Debt Repayment Decisions," paper presented at the First Annual Boulder Summer Conference on Consumer Financial Decision Making, Boulder (June 27–29).
- Shin, Jiwoong and Dan Ariely (2004), "Keeping Doors Open: The Effect of Unavailability on Incentives to Keep Options Viable," *Management Science*, 50 (5), 575–86.
- Shu, Suzanne B. (2010), "Consumer Behavior in Relation to Truth in Lending Disclosures," paper presented at the First Annual Boulder Summer Conference on Consumer Financial Decision Making, Boulder (June 27–29).
- Simonson, Itamar (1990), "The Effect of Purchase Quantity and Timing on Variety-Seeking Behavior," *Journal of Marketing Research*, 27 (May), 150–62.
- Stango, Victor and Jonathan Zinman (2009a), "Exponential Growth Bias and Household Finance," *Journal of Finance*, 64 (6), 2807–49.
- and ——— (2009b), "What Do Consumers Really Pay on Their Checking and Credit Card Accounts? Explicit, Implicit, and Avoidable Costs," *American Economic Review Papers and Proceedings*, 99 (2), 424–29.
- Stewart, Neil (2009), "The Cost of Anchoring on Credit-Card Minimum Repayments," *Psychological Science*, 20 (1), 39–41.
- Thaler, Richard H. and Eric J. Johnson (1990), "Gambling with the House Money and Trying to Break Even: The Effects of Prior Outcomes on Risky Choice," *Management Science*, 36 (6), 643–60.