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

Moty Amar  
Assistant Professor of Marketing  
Ono Academic College, School of Business  
104 Zahal St., Kiryat Ono 55000 Israel  
Phone: 972-545-777-195; Email: mamar@ono.ac.il

Dan Ariely  
James B. Duke Professor of Behavioral Economics  
Fuqua School of Business, Duke University  
100 Fuqua Drive No. 90120, Durham, NC 27708  
Phone: 919-660-7703; Email: dandan@duke.edu

Shahar Ayal  
Assistant Professor of Psychology  
New School of Psychology, Interdisciplinary Center (IDC) Herzliya  
P.O. Box 167, Herzliya, 46150, Israel  
Phone: 919-660-8057; Email: s.ayal@idc.ac.il

Cynthia E. Cryder  
Assistant Professor of Marketing  
Olin Business School, Washington University in St. Louis  
Campus Box 1133, One Brookings Drive, St. Louis, MO 63130  
Phone: 314-935-8114; Email: cryder@wustl.edu

Scott I. Rick  
Arnold M. & Linda T. Jacob Assistant Professor of Marketing  
Ross School of Business, University of Michigan  
701 Tappan Street, R5486, Ann Arbor, MI 48109  
Phone: 734-615-3169; Email: srick@umich.edu

In Press, Journal of Marketing Research
Authors’ Note

All authors contributed equally to this research, and author names are listed in alphabetical order. The authors thank the two anonymous reviewers, the associate editor, participants at the First Annual Boulder Summer Conference on Consumer Financial Decision Making, the 2009 Marketing Science Conference, and the 2009 Society for Judgment and Decision Making Conference for valuable comments. Please direct correspondence to Shahar Ayal.
Winning the Battle but Losing the War:  
The Psychology of Debt Management

ABSTRACT

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, we hypothesized that people would 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, we developed an incentive-compatible debt management game, in which participants were saddled with multiple debts and decided how to repay them over time. Consistent with our hypothesis, four experiments revealed evidence of debt account aversion: Participants consistently paid off small debts first, even though the larger debts had higher interest rates. We also found that restricting participants’ ability to completely pay off small debts, and focusing their attention on the amount of interest each debt has accumulated, helped them reduce overall debt more quickly.

Keywords: Financial Decision Making, Debt Repayment, Debt Consolidation, Subgoals, Credit Cards
According to the Federal Reserve, the total outstanding credit card debt carried by Americans reached an all-time high of $975 billion in 2008, a figure that will surely remain high as more and more people reach for the plastic just to make ends meet. Additionally, according to a recent Experian report (2009), consumers who use credit already hold over 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 further increase.

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 seeking 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 paper 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: In order 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. Once this loan has been paid off, people should move to the loan with the next highest interest rate, and so on.

From a psychological perspective, however, there is reason to suspect that consumers might stray from normative principles when managing debt (cf. Stango and Zinman 2009a; 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 2009b). 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 in which consumers might stray from normative principles when managing multiple debts is by treating debt repayment decisions like asset allocation decisions. Benartzi and Thaler (2001) found that many people faced with the decision of how to allocate their retirement contributions across saving plan funds appeared 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 account(s) to repay similarly complex, this naïve diversification heuristic may generalize to the debt repayment domain.

While diversity is often sought in the domain of gains (cf. 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, then 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).

Additionally, 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 Dreze 2006) demonstrated 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).

The shape of the prospect theory value function in the loss domain (Kahneman and Tversky 1979) also suggests 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 (cf. 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). Further, the steepness of the loss function near zero also implies that paying off a small debt will provide greater relief than making a similar reduction to a larger debt.

Taken together, the research discussed above suggests that consumers are likely to manage multiple debts in ways that can ultimately impede their ability to rid themselves of debt. While 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 America 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 above suggests that Ramsey may be preaching to the choir, and further encouraging non-optimal 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. ET on CNBC, logged onto the CNBC website to complete the survey. Their incentive for participating was receiving a report of the survey’s results once 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% APR, and a Visa account with a $1,000 balance and a 15% APR. They were also asked to imagine that they had just received either a $100 or $1,000 government stimulus rebate and that they had decided to use the entire rebate to repay debt. Finally, they were asked 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 due to debt account aversion.²

Because the CNBC survey did not measure participants’ actual credit card debt, the above 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 via Amazon’s Mechanical Turk, a website commonly used to recruit adult participants and validated by Buhrmester, Kwang, and Gosling (in press) and Paolacci, Chandler, and Ipeirotis (2010). A total of 177 U.S. participants...
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. 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 than the low-APR repayment amount reported among non-users ($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.

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 (see Rick, Cryder, and Loewenstein (2008) for original survey details) completed the present 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 \( D = 0.20 \) and \( R = 0.33 \). If \( R > D \), then consumers are devoting disproportionate effort toward closing the smallest debt, presumably due to debt account aversion. Indeed, consistent with debt account aversion, we found that \( R \) was significantly greater than \( D \) on average (0.27 vs. 0.16, \( t(42) = 3.91, p < .001 \), paired \( t \)-test).\(^5\)

These initial results suggest that debt account aversion might be 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 non-optimal behavior persist when there are immediate monetary incentives to behave optimally? Does debt repayment behavior become more optimal in repeated decision settings? More importantly, 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 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. Additionally, 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 (see Appendices for sample screen
shots; full game instructions as well as log-in information for the online game are available from
the corresponding author upon 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, 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 towards Debts 1 and 2, and would
conclude the game with three open Debts that sum to $29,428 in total debt. By 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, 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 less than $30,000, $3 if their total debt was between $30,000
and $35,000, $2 if their total debt was between $35,000 and $40,000, and $1 if their total debt
was greater than $40,000.

<table>
<thead>
<tr>
<th>Debt</th>
<th>Annual Interest Rate</th>
<th>Initial Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt 1</td>
<td>2.50%</td>
<td>$3,000</td>
</tr>
<tr>
<td>Debt 2</td>
<td>2.00%</td>
<td>$8,000</td>
</tr>
<tr>
<td>Debt 3</td>
<td>3.50%</td>
<td>$11,000</td>
</tr>
<tr>
<td>Debt 4</td>
<td>3.25%</td>
<td>$13,000</td>
</tr>
<tr>
<td>Debt 5</td>
<td>3.75%</td>
<td>$52,000</td>
</tr>
<tr>
<td>Debt 6</td>
<td>4.00%</td>
<td>$60,000</td>
</tr>
</tbody>
</table>
Table 1. The interest rate and initial size of each debt

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 or not participants had enough money to completely pay off any individual debt (Experiment 2), and whether or not 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 to appreciate the monetary implications of interest rates and thus focus on repaying the highest-interest debts first. All four experiments were conducted at the same university, but laboratory software ensured that participants never completed more than one experiment.

EXPERIMENT 1: DEBT ACCOUNT AVersion
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; once minimum payments have been made, people must decide what share of their remaining income will be allocated to repaying debt, and how much will be saved or used for other purposes. However, if achieving subgoals can demotivate people from pursuing superordinate goals (e.g., Amir and Ariely 2008; Fishbach and Dhar 2005), people who pay off a debt in a given round may feel as if they have done enough for that round, saving the rest of their cash (as
opposed to using that cash to pay down another debt). Additionally, despite the fact that money can only be used to pay down debt, people might have difficulty overcoming the inclination to keep some cash at hand, perhaps for additional flexibility (cf. 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 and sixty two undergraduate students (56% female; mean age: 21.5) at a private mid-Atlantic university 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 ($29,428; both ps < .001). Across both conditions, the average participant lost $12,051 due to non-optimal debt repayment decisions. Below, we examine treatment differences and the magnitude and frequency of non-optimal 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 appears to be driven largely by the fact that some people in the Saving-Allowed condition retained 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 than Saving-Allowed
participants who did not always save to completely pay off the smallest four debts (Debts 1-4; 64% vs. 37%; \( \chi^2(1) = 5.86, p < .025 \)).

**Magnitude and Frequency of Non-Optimal 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 Appendices), not even one participant consistently demonstrated financially optimal behavior. That is, no participant consistently repaid, in each round, all of their 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 five 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 10 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 “non-optimally 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 non-optimally in each round (pooling across participants). In the No-Saving condition, approximately half of the available cash was allocated non-optimally in each round (M = 51%, SD = 13%). The opportunity to save cash significantly increased the percentage of money that was allocated non-optimally (M = 59%, SD = 17%; \( t(160) = 3.50, p < .005 \)). A repeated measure ANOVA treating the mean proportion of non-optimally 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 non-optimally
as the game progressed. Pooling across conditions, the average percentage of non-optimally 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 to 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. By 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 (\( \chi^2(1) = 20.18, p < .0001 \)). 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 based on 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 they were to close the debts that a financially optimal player would close (11% vs. 4%; \( \chi^2(1) = 5.66, p < .025 \)).

While 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), they are 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.) While 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, whereas 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. By 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.

_____________________

Insert Figure 2 about here
EXPERIMENT 2: SHORT ON CASH

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 or not 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 to 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 different 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 of 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 had 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 different portfolios) to obfuscate the purpose of the experiment.

Sixty-five undergraduate students (50% female; mean age: 22) at a private mid-Atlantic university 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.

<table>
<thead>
<tr>
<th>Debt 1</th>
<th>Debt 2</th>
<th>Debt 3</th>
<th>Debt 4</th>
<th>Debt 5</th>
<th>Debt 6</th>
<th>Available Cash (Low-Cash)</th>
<th>Available Cash (High-Cash)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portfolio 1</td>
<td>$4,572</td>
<td>$11,213</td>
<td>$19,751</td>
<td>$20,750</td>
<td>$22,339</td>
<td>$20,876</td>
<td>$3,500</td>
</tr>
<tr>
<td>Portfolio 2</td>
<td>$3,040</td>
<td>$9,694</td>
<td>$12,793</td>
<td>$5,108</td>
<td>$27,410</td>
<td>$47,003</td>
<td>$2,200</td>
</tr>
</tbody>
</table>

Table 2. The four decisions of interest (2 Portfolios × 2 Cash allotments) in Experiment 2

Results and Discussion

We pooled data across Portfolios. Consistent with debt account aversion, the mean percentage of non-optimally 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 to 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**

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” utilized 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 participants’ 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} \left( \frac{Debt_i}{\sum_i Debt_i} \right) \times \text{Interest Rate}_i = 2.98\%$). This increase captures the fact 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 and two undergraduate students (60% female; mean age: 21.8) at a private mid-Atlantic university participated in the experiment.

Results and Discussion

Mean total debt in both conditions was significantly greater than that of a financially optimal player (both $p$s < .001), and more importantly, 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 non-optimal behavior.

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, focusing only on those who closed either Debts 1-4 or the consolidated loan, Control participants closed Debts 1-4 significantly earlier than Debt Consolidation participants closed the consolidated loan.
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 suggest that debt consolidation may be more beneficial than previously thought. Specifically, by eliminating consumers’ ability to repay small debts, debt consolidation appears to help refocus attention on the overarching goal of reducing total debt.

**EXPERIMENT 4: FOCUSING ATTENTION ON INTEREST**

In Experiments 2 and 3, we utilized interventions that helped debt account-averse players, but would slightly harm 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 to 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 2009b), interest rates may play less of a role in repayment decisions than they should (cf. Hsee 1996). Translating abstract rates into a more tangible and familiar unit (dollar amounts) may increase the weight players place on interest rates (cf.
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) at a private mid-Atlantic university participated in the experiment.

Results and Discussion

Mean total debt was significantly greater than that of a financially optimal player in all conditions (all $p < .001$). 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 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%; $\chi^2(1) = 0.08, p = .77$).

Thus, while the Retrospective intervention did not erase debt account aversion, it did help to move repayment behavior in the direction of optimality. However, the Prospective
intervention did not produce any beneficial effects. One reason why 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. By 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 over five credit cards, each with an average balance of over $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 most 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 to 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. Of course, it should be noted that while our interventions improved the optimality of debt repayment decisions, the differences between conditions and the financially optimal benchmark were generally greater than the differences between conditions. Thus, while there may be ways to reduce the bias of repaying smaller loans first, fully extinguishing it may require more forceful intervention – perhaps one where a consumer pays a central payment center, and this payment center allocates payments to the different loans.

Limitations
Like 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. Additionally, in real life there are transaction and cognitive costs that 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 individuals 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 common response to multiple debts.

*Is Debt Account Aversion Always a Mistake?*

Although we have identified situations in which debt account aversion produces non-optimal behavior, there may be other situations in which debt account aversion proves to be a useful heuristic. As noted above, 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 forego a new purchase in favor of repaying a small debt.

It is also important to note that the size of the 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 process(es) 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 goal-gradient effect (e.g., Kivetz, Urminsky, and Zheng 2006), the tendency to adopt subgoals when attempting to achieve a difficult superordinate goal (e.g., Newell and Simon 1972), 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.

It is also important to determine whether consumers think 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 is objectively suboptimal, but pursue 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 to the behavior (suggestions) of advisors 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 (non-advised) players and advisors. That is, advisors should advise their clients to prioritize repayment of low-balance, low-interest loans. However, if closing small accounts delivers emotional benefits that advisors do not vicariously experience, advisors should behave more optimally.

It should be noted that debt account aversion is only one way in which consumers mismanage their debts. For example, recent work has revealed that consumers tend to over-weight 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 2009a). Future work should continue to examine the ways in which 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 suggests that the consumer may (non-optimally) use the latter. More broadly, debt account aversion may influence the proportion of income consumers divert from new purchases (or savings and investments) toward 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 because they need “some quick wins in order to stay pumped enough to get out of debt completely.” Our consistent evidence of debt account aversion suggests that many consumers share Ramsey’s intuition. While this heuristic is not necessarily a mistake, our work reveals that debt account aversion can systematically lead consumers astray when larger debts have larger interest rates. Ultimately, it appears that debt account aversion may enable consumers to win the battle, but lose the war against debt.
REFERENCES


FOOTNOTES

1 At first glance, it is difficult to reconcile debt account aversion with consumers’ tendency to hold multiple debts. The phenomena become easier to reconcile when one considers 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. Additionally, consumers who struggle to make ends meet may open multiple credit cards out of necessity once 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.

2 It is worth highlighting that the non-optimal 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%; $\chi^2(1) = 23.19, p < .0001$).

3 Overall, 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.

4 To 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 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.

5 One 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 those participants are excluded from the analysis (0.25 vs. 0.14, $t(37) = 3.31, p < .01$, 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 $D$ (since larger debts will have larger minimum payments).

6 The 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 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.

7 Because the game changes over time (e.g., allocating money non-optimally 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 non-optimally. Future research could more definitively address learning by examining knowledge transfer (e.g., by manipulating whether or not participants initially play the current debt management game and then letting everyone play a new debt management game, with different debts and interest rates).
The figure displays the mean proportion of money allocated non-optimally 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.
FIGURE 2
AVERAGE ROUND EACH DEBT WAS CLOSED, COMPARED TO FINANCIALLY OPTIMAL AND DEBT ACCOUNT-AYERSE BENCHMARKS (EXPERIMENT 1)

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

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.

**Control Condition**

**Prospective Condition**

**Retrospective Condition**