The Effect of Student Loan Debt on Spending:

The Role of Perceived Payoff Difficulty

Working Paper

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ABSTRACT

Across four studies, the authors investigate the effect of student loan debt on spending. Using evidence from experimental scenarios and actual consumer finance data, the authors find that borrowers with moderate student loan debt are less likely to spend than students with low (or no) debt. However, borrowers with high debt are *more* likely to spend relative to those with moderate debt. The latter effect is consistent with goal disengagement, as paying off high student loan debt appears difficult. Importantly, the authors present interventions to moderate payoff difficulty, demonstrating that the spending propensity associated with high student loan debt is attenuated by reducing perceived payoff difficulty. From a public policy perspective, the authors discuss why the effect of high student loan debt could potentially be troubling for young borrowers' major spending decisions.

[132 words]

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At $1.4 trillion in aggregate outstanding debt with over 43 million individual borrowers, student loan debt is the second-largest consumer debt in the United States, second only to home mortgages (Chakrabarti et al. 2017). The staggering magnitude of student loan debt has been attributed to the increasing number of borrowers, larger balances per borrower and slower repayment progress (Chakrabarti et al. 2017). For instance, over half of the college attendees in 2016 took on at least some student loan debt while pursuing higher education (Chakrabarti et al. 2017). The average student loan debt per borrower was $34,200 in 2016, a 15% increase from 2013 (Bricker et al. 2017), and nearly 70% increase from 10 years ago (Chakrabarti et al. 2017). About 13% of college students reported having accumulated $40,000 or more student loan debt at the time of survey, and another 31% reported expecting to have $40,000 or more by graduation (National Student Financial Wellness Study 2014). Additionally, the repayment progress in student loan debt has been the slowest among the most recent college graduates (Chakrabarti et al. 2017). It is therefore not surprising that student loan debt has become a major source of financial burden for college students and recent graduates (Korn 2017a). For instance, over 53% of college students report experiencing moderate or high levels of stress related to their student loan debt (National Student Financial Wellness Study 2014).

Existing research has centered on the social impact of student loan debt (e.g. Brown and Caldwell 2013) because increasing student loan debt can lead to problems such as slower payback rates (Fuller 2017) and an increase in defaults (Chakrabarti 2017). Recent data points to a worsening of this problem; in 2014, 17% of student borrowers leaving college owed $50,000 or more in student loans, and such students now account for 58% of the $1.4 trillion outstanding student loan debt (Mitchell 2018). Furthermore, most of these borrowers have made no progress in paying off their student loans in the past four years (Looney and Yannelis 2018).

Our research sheds light on a topic that has not received much research attention thus far: the motivational effect of high student loan debt on young borrowers' spending. If high student loan debt fails to deter borrowers from spending, it could partially explain why borrowers with high student loan debt are experiencing increasing default rates and slower debt repayment progress (Brown 2015; Chakrabarti et al. 2017; Looney and Yannelis 2018). In this paper, we show that borrowers with moderate student loan debt control spending more than those with low student loan debt, whereas borrowers with high student loan debt fail to control their spending relative to those with moderate student loan debt. Based on the motivational literature on goal attainability, we attribute this effect to borrower's perceived payoff difficulty of student loan debt. While moderate payoff difficulty is motivating, too much difficulty results in demotivation. We provide experimental evidence showing that when the perceived payoff difficulty is reduced, borrowers with high student loan debt become more motivated to control their spending.

Our research adds to a timely discussion on student loan debt and consumer spending. Americans have greater need than ever to find ways to spend less. According to a survey with 5,000 U.S. respondents, "paying down debt," and to "save more, spend less" were among the top New Year's resolutions for 2018, with millennials (aged 25-34) most likely to choose finances as their priority compared with other age groups (Huddleston 2017).

In particular, we choose to examine automobile purchases as our main context for spending, for three important reasons. First, automobile purchases represent a common, and economically important, purchase decision that often occurs near graduation. In fact, student loan debt and auto debt are the only two types of debt that have grown significantly for younger borrowers (aged 18-39) in the periods between 2006-2016 (Chakrabarti et al. 2017). Second, auto ownership represents a major personal and professional milestone and can be easily justified

if individuals are spending more than seems reasonable given their objective financial circumstances. Sussman and Alter (2012) show that people are more likely to overspend for major and unique spending occasions that celebrate a critical milestone. Finally, young borrowers tend to prioritize auto loans over student loan debt repayment (Navient 2016). For example, 48% young adults (between the ages of 22 and 35) report having trouble with making payments toward their debt and on average place higher priority on paying other bills—such as housing, food, utilities, and car loans—over student debt (Navient 2016). This is potentially problematic if the financial consequence of overspending on automobile purchase spills over to delayed progress in student loan repayment. In sum, the financial implication of overspending on automobile purchases is too significant to be ignored.

We now review why student loan debt is distinct from many other common consumer debt, how its features make borrowers more susceptible to demotivation, and present a policy intervention to help borrowers control their spending.

Literature Review

Student Loan Debt Characteristics

Unlike most consumer debt in which repayment of the debt begins soon after it is incurred (e.g. mortgage, auto loans or credit card debt), student loan debt has a large temporal separation between the consumption experience of acquiring a higher education and the scheduled repayments. There is usually a span of several years during which student borrowers keep accumulating debt without making any payment. When the payment aspect is separated from the consumption experience, it creates decoupling (Prelec and Loewenstein 1998). Consequently, student loan debt borrowers are often not aware of the actual cost of higher education until much later. For instance, 41.5% of college students report having no idea of their

future monthly student loan debt repayment amounts (National Student Financial Wellness Study 2014).

In the meantime, the transitional period that encompasses the end of college and the beginning of employment is full of major consumption decisions: Should I rent an apartment or move back in with my parents? Should I buy a car? How much should I spend on clothes? As there is currently no federal requirement on repayment disclosure for most states in the U.S. (Korn 2017b), the payment aspect of student loan debt is not salient prior to repayment. Thus, borrowers could be overwhelmed and demotivated by a large lump sum amount of their debt toward the period when repayment is about to commence.

Goal Attainability and Motivation

Goal attainment and motivation underlie every aspect of consumer behavior (Bagozzi and Dholakia 1999), and financial behavior in particular. One main determinant of an individual's commitment and motivation is the cognitive assessment of the difficulty in attaining a goal (Bandura 1997). Both the expectancy-value model (Atkinson 1957) and goal-setting theory (Locke and Latham 1990) also propose that the assessment of one's ability to attain a goal motivates an individual in goal pursuit. In general, goal-oriented motivation and effort increase linearly as the goal becomes more difficult (Locke and Latham 1990), because the additional challenge of the goal requires extra conscious effort.

Importantly, this linear pattern holds only when individuals stay committed to the goal. Individuals are much less likely to commit to goals that they deem as too difficult to achieve (Locke, Latham, and Erez 1988; Locke and Latham 1990). Erez and Zidon (1984) show that participants' performance increases linearly as the level of difficulty increases until the point

when they reach the limits of their ability at high levels of difficulty. Subsequently, Erez and Zidon (1984) document a higher rate of dropout because of increasingly difficult goals.

The subjective belief of goal attainability thus remains an important moderator in the relationship between goal difficulty and goal-oriented motivation (Bandura 1997). Motivation increases as a function of the subjective belief that the goal can be attained. A difficult but attainable goal motives people to work harder and stay committed. As goals become more difficult and reach the point of being unattainable, however, they lower the anticipation of success. Unattainable goals produce feelings of failure that decrease self-efficacy (Bandura 1997) and lead to disengagement. Indeed, when people are exposed to a performance standard that is viewed as unattainable, they are less likely to stay committed (Roger and Feller 2016) and are more likely to disengage.

An extreme form of disengagement, such as abandoning the goal (sometimes called the "what-the-hell" effect), refers to the loss of restraint following the initial violation of a goal (Cochran and Tesser 1996). In the financial domain, goal abandonment leads to overspending when consumers violate specific financial goals such as contributing a certain amount to savings (Soman and Cheema 2004). Similarly, Wilcox, Block, and Eisenstein (2011) find that having credit card debt has the unintended effect of encouraging more spending, especially among credit card borrowers with high self-control who prioritize avoiding such credit card debt. In particular, overspending is the consequence of goal violation that is specific to individuals with high self-control. Because student loan debt mostly arises from individual's financial needs, and to much lesser degrees from levels of self-control, the mechanism observed among credit card debt borrowers may not be directly transferrable to understanding the process of student loan debt

repayment. As a result, the unique motivational effect of student loan debt on spending remains an open question.

Motivational Consequence of Student Loan Debt

There is often a large degree of uncertainty associated with any goal during the early stages of goal pursuit. Consequently, commitment is largely determined by perceived goal attainability during these early stages (Zhang and Huang 2010). Similarly, student borrowers have limited information to infer the attainability of paying off their student loan debt, especially at the early stage of their repayment process. As a result, student loan debt borrowers are likely to rely on perceived payoff difficulty to infer the feasibility of paying off their student loan debt. If perceived payoff difficulty is too high, borrowers may infer that the goal is unattainable and are less likely to stay committed. If perceived payoff difficulty is moderate, however, borrowers infer that paying off the student loan debt is attainable and are willing to exert extra effort toward achieving this goal.

As the consumption period comes to an end (i.e. graduation), the perceived payoff difficulty may be greatly exacerbated due to the sudden increase in the salience of the total amount of student loan debt that has been slowly accumulating over the past few years. Yet, students do not start payment until at least six months later. During this time, borrowers continue to make various spending decisions. A motivated and committed borrower will likely make every effort to cut spending, remaining price conscious in most purchase decisions. Unmotivated and indifferent borrowers, on the other hand, are less likely to control their spending.

Hypotheses 1 and 2: Non-Monotonic Effect of Student Loan Debt on Spending

We hypothesize that the motivational impact of student loan debt on spending is non-monotonic. Specifically, individuals with moderate (vs. low) levels of student loan debt perceive the goal of paying off the loan to be attainable (Bandura 1997), and the increase in payoff difficulty will boost commitment to control discretionary spending. Formally:

H1: Individuals with moderate debt will spend less than individuals with low debt.

With increases in student loan debt, however, at some point the debt may seem so high that further increases in payoff difficulty would fail to motivate individuals to control their spending. The lack of motivation would suggest disengagement (Roger and Feller 2016), resulting in loss of restraint and increases in spending (Soman and Cheema 2004). Thus, individuals with high student loan debt are less likely to control spending relative to those with moderate student loan debt. Formally:

H2: Individuals with high debt will spend more than individuals with moderate debt.

Next, we show that individuals with moderate levels of student loan debt are more likely to control spending relative to those with low (or no) student loan debt. However, individuals with high student loan debt spend more than those with moderate student loan debt (Study 1). In Study 2 we analyze data from the Survey of Consumer Finances. We find a similar pattern of relationships between increasing student loan debt and a household' overspending tendencies.

We attribute this pattern to the increased perception of payoff difficulty at higher levels of student loan debt.

Study 1: Student Loan Debt Scenario

In Study 1, we initially test out the directional effect of student loan debt on spending. We randomly assign student participants to one of three debt scenarios (high debt, moderate debt and a control condition) depicting a purchase facing a soon-to-be college graduate. We measure an individual's spending propensity via a choice between a cheaper vs. a more expensive option. The control condition is designed to measure spending propensity when no student loan debt information is mentioned relative to the two hypothetical debt conditions.

Participants, Method, and Design

We recruited 205 participants (56% females; average age = 24.10 years, SD = 5.02) from Amazon Mechanical Turk (AMT) to participate in the survey. Only currently enrolled students in the U.S. were eligible to participate. Participants read a scenario where they were about to graduate from college. In the scenario, participants were told that they just got a job offer with an annual salary, and visited the dealership to consider a few models for a new car (see Appendix A for the complete scenario). Participants were randomly assigned to one of the three conditions: high debt ($80,000), moderate debt ($30,000) and control (no debt mentioned). The debt levels were determined by a pilot study in which student participants from AMT read about the same scenario and then rated the difficulty of paying off a given debt (1 = very easy, 7 = very

difficult). Students perceived paying off $80,000 to be significantly more difficult than paying

off $30,000; M $_{\$80k}$ = 5.69, SD = .99 vs. M $_{\$30k}$ = 4.88, SD = 1.37, t(101) = 3.40, $p < .01$.

After reading the scenario, participants in the debt conditions were presented a summary

letter regarding their hypothetical debt situation, stating overall student loan debt and interest

rate. Participants in the control condition did not view any debt information. All participants then

viewed a choice scenario involving two cars (a less expensive vs. a more expensive option). The

choice between the two options was our dependent measure.

Results and Discussion

Overall, 21% of participants chose the more expensive option. Figure 1 depicts the choice

results across the three conditions. Participants in the high-debt condition were more likely to

choose the premium option (24.3%) than participants who were in the moderate-debt condition

(11.4%, χ^2 (1) = 3.94, p = .05), supporting H2. Participants in the moderate-debt condition were

less likely to choose the premium option than those in the control condition (27.7%, χ^2 (1) =

5.73, p = .01), consistent with H1.

<Insert Figure 1 about here>

Results from Study 1 establish the basic directional effect of student loan debt.

Specifically, moderate student loan debt motivated individuals to restrain their spending

compared to the control condition. However, high student loan debt failed to provide any

motivation when compared to the control group.

We used the control condition to observe the baseline spending propensies among the

same sample when no student debt is mentioned. To verify that the effect remains if we replace

the control condition with a low debt, we conducted a follow-up study (see Web Appendix A,

Supplemental Study 1) using a low-debt condition ($2,000) to replace the control (no-debt)

condition. To enhance external validity, we replaced the the dichotomous choice with a 7-point scale (1 = definitely choose lower-priced model, 7 = definitely choose higher-priced model).

The results revealed the same U-shape pattern; moderate-debt participants were less likely to prefer the expensive option than low-debt participants, $M_{\text{low debt}} = 4.05$ vs. $M_{\text{moderate debt}} = 3.15$, $F(1, 218) = 6.11$, $p = .01$, supporting H1. By contrast, high-debt participants were marginally more likely to choose the expensive option than moderate-debt participants, $M_{\text{moderate debt}} = 3.15$ vs. $M_{\text{high debt}} = 3.82$, $F(1, 218) = 3.31$, $p = .07$, consistent with H2. As in Study 1, these data suggest that individuals with moderate student loan debt were more motivated to restrain spending compared to individuals with low debt or those with high debt.

In Study 1 we used an experimental design to test for the directional effect of a given amount of student loan debt on a hypothetical purchase decision. In the next study, we analyze the relationship between actual student loan debt and overspending propensity using an archival dataset. We expect to find reduced overspending propensity at moderate levels of student loan debt but not for high student loan debt, specifically for younger consumers.

Study 2: Actual Student Loan Debt and Overspending

We analyze data from the 2013 Survey of Consumer Finances (SCF) to test the relationship between the magnitude of student debt and household spending propensity, and whether the pattern remained the same across different age groups. The SCF is a triennial survey from the U.S. Federal Reserve that "collects information about family income, net worth, balance sheet components, credit use, and other financial outcomes" (Bricker et al. 2014, 1).

Data

Bricker et al. (2014) detail the surveying technique and descriptive statistics for the SCF. Our analysis uses aggregate variables compiled by the Federal Reserve that indicate household student loan debt, income and wealth percentile, as well as household demographics such as age and educational level.

We define overspending as the tendency to spend beyond one's income. This allows us to use a self-reported measure in the SCF survey that tracks households' spending during the prior year relative to household income level. We recoded the original three-level variable into an "Overspending Propensity" score (-1 = spending less than income, 0 = spending at income, 1 = spending exceeding income) where a higher score indicates greater overspending propensity. We follow the standard method to correct for the estimates of standard errors from multiply imputed data (Kennickell 1998).

Analysis and Results

We first analyze young millennial families (age of the head of household ≤ 35, N = 1,116). For these selected households, the average conditional student debt is $29,566. At the aggregate level, 13.71% of the selected households reported spending exceeding income, 30.24% reported spending at income, and 56.05% reported spending below income.

To examine the relationship between student loan debt and household overspending propensity, we model polynomial regressions with overspending propensity as the dependent variable. The predictor variables for our model are: student debt (LNSDEBT), student debt squared (LNSDEBT^2), student debt cubed (LNSDEBT^3), and income (LNINC). We add 1 to all predictor variables measured using a dollar value and perform a logarithmic transformation. Income is mean centered by subtracting the mean of log values from each observation. Note that rather than standard OLS coefficient estimates, the reported regression coefficients are a point

estimates over five implicates, with sampling weight applied to correct for population-wide standard error estimate (Kennickell 1998).

We find significant and positive coefficients for the linear term, significant and negative coefficients for the squared term, and significant and positive coefficients for the cubed term of student loan debt. The non-monotonic effect on overspending remains robust after accounting for income, household demographics, and the magnitude of other types of debt (see Table 1 for nested model estimates). Because of the discrete nature of self-reported measure on household overspending, we repeat the analysis with a logistic regression and the pattern remains robust.

We then test whether the effect of student loan debt on overspending propensity is specific to younger households. We estimate a regression model including age, and its interaction with the polynomial terms of student loan debt. These coefficients are presented in Table 2. There is a significant interaction effect between age and student loan debt. Figure 2 plots the estimated effect of student loan debt on overspending propensity by age groups. As there is a discontinuity between those who do not have any debt versus those who have debt, our estimation starts with $2,000 of debt. For millennial households, families that have moderate student loan debt (e.g., $5,000–$20,000 student loan debt) reported lower overspending propensity compared with families with $2,000 student loan debt. Households with high student loan debt reported higher overspending propensity compared to household with moderate student loan debt. This trend is strongest among younger millennial households, becoming weaker for older consumers.

<Insert Figure 2 about here>

Discussion

Study 2 demonstrate two important findings by modeling actual student loan debt and household overspending propensity. First, for millennial households (head of household with age <= 35), overspending propensity is reduced at moderate student loan debt, but not at high student loan debt. Secondly, we observe that the non-monotonic relationship between student loan debt and overspending is most pronounced for younger (vs. older) consumers.

Although it may be possible that younger consumers are more likely to overspend as part of the process of borrowing from future income to fund current day consumptions (Friedman 1957), the permanent income hypothesis cannot explain the reduced overspending propensity we observe at moderate levels of student loan debt.

While moderate student loan debt motivates borrowers to control their everyday spending within the means of their income, high student loan debt fails to provide this critical motivation and could instead lead to reduction in commitment. To examine the role of perceived payoff difficulty in the motivational process, we turn to experimental manipulations in the next two studies to demonstrate its causal effect.

Making High Levels of Student Loan Debt Appear More Manageable

Student loan debt in its present form presents a unique challenge for borrowers to manage motivation toward achieving financial goals. The social-cognitive model (Bandura 1997) finds that an unattainable super-ordinate goal reduces motivation and goal commitment. Student borrowers who have not yet started debt repayment but are faced with high debt are susceptible to the demotivating effect of the payoff goal appearing to be unattainable. When they perceive the payoff goal to be unattainable, borrowers may decrease committment and disengage from the

goal. Consequently, they are less motivated to control spending and may pay less attention to how much they spend. As Study 1 demonstrates, borrowers with higher amount of student loan debt—presented as a lump sum—are less likely to control spending compared to borrowers with moderated amount of student loan debt. However, if the perceived payoff difficulty of student loan debt could be decreased to a level that appears to be manageable, borrowers with high student loan debt may be more motivated. This suggests a potential intervention that has significant implications for public policy as well as consumer welfare.

Prior research on information architecture shows that the presentation and framing of numerical information impacts consumer financial decision-making in domains such as savings (Choi et al. 2016) and credit card payments (Navarro-Martinez et al. 2011). However, the exact impact of information architecture of student loan debt on spending has not been previously explored. As we have conceptualized, because young borrowers tend to use payoff difficulty to infer the attainability of paying off their student loan debt, interventions that provide a more attainable representation of high student loan debt should decrease perceived payoff difficulty and consequently motivate borrowers to control spending.

In the next two studies, we focus on manipulation-of-mediator experimental designs (Pirlott and McKinnon 2016; Spencer, Zanna, and Fong 2005) by manipulating perceived payoff difficulty to be low or high. The manipulation-of-mediator design offers two advantages. First, it allows us to account for individual variability in perceived payoff difficulty by using random assignment of experimental conditions. Second, and more importantly, manipulating perceived payoff difficulty allows us to directly test implementable interventions in consumers' perceptions of student loan debt that have significant public policy implications.

We demonstrate that the demotivating effect of high student loan debt can be mitigated if we decrease payoff difficulty, either through a meta-cognitive manipulation (Study 3) or through loan repayment formats (Study 4).

Manipulating Meta-Cognitive Difficulty

Research on meta-cognitive experience suggests that people form judgments based on the ease or difficulty of thought generation (Schwarz 2004). If individuals are required to generate thoughts related to a given behavior (for instance, coming up with two vs. eight ways to pay off their student loan debt), they search for and report incidents that happen more or less frequently. Because generating thoughts associated with low-frequency events is more difficult, the meta-cognitive experience would lead individuals to infer that the behavior is more difficult when they have to recall more events. This procedure has been used to manipulate consumer perception (Novemsky et al. 2007) and to induce anticipated ease or difficulty (Bartels and Urminsky 2011). We propose manipulating meta-cognitive experience as an intervention to reduce the perception of payoff difficulty for high student loan debt. Based on the effect of different levels of student loan debt on spending (H1 and H2), making the goal of paying off high student loan debt appear more attainable should attenuate the effect of high (vs. moderate) debt on spending.

While a meta-cognitive manipulation is useful to theoretically demonstrate the impact of an intervention that increases goal attainability, it provides limited applicability in the real world. For the latter, we demonstrate an implementable intervention—presenting the student loan debt in a monthly format—as another way to increase goal attainability.

Manipulating Debt Format: Lump Sum versus Monthly Payments

Student loan debt, in its current form, is most commonly administered and communicated to borrowers in lump sum format, as students received a new financial statement each semester that gradually adds to the cumulative total amount of their debt. As shown in the preceding studies, a large lump sum amount could significantly lower a borrower's motivation to control spending. However, disclosing the monthly payment amount could have a unique benefit on borrowers' motivation. The social-cognitive model (Bandura 1997) suggests that when the unattainable super-ordinate goal is represented as more attainable proximal sub-goals, individuals exert greater effort toward goal attainment (Bandura and Schunk 1981).

Although the literature on presenting student loan debt in monthly payment format is sparse, preliminary evidence is encouraging. When Indiana University started sending student borrowers estimated future monthly payments as part of a comprehensive financial literacy program, there was a 11% decline in total federal borrowing from a year earlier (Lorin 2014). Similarly, Schmeiser, Stoddard, and Urban (2015) reported a natural experiment among students at Montana State University and University of Montana who received different student loan debt disclosure forms. Students who received a projected monthly summary on average borrowed $1,360 less in the subsequent semester than students who did not receive the monthly disclosure.

Recent research on credit card debt management also provides support for the motivational benefits of setting attainable sub-goals. Consumers who focus on attainable sub-goals such as eliminating one credit card debt account at a time stay more committed to total debt repayment than those who try to pay off multiple accounts at the same time (Kettle et al. 2016), and the former are more likely to pay off their total debt balance (Gal and McShane

2012). When left on their own to choose, consumers prefer to pay off the most attainable (smallest) debt first even if other debt may have higher interest rates (Amar et al. 2011). These findings illustrate that individuals derive greater self-efficacy from completing attainable sub-goals and are therefore more motivated in their overall goal pursuit.

In addition to providing a proximal and attainable representation of high student loan debt, the monthly repayment format has several additional advantages. First, the perception of monetary magnitude depends on whether a value is presented in aggregate or in smaller denominations (Goldstein, Hershfield, and Benartzi 2016; Gourville 1998). For instance, people perceive retirement savings to be larger (more adequate) within the range of $25,000 to $200,000 annual income than the equivalent monthly income (Goldstein et al. 2016). Similarly, student loan debt presented in a lump sum may appear larger in magnitude compared to equivalent monthly payment terms, further contributing to the perceived difficulty of high debt presented in a lump sum. A $60,000 student loan debt may appear much more difficult to pay off versus making a $600 monthly payment on the same loan, especially to inexperienced college students.

Second, monthly payments provide an easily retrieveable reference point that tends to facilate perception of attainability. Anecdotally, major sources of income and expenses, such as paychecks, rent, credit card payments, and utilities, often occur in monthly terms. It is likely that many people are used to thinking about their personal cash flow situation in monthly terms. For instance, Ülkümen, Thomas and Morwitz (2008) find that consumers have greater ease estimating monthly budgets than estimating annual budgets. Further, Pham and Taylor (1999) show that mental simulation enhances goal-directed behaviors. In this context, a monthly payment representation may not only increase the ease with which students relate to a large debt, but may also increase motivation by representing a distant concept at a more concrete level.

In sum, we predict that representing student loan debt in more attainable meta-cognitive experiences or repayment formats will motivate borrowers with higher levels of debt to exert greater control on spending and thereby reduce spending propensity (see Figure 3 for conceptual model). More formally:

> **H3**: The effect of high student loan debt on increasing spending will be attenuated when perceived payoff difficulty is manipulated to be low (vs. high).

<Insert Figure 3 about here>

In what follows, we manipulate perceived difficulty through meta-cognitive experiences in Study 3 and through repayment format (monthly vs. lump sum) in Study 4. We demonstrate that reducing perceived payoff difficulty of student loan debt attenuates the spending propensity of borrowers with higher levels of student loan debt.

Study 3: Manipulating Meta-Cognitive Difficulty

Participants, Method, and Design

To establish that reporting eight ways (vs. two ways) to pay off student loan debt affects perceived payoff difficulty, we conducted a pilot study with AMT participants ($N = 198$) who reported having student loan debt at the time of the study. Pilot study participants were randomly assigned into one of the two meta-cognitive conditions: the low-difficulty condition ("please list two ways that would help you pay off your student debt") or the high-difficulty condition ("please list eight ways that would help you pay off your student debt"). After completing the meta-cognitive exercise, participants rated perceived difficulty of paying off their student loan

debt (1 = very easy, 7 = very difficult). Participants who had to report eight ways perceived

paying off their debt to be more difficult than those who had to report two ways (M $_{8\text{-ways}}$ = 5.08,

SD = 1.53 vs. M $_{2\text{-ways}}$ = 4.61, SD = 1.61, t(196) = 2.11, *p* =.04).

For the main study, AMT participants between the ages of 18 and 30 (*N* = 602, 42%

females; average age = 24.36 years, SD = 2.90) completed the study for a small payment. After

participants reported their current student loan debt (on a sliding scale from 0–200, in thousands

of dollars), those who reported having student loan debt were randomly assigned into the low-

difficulty condition or the high-difficulty condition. Participants who reported student loan debt

to be zero did not go through the meta-cognitive exercise.

Participants then read about a hypothetical automobile purchase scenario and saw two car

models (see Appendix C). We counterbalanced the presentation of the premium (higher-priced)

option as either option A or B. Participants reported their preference between the two models (1

= definitely choose A, 7 = definitely chose B). We coded the responses so that a higher score

indicated a greater preference for the higher-priced option. We then measured demographic

factors such as participants' credit card balances (slider from 0–50, in thousands of dollars) and

their household's annual income (slider from 0–250, in thousands of dollars).

Results

One hundred and twenty participants reported having no student loan debt, and their

average preference for the expensive option was 3.04 (SD = 2.12). For participants with student

loans (*N* = 482), mean student loan debt was $34,770 (SD = $36,949), and median student loan

debt was $23,000. To test the interaction effect of the difficulty manipulation and actual levels of

student debt, we estimated a regression of preference for the expensive option on student loan

debt (log transformed and centered), difficulty condition (-1 = low difficulty, 1 = high difficulty), and their interaction term in PROCESS (model 1 in Hayes 2013) using 10,000 bootstrap samples.

Supporting H3, the interaction term between debt and manipulated difficulty was significant, $t(478) = 2.28$, $p = .02$. Neither the main effect of the difficulty condition nor debt was significant (ps > .50). A spotlight analysis reveals that the conditional effect of student loan debt on preference for the expensive option is significant in the high-difficulty condition, $b = .28$, $t(478) = 2.01$, $p = .04$, but the conditional effect of student loan debt on preference for the expensive option is not significant in the low-difficulty condition, $b = -.17$, $t(478) = -1.22$, $p = .22$. This interaction remains robust after controlling for annual income and credit card debt.

<Insert Figure 4 about here>

The interpretation of the interaction effect is depicted in Figure 4. While the model uses log debt, for ease of explication we report actual debt levels. Higher debt was associated with greater preference for the expensive option for participants assigned to the high-difficulty condition (who reported eight ways to pay off their student loan debt). By contrast, higher debt had no effect on the preference for the expensive option for participants assigned to the low-difficulty condition (who reported two ways to pay off their student loan debt).

We also estimated the range of significant interaction effect using the Johnson-Neyman technique in PROCESS (Hayes, 2013). Because 89% of the participants reported having college-level education or below, we focus on this sub-sample to interpret the significance region of student loan debt levels that are most susceptible to the difficulty manipulation (this analysis

allows us to exclude a small sample of participants who may have attended medical school or law school and have very large amounts of student loan debt). For participants with college-level education, the interaction term between student loan debt and manipulated difficulty remained significant, $t(423) = 2.52$, $p = .01$. The Johnson-Neyman technique identified student loan debt levels below $5,820 or above $63,720 as the significance region where increasing perceived payoff difficulty leads to opposite effects on spending. In other words, with student loan debt of $5,800 or less, participants in the high (vs. low) difficulty condition were less likely to prefer the expensive option. By contrast, with student loan debt of $64,000 or greater, participants in the high (vs. low) difficulty condition were *more* likely to prefer the expensive option. This latter pattern highlights the demotivating effect of increased payoff difficulty among people with high student loan debt.

Discussion

Results from Study 3 supported the prediction that the effect of high student loan debt on spending is attenuated when perceived payoff difficulty is manipulated to be low (vs. high). Among participants in the high-difficulty condition (i.e., those who reported eight ways to pay off their debt), higher debt increased preference for the more expensive option while this effect is absent among participants in the low-difficulty condition. Because of random assignment between the two difficulty conditions, such difference in the effect of student loan debt on spending cannot be attributed to payoff difficulty perceptions being influenced by greater expected future income or any other characteristics that are generally assumed for borrowers with high student loan debt. The effect also rules out the alternative explanation that borrowers with higher student loan debt have a stronger preference for more expensive items, because those

borrowers in the low difficulty condition did not show such preference. Additionally, the interaction effect remains robust after controlling for income and credit card debt.

Notably, a U-shape effect on spending emerges when we compare the preferences for the following three groups: participants with $5,000 student loan debt in the low-difficulty condition, participants with $25,000 debt (in either difficulty condition), and participants with $65,000 student loan debt in the high-difficulty condition. Based on the estimation from the interaction effect, the inflection point of the U-shape pattern is around $25,000 student loan debt.

Our findings further demonstrate that, from a theoretical perspective, a meta-cognitive experience of ease is an effective intervention for borrowers with high student loan debt to boost motivation for controlling spending: specifically, borrowers with high student loan debt are less likely to spend when they are assigned to low (vs. high) difficulty condition. Next, we demonstrate a more practical manipulation to influence goal attainability and mitigate the negative effect of high student loan debt.

Study 4: Conjoint Study with Manipulated Payoff Format
(Lump Sum vs. Monthly Payment)

We design Study 4 to test the intervention of presenting student loan debt in different repayment formats and the subsequent effect on spending. Participants were randomly assigned to one of the two conditions of student loan debt repayment format (lump sum vs. monthly payment). We use a choice-based conjoint analysis to quantify spending propensity among borrowers with actual student loan debt.

Manipulation Check

We conducted a manipulation check to test the effect of debt repayment format on perceived payoff difficulty. Two hundred and seventy-eight AMT participants (28% females, average age = 27.70 years, SD = 5.56) were randomly assigned to a 2 (high debt [$61,000] vs. moderate debt [$21,000]) x 2 (repayment format: lump sum vs. monthly payment) between-subjects design. Note that the $61,000 high-debt condition is consistent with the significance range detected in Study 3. Participants in each condition read about a hypothetical student loan debt summary letter and reported their perception of how difficult it would be to pay off the student loan debt completely in 10 years (lump-sum condition) or how difficult it would be to make the monthly payment (monthly payment condition) in the context of the scenario (1 = very easy, 7 = very difficult; see Appendix C).

We performed an ANOVA on perceived payoff difficulty using debt level, repayment format, and their interaction term. There was a significant main effect of debt level, $F(1, 274) = 45.19$, $p < .01$, and a significant main effect of repayment format, $F(1, 274) = 13.69$, $p < .01$. The interaction term was not significant ($p > .40$). Planned contrasts showed that monthly repayment format significantly reduced perceived payoff difficulty both at moderate level of student loan debt ($M_{lump\ sum} = 3.56$ vs. $M_{monthly} = 2.69$), $F(1, 274) = 10.13$, $p < .01$ and at high level of student loan debt ($M_{lump\ sum} = 4.70$ vs. $M_{monthly} = 4.14$), $F(1, 274) = 4.19$, $p = .04$.

Participants, Method, and Design

Two thousand and fifty-two AMT participants (44% female, 95% were between the ages of 18–35) were recruited in return for a small payment. Currently enrolled students based in the U.S. at the time of the survey were eligible to participate. Among eligible participants, 137 participants (6.7%) were missing student loan debt data and were excluded from the analysis. The resulting sample size was 1,915. We used a choice-based conjoint design to quantify spending propensity in the overall choice process. The choice scenario involved multiple automobile models. To contextualize the choice process, we included several attributes in addition to price in the experimental design. All attributes and their associated levels are listed in Appendix D.

Participants were randomly assigned to one of the two experimental conditions (repayment format: lump sum or monthly payment). Participants in the lump-sum condition reported their current student loan debt before starting the conjoint exercise. Participants in the monthly payment condition did the same and then saw an additional screen that converted their student loan debt into equivalent monthly payments (see Appendix E). Student loan debt was reported in the context of other demographic items (e.g., personal income) to reduce participant demand characteristics. We used Sawtooth Software (version 8.2.2) to generate the experimental design for 15 random-choice sets and three fixed-choice sets (to assess the reliability of choice).

Model Specification and Estimation Procedure

We measure spending propensities in the overall choice process using a random utility model at the individual level. This is a standard Bayesian modeling approach with a hierarchical prior (Lenk et al. 1996; Rossi et al. 2005), using Sawtooth Software's CBC/HB 5.0 procedure in

SSI Web 8.2.4 (see Rossi, Allenby, and McCulloch 2005 for estimation details). Let respondent j's utility for automobile i in choice task k be a linear combination of the attributes:

$$U_{k,j,i} = \alpha_j + \beta'_j \text{ Attributes}_{k,i} + \varepsilon_{k,j,i} \text{ where } \varepsilon_{k,j,i} \sim N(0, \sigma^2_j) \tag{1}$$

We use 10,000 burn-in iterations and 10,000 iterations to characterize the posterior. The prior is diffuse; prior degrees of freedom are set to 5 and prior variance to 2. We assume participants prefer lower (vs. higher) prices and use a single linear coefficient for the price attribute (β_{price}), which is referred to as spending propensity in the following analyses.

Modeling the Effect of Student Loan Debt on Spending

We use the mean of the posterior distribution of the price attribute (β_{price}) as our individual-level estimate of spending propensity. To initially examine the effect of increasing student loan debt and spending, we estimate a cubic regression spline with knots at the quintile boundaries of student loan debt (Wood 2006) for spending propensity. Cubic regression spline is one form of the generalized additive models that do not require a priori estimate of the response curve's shape (Wood 2006). Instead of determining whether a second-order or a third-order polynomial model fits the data better, cubic regression spline employs a class of equations called "smoothers" that generalize data into smooth curves to subsections of the data divided by some number of "knots." Similar procedures have been used to test for nonlinear relationships between peer performance and student motivation (Roger and Feller 2016).

Modeling the Effect of Debt Repayment Format

We use Bayesian estimates generated by Markov Chain Monte Carlo algorithms (Rossi et al. 2005) to compare spending propensity in the two treatment conditions for any given debt segment, by counting the number of posterior draws. If the proportion of draws greater than or less than exceeded 95% (one-tailed comparison), we reported Bayesian significance at that level.

Results and Discussion

Descriptive Statistics

Mean student loan debt, including those who did not have student loan debt, was $16,555. Mean student loan debt conditional on having a student loan was $26,093 (ranging from $100 to $250,000). These student loan debt characteristics are consistent with the conditional mean of $29,800 in the 2013 Survey of Consumer Finances (Bricker et al. 2014).

The Effect of Student Loan Debt on Spending

To examine the relationship between student loan debt and spending propensity, we estimated spending propensity as shown in Equation (1). Figure 5 depicts estimated individual spending propensity as a function of student loan debt via a cubic regression spline with knots at the quartile boundaries (Wood 2006) for the two experimental conditions. The estimation of the non-monotonic effect is significant in the lump-sum condition, F (2.8, 953) = 2.67, $p = .04$. In other words, our analysis confirmed that there is a non-monotonic relationship between student loan debt and spending propensity in the lump-sum condition. Figure 5 shows that $40,000 student loan debt represents a notable threshold in the lump-sum condition. The spending propensity of students with less than $40,000 student loan debt is significantly lower than students with no or little debt, as depicted by the 95% confidence interval. The spending

propensity of students with $40,000 or more student loan debt is not significantly different from

students with no or little debt. By contrast, the same cubic regression spline for the monthly

payment condition revealed no significant increase in spending propensity for students with over

$40,000 debt, as predicted by H3 (see Web Appendix B for additional robustness checks).

<Insert Figure 5 about here>

Effect of Debt Repayment Format

To analyze the effect of repayment format on individual-level spending propensity at

moderate or high student loan debt, we dummy-code the effect of repayment format (0 = lump

sum, 1 = monthly payment) and add the term to the heterogeneity equation at the individual

level. Among students with debt over $40,000, spending propensity was significantly lower in

the monthly payment condition than in the lump-sum condition, $p = .03$. Viewing debt in a

monthly payment (vs. lump-sum) format significantly reduced spending propensity among

students with over $40,000 student loan debt (see Figure 6), supporting H3. Notably, the effect

of monthly repayment format did not significantly moderate spending propensity for any other

debt segment.

<Insert Figure 6 about here>

Discussion

Study 4 provides corroborating evidence that there is a non-monotonic effect of student

loan debt on spending when debt is presented in a lump-sum format. Additionally, Study 4

demonstrated that presenting debt in monthly repayment format attenuates the spending

propensity of borrowers with high student loan debt ($40,000 or more). This pattern is consistent

with the findings from Study 3 that decreasing perceived difficulty through meta-cognitive

experience is associated with lower spending propensity among borrowers with higher levels of student loan debt. The specific threshold at which the de-motivating effect of student loan debt tends to occur varies from Study 3 to Study 4. We address this issue in greater detail in the general discussion.

The effect of student loan payment format also allows us to rule out an alternative explanation: borrowers with higher levels of student loan debt have higher income expectation and therefore are willing to spend more. When borrowers with over $40,000 student loan debt consider their student loan debt in monthly payment form rather than lump sum form, they show significantly lower spending propensity. Furthermore, the effect remains robust after controlling for individual differences in future income expectation and preference for luxury purchases.

General Discussion

Our research provides a timely examination on the motivational effect of student loan debt on spending. First, we demonstrate a non-monotonic effect of student loan debt on spending . Study 2 also finds that the overspending propensity at high levels of student loan debt is strongest among people who are up to 35 years old. Importantly, we highlight how decreasing payoff difficulty can attenuate the de-motivating effect of high student loan debt on spending. Studies 3 and 4 show that reducing perceived payoff difficulty attenuates the effect of high student loan debt on spending. When perceived payoff difficulty was manipulated through a meta-cognitive exercise in Study 3, greater perceived payoff difficulty at high levels of student loan debt increased spending. When perceived payoff difficulty is manipulated through a debt repayment format in Study 4, borrowers with high (vs. moderate) debt are more likely to spend

when debt is presented in lump-sum format. However, borrowers with high (vs. moderate) debt are less likely to spend when debt is presented in the monthly repayment format.

Overall, our findings highlight the role of perceived difficulty in student loan debt management and provide initial evidence suggesting that the psychological impact of high student loan debt may increase spending. Our research also contributes to the burgeoning field of information architecture (Goldstein et al. 2016; Johnson et al. 2012; Navarro-Martinez et al. 2011) in demonstrating that presenting financial information in the right way is an effective intervention that provides sufficient motivation for individuals to control spending.

The non-monotonic relationship we document in this paper is consistent with the pattern of student loan debt repayment difficulties found by the Federal Reserve of New York (Brown et al. 2015; Chakrabarti et al. 2017). For instance, Brown et al. (2015) report that smaller proportion (48%) of borrowers with moderate student loan debt balances ($10,000–$50,000) demonstrate payment difficulties compared to those with high balances (57%, for $50,000 original loan balance or higher) or those with low balances (58%, for those with original balance of $10,000 or less). Whereas a standard student loan debt repayment plan is for ten years, 22% of the 2009 cohort with over $50,000 student loan debt have rising student loan balances five years after graduation. Although a small proportion of those borrowers may rely on loan forgiveness programs (where the remaining balance of debt will be forgiven after twenty years of service in the public sector), the increasing load of student loan debt affects a borrower's ability to apply for other types of credit and presents a burden for the federal taxpayers in the case of widespread failure to repay (Brown et al. 2015).

Debt Levels and Payoff Considerations

While it is tempting to pin down the exact level of student loan debt that borrowers tend to perceive as highly difficult to pay off, we recognize that the threshold for high debt is quite subjective. In Study 1, the hypothetical high student loan debt ($80,000) was set higher to induce the experimental effect, whereas Studies 3 and 4 measured actual student loan debt. Study 3 manipulated perceived difficulty through a meta-cognitive exercise and found that $64,000 marked the threshold above which the meta-cognitive exercise significantly affects spending tendencies. Study 4 used debt repayment format as a manipulation on perceived payoff difficulty and found that $40,000 student loan debt was the threshold above which borrowers show greater spending propensity when student loan debt was presented as a lump sum. These ranges of high student loan debt were consistent with findings from Study 2 that borrowers with student loan debt of $40,000 and higher show overspending propensity similar to that of people with low student loan debt. These ranges are also in line with "large-borrower" classifications of $50,000 or higher in recent studies (Looney and Yannelis 2018) that document payoff difficulties for this growing segment (Mitchell 2018).

We note that the spending propensity measured in Study 4 is a revealed preference and therefore may be more sensitive than an explicitly stated spending preference measured in Study 3. Interestingly, it allows us to uncover a lower threshold compared to when participants explicitly indicate their preference. Because of the subjective nature of perceived payoff difficulty, it is more critical to recognize factors that contribute to greater (vs. less) perceived payoff difficulty at any given debt level. As we have demonstrated in Studies 3 and 4, both meta-cognitive experiences and debt repayment format influence the perception of payoff difficulty, which in turn affects spending propensity.

We also find that the time frame of the perceived payoff difficulty question matters. Because the payment term of student loan debt can vary between 10 and 30 years, borrowers may prefer to spread out student loan into longer payment terms to pay a manageable monthly amount or to or delay payment using the forbearance program, without realizing that they may accrue more interest in the process. Without an explicit timeframe on the payment term when considering payoff difficulty, different participants may be thinking about different time frames when considering the attainability of the goal of paying off student loan debt. Our pilot tests indicate that framing perceived payoff difficulty to be within the next ten years provides a uniform and realistic projection onto the perceived attainability of the payoff goal.

Because sub-goals are much more motivating than super-ordinate goals (Bandura 1997), considering student loan debt in monthly repayment format also means considering the difficulty of managing debt on a month-to-month basis versus a much longer time frame. As a result, we find that monthly repayment format reduces the perception of difficulty for both high and moderate levels of student loan debt.

Theoretical Implications

Student loan debt is the second-largest form of consumer debt, yet there is a dearth of research on the psychological impact such debt on spending. Our research furthers the understanding of motivation as an important underlying mechanism in explaining financial decision making. There is a growing body of research documenting the impact of motivation in credit card debt management. For example, Amar et al. (2011) show that consumers are motivated to reduce the total number of credit card debt accounts, rather than the aggregate level

of debt itself, to alleviate the psychological impact of having multiple losses. Gal and McShane (2012) find that closing an individual debt account is a powerful motivator in total debt elimination as it boosts feelings of self-efficacy. As our findings and others suggest, a financial goal that is perceived to be unattainable leads to a significant reduction in motivation, which could, in turn, affect not only spending decisions but also other financial decisions such as debt repayment, savings, and retirement contributions. By contrast, when individuals can shift attention to a more attainable representation of the debt, it provides greater motivation for consumers to strive for and attain their financial goals.

Our research also adds a motivational dimension to financial constraints imposed by existing debt, thereby addressing a previously overlooked aspect of such constraints. Prior research shows that consumers who feel more financially constrained, mostly through a reduction in income, are more value and price conscious (Ailawadi, Neslin and Gedenk 2001), consequently placing a higher value on more durable material goods over experiential goods (Tully, Hershfield and Meyvis 2015). While this theory may explain why individuals with excessive debt show a greater preference for premium goods, with the assumption that premium goods are viewed as more durable, it does not explain why individuals with moderate debt would be less likely to prefer the premium options compared to individuals with lower levels of debt. The motivational account—focused on perceived payoff difficulty—is the most parsimonious explanation that predicts a reversal of the tendency to overspend as debt level increases.

The finding that the student loan debt repayment format (monthly payment vs. lump sum) attenuates the effect of high debt on spending highlights the psychological effect of a monthly payment disclosure. Navarro-Martinez et al. (2011) suggest that a credit card minimum payment disclosure affects the psychological representation of the immediate cost of debt and influences

debt repayment behavior. Participants in experiments paid less toward their credit card debt when minimum payment information was present versus absent. In addition, the effect of a credit card minimum payment disclosure outweighs the disclosure of other supplemental information such as time to pay off the loan or future interest costs (Navarro-Martinez et al. 2011). These results along with ours suggest the possibility that the specific form of the current payment, regardless of debt type, may be the single most salient factor in influencing consumers' financial behavior.

Relationship to Prior Research

Several alternative mechanisms may co-occur with the motivational effect we have documented in explaining the spending pattern among borrowers with higher levels of debt. For example, Sussman and Shafir (2012) suggest that for a person with negative net worth (e.g., with a higher amount of debt), subjective feelings of wealth are not affected as much by decreases in debt burden as they are by the acquisition of additional assets. For these individuals, taking on additional debt of $1,000 and then spending that $1,000 to acquire an asset increases subjective feelings of wealth. Research in compensatory consumption also suggests that individuals experiencing sadness or stress are more likely to use shopping and spending behaviors to compensate for the negative emotional states and to restore control (Durante and Laran, 2016; Rick, Pereira, and Burson 2014). While these are plausible processes underlying borrowers' preference for more expensive purchases, results from Study 4 suggest that individuals with debt just below the threshold level are much less likely to splurge despite having a debt burden, compared to individuals with debt just above the threshold.

It is possible that above a certain threshold of debt, because of the impending difficulty associated with paying off the debt, borrowers feel a disproportional surge in stress or anxiety, which could in turn lead to some compensatory mechanism to alleviate the negative emotional states. To this point, results from Studies 3 and 4 illustrate that higher debt does not necessarily lead to more spending if borrowers perceive the goal of paying off the debt to be attainable. We show that presenting student loan debt in monthly payment format is an effective intervention to alleviate the tendency to overspend, because it provides a more attainable representation of an otherwise highly unattainable financial goal.

Although we focus on the effect of student loan debt, our results might hold for other types of debt as well. Our findings are particularly relevant to financial products such as debt consolidation programs, which are marketed as debt relief by offering lower interest rates over a longer debt repayment period. In reality, debt consolidation programs often involve a higher total interest payment in the long run (Bolton, Bloom and Cohen 2011). Our findings point out an additional deleterious effect that may come with total debt consolidation. In our view, debt consolidation presents a potential situation in which consumers can be induced into thinking about a large lump-sum amount of debt and as such may overspend on subsequent purchases.

Yet, there are reasons to believe that student loan debt might be particularly susceptible to the effect of perceived payoff difficulty. First, student loan debt is often accumulated when the debtor's experience with household expense budgeting is limited. Most students have never faced regular household living expenses that must be funded entirely from their own incomes. As such, they may lack perspective on how their student loan debt will translate into future reductions in consumption. Indeed, results from Study 2 confirmed that the non-monotonic effect of student loan debt on overspending is strongest among people under the age of 35.

Additionally, because of the temporal gap between consumption and repayment of student loan debt, perceived attainability is most salient for students as they are about to embark on debt repayment following graduation. Finally, strategic overspending (that may result in bankruptcy) is not applicable to student loan debt because such debt cannot be discharged by declaring bankruptcy.

Given that student borrowers are new to the repayment process of student loan debt, there is reason to speculate that perceived difficulty may be a salient psychological process. Thus, the intricacies of the psychological processes in debt management remain an important area for future research. For example, given a limited monthly budget, individuals often have to prioritize among paying off student loan debt, auto loans, or credit card debt. Our findings suggest scenarios like these entail highly negative consequences for the management of other forms of debt, especially if individuals find themselves having to stretch existing financial resources to make ends meet.

Policy Implications

We recommend policy interventions to ameliorate perceived payoff difficulty, especially for borrowers with high student loan debt. Results from our meta-cognitive exercise suggest a possible productive intervention that a college financial-aid advisor could employ with student borrowers. Instead of relying only on exit counseling at the time of graduation to bring student borrowers up-to-date about their aggregate loan status, advisors could work with student borrowers early on and regularly during their college years, focusing on a few attainable ways for students to start thinking about paying off student loan debt.

Our research also suggests that the monthly repayment format is an effective tool to ameliorate perceived payoff difficulty associated with high student loan debt. This leads to a policy recommendation that student debt loan disclosure should change to emphasize the required monthly payments of a given loan. Our results show that knowing the amount of future monthly payments (even if it is a rudimentary projection) has both economic and psychological benefits. It allows student borrowers to escape the mental trap of overwhelmingly high student loan debt and helps shift borrowers' focus to more attainable means of debt repayment.

Knowledge of future monthly payments has the potential added benefit, not examined directly by our research, of aiding a student's ability to better plan their loan repayment obligations in the context of that student's income and other expenses. Although speculative, we believe that this greater ability to plan may facilitate debt repayment progress, and the social and personal cost implications that flow from such defaults. It may also allow some students to pause before committing to a particular college or university, particularly one that will require a high debt load. Preliminary success of such an intervention has been documented for students at Indiana University (Lorin 2014). When students received a form letter with future monthly payment projection in the 2012–2013 academic year, they collectively reduced future borrowing by 11% compared to the national average of 2% decline during the same period.

In conclusion, we recommend that the U.S. Department of Education update student loan disclosure law to require the inclusion of estimated monthly loan payments both at the time of the initial loan application and any subsequent loan applications. Our proposal does not restrict a student's choice to borrow or not borrow. Rather, it simply ensures that borrowers have a better understanding of what they are doing in the context of their future financial lives so they can adjust their consumption decisions accordingly.

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Tables
Table 1. Results for Polynomial Regression Models Predicting Overspending Propensity among Young Families (head of household age ≤ 35), Study 2

Predictor		Model 1	Model 2	Model 2 restricted
INTERCEPT		−.4519 (.0192)	−.4852 (.0217)	−.4720 (.0223)
LNSDEBT	Student debt	.2029* (.0971)	.1903* (.0946)	.2189* (.0978)
LNSDEBT^2	Student debt squared	−.0427* (.0208)	−.0402* (.0201)	−.0462* (.0207)
LNSDEBT^3	Student debt cubed	.0023* (.0011)	.0022* (.0011)	.0025* (.0011)
LNINC	Income	−.1613* (.0225)	−.1163* (.0231)	−.1107* (.0245)
LNCCDEBT	Credit card debt		.0239* (.0047)	.0247* (.0048)
LNAUTODEBT	Automobile debt		−.0196* (.0039)	−.0199* (.0041)
LNMDEBT	Mortgage debt		−.0114* (.0041)	−.0113* (.0042)
FEMALE	vs. male		.0719* (.0334)	.0722* (.0335)
EDU	Years of education		−.0315* (.0073)	−.0310* (.0074)

Note. Overspending propensity is estimated based on household self-report on their spending during the prior year (−1 = spending less than income, 0 = spending at income, 1 = spending exceeding income). Coefficients with an * indicate confidence interval not including zero. Standard errors are in parentheses. Income and control variables are mean centered. Model 2 restricted model replicated the estimates of Model 2 with a sample whose income and wealth were both below the 90th percentile of the U.S. population.

Table 2. The Interaction Effect of Student Loan Debt and Age on Overspending Propensity, Study 2

Predictor	Coefficients	SE	Lower CI	Upper CI
INTERCEPT	−.3984	.0090	−.4160	−.3808
LNSDEBT	.0379	.0674	−.09430	.17011
LNSDEBT^2	−.0039	.0144	−.03202	.02429
LNSDEBT^3	.0001	.0008	−.00135	.00165
LNINC (centered)	−.1978*	.0085	−.21438	−.18119
Age (centered)	.0003	.0005	−.00059	.00125
LNSDEBT x Age	−.0078	.0040	−.01561	.00009
LNSDEBT^2 x Age	.0019*	.0009	.00019	.00354
LNSDEBT^3 x Age	−.0001*	.0000	−.00019	−.00001

Note. Coefficients with an * indicate confidence interval (CI) not including zero. Income and control variables are mean centered. The mean age of the head of the household for the full sample (N = 6,015) in SCF is 51.16.

Figures
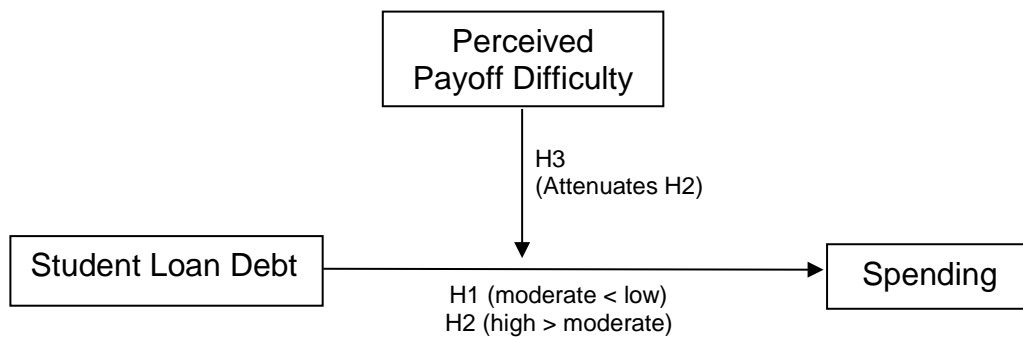**Figure 1. Choice Results by Debt Conditions, Study 1**
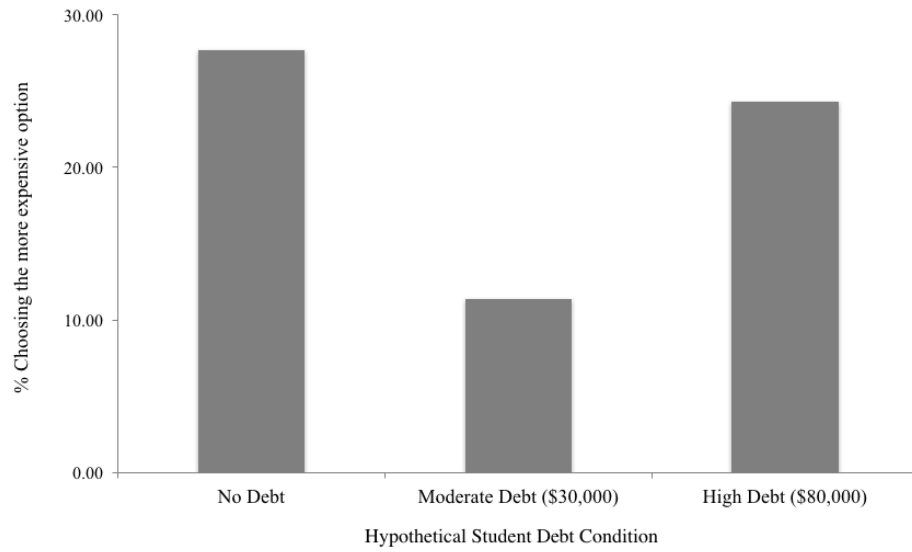
Figure 2. Estimated Effect of Student Debt by Age on Overspending Propensity, Study 2
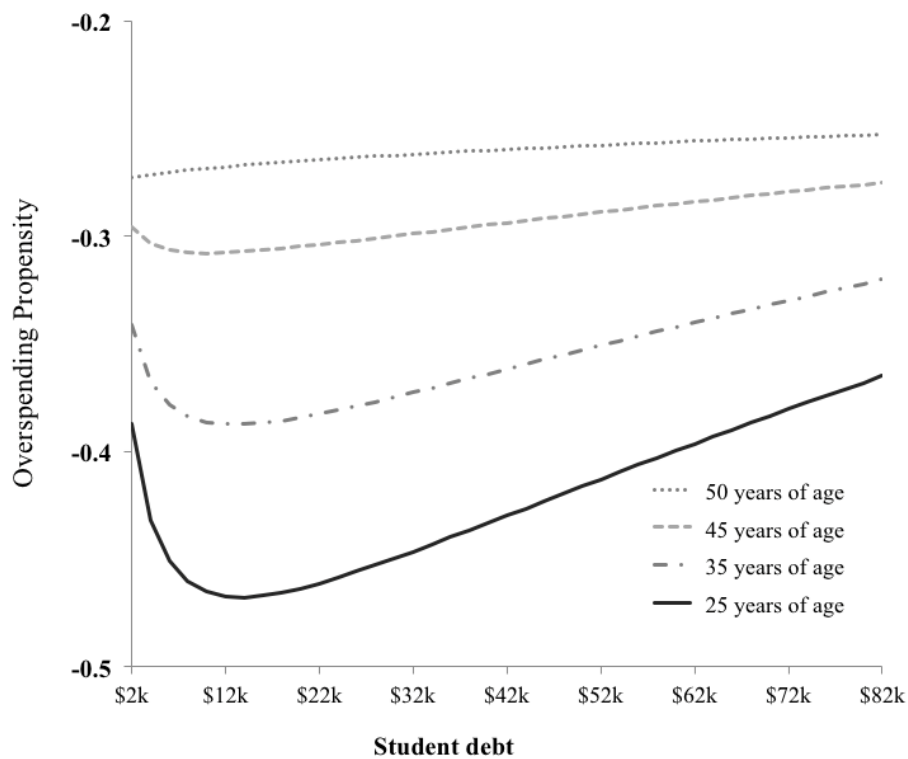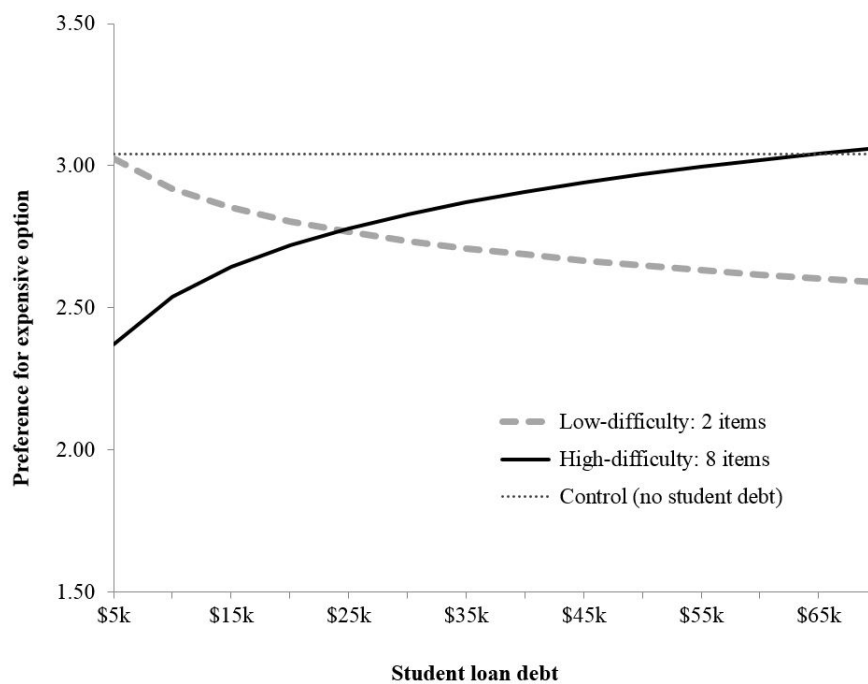

Note. Overspending propensity score is estimated based on household self-report on their spending during the prior year (−1 = spending less than income, 0 = spending at income, 1 = spending exceeding income.)
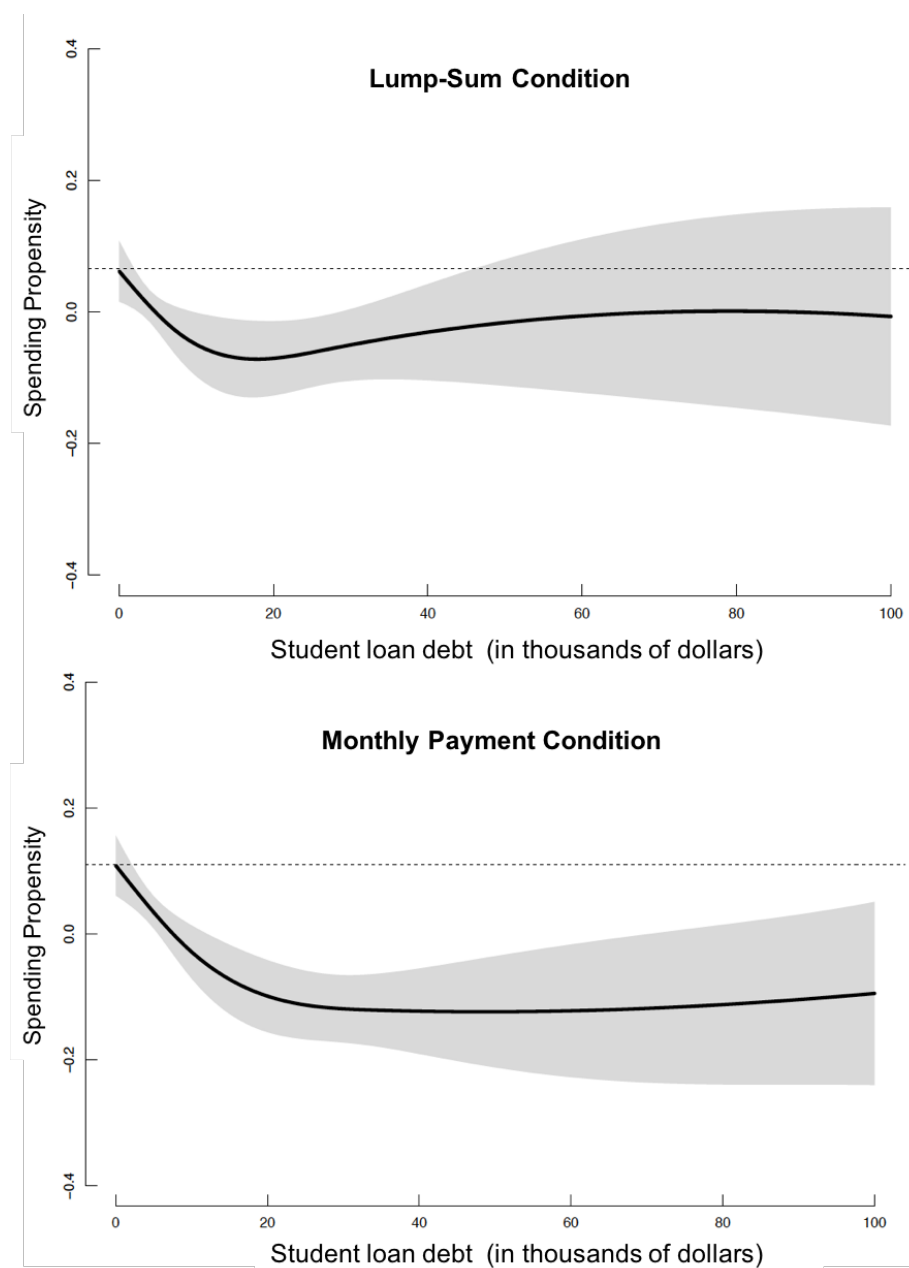
Figure 3. Conceptual Model

Figure 4. Interaction Effect of Manipulated Payoff Difficulty and Student Loan Debt Level on Preference, Study 3

Figure 5. Spending Propensity as a Function of Student Loan Debt by Experimental Conditions, Study 4

Note. Spending propensity reflects price sensitivity and is graphed as a function of student loan debt. A higher price coefficient indicates greater likelihood of spending. The dark lines are the cubic regression spline estimates; the gray areas around the lines are the 95% confidence intervals. Estimates are less certain at the higher end of student loan debt levels because of the reduced sample sizes.

Figure 6. The Effect of Repayment Format on Spending Propensity across Student Debt Segments, Study 4
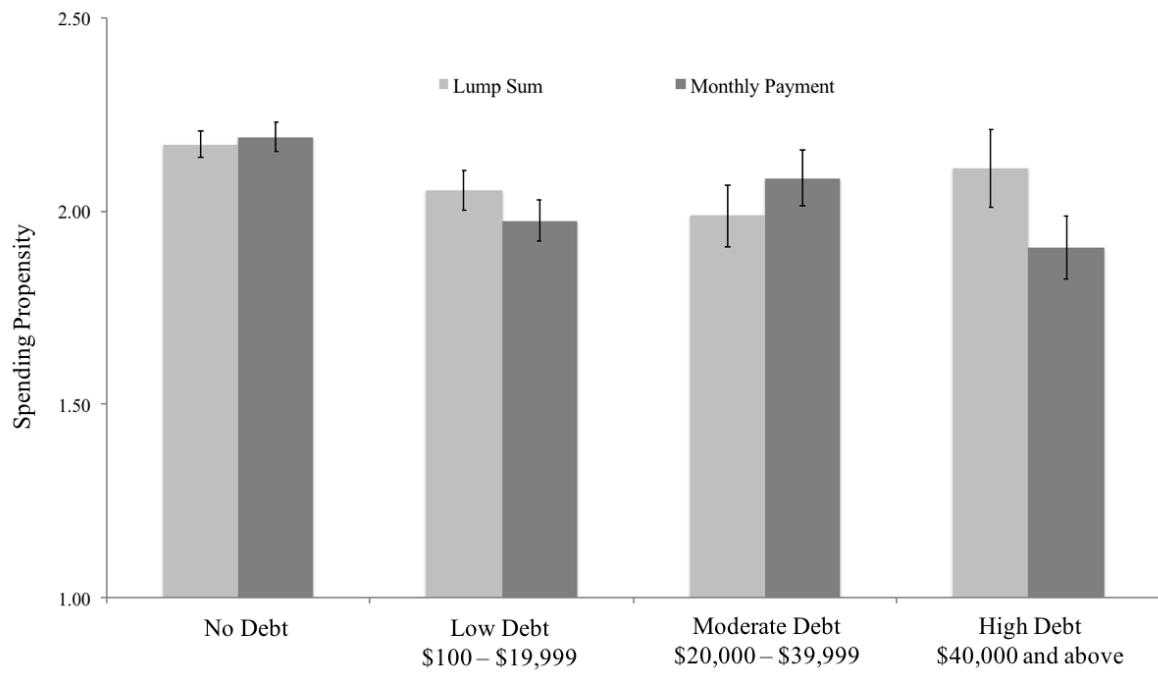
Appendices
Appendix A. Choice Scenario in Study 1

Imagine you are about to graduate, and just got a job offer for an entry-level position with an annual salary of $45,000. You are expected to remain in that position for the next few years. Assume that you don't own a car, and that your new job requires you to own a car. After consulting with your family and friends, you decide you will go to the dealership to buy a new car.

[$30,000 and $80,000 debt conditions] Prior to your visit to the dealership, you find a letter in your mailbox from your student loan provider regarding your current student loan debt. Please go on to the next screen to view your student loan summary letter.

Below is a summary of your student loan debt.

Your Student Loan Summary

Loan Amount:	$30,000
Interest Rate:	6.8%
Time until Graduation:	6 Months
Repayment Term:	20 Years
Repayment Plan:	Standard Repayment Plan

IMPORTANT FACTS:
This summary provides estimates intended for use only as a planning guide. Results are based on a standard repayment plan, where you pay a fixed amount every month for a set number of months, based on your loan term.

[Next screen]
While at the dealership, you have narrowed the choices down to the following two options (both options have available financing). Which option would you choose?

2015 FUSION SE
MPG City/Hwy **22/34**
EPA estimated

All S Standard Features Plus
• SiriusXM Satellite Radio
• SecuriCode™ Keyless Entry Keypad
• 10-way Power Driver's Seat

BASE MSRP **$21,185**

Fusion SE
○

2015 FUSION TITANIUM
MPG City/Hwy **22/34**
EPA estimated

All SE Standard Features Plus
• Leather-trimmed sport-styled front heated seats
• Sony® Premium Audio with 12 Speakers & HD Radio™
• Reverse Sensing System

BASE MSRP **$25,185**

Fusion Titanium
○

Appendix B. Choice Scenario, Study 3

Imagine that you have recently completed your bachelor's degree. You are going to start a job at an entry-level position in a big city. Assume that you don't currently own a car and that you are planning to buy one. After consulting with your family and friends, you go to the dealership to look at a few options.

Appendix C. Debt Repayment Format Manipulation Check Scenario and Scale, Study 4

Lump sum condition: $21,000 v. $61,000

Imagine that you are about to complete your bachelor's degree. After graduation, you are going to start at a job earning **$49,000 a year.**

Just before graduation, you receive the following letter from the financial aid office regarding your student loan debt.

<u>Your Student Loan Summary</u>
Loan Amount: $21,000/$61,000
Interest Rate: 3.8%
Repayment Term: 10 Years

In the context of the scenario, how easy or difficult will be it be for you to completely pay off your student loan debt of $21,000/$61,000 in 10 years?

Very easy ○ ○ ○ ○ ○ ○ ○ Very difficult

Monthly payment condition: $212 v. $612/month

Imagine that you are about to complete your bachelor's degree. After graduation, you are going to start at a job earning **$49,000 a year (approx. $4,083/month).**

Just before graduation, you receive the following letter from the financial aid office regarding your student loan debt.

<u>Your Student Loan Summary</u>
Loan Amount: $21,000/$61,000
Interest Rate: 3.8%
Repayment Term: 10 Years
Payment: $212/$612/month

In the context of the scenario, how easy or difficult will be it be for you to make the student loan payment of $212/$612/month?

Very easy ○ ○ ○ ○ ○ ○ ○ Very difficult

Appendix D. Conjoint Example (A) and Attributes (B), Study 4

If these were your only options, which would you choose?

Toyota RAV4	Ford Focus Sedan	BMW328i Sedan	NONE: I wouldn't choose any of these.
No Navigation System	No Navigation System	GPS Navigation System	
Metallic Red	Black	Pearl White	
Cloth Interior	Leather Interior	Leather Interior	
$33,000	$30,000	$42,000	

Attribute	Price	Manufacturer/Model	Paint Color	Interior Trim	Navigation System
Level 1	$15,000	BMW sedan	Metallic red	Cloth	GPS
Level 2	$18,000	BMW coupe	Pearl white	Leather	None
Level 3	$21,000	Ford Focus sedan	Metallic dark blue		
Level 4	$24,000	Ford Focus hatchback	Black		
Level 5	$27,000	Toyota RAV4			
Level 6	$30,000	Toyota RAV4 SE			
Level 7	$33,000	Honda Civic			
Level 8	$36,000	Honda Civic hybrid			
Level 9	$39,000				
Level 10	$42,000				

Appendix E. Example of Monthly Repayment Screens Based on Self-Reported Student Loan Debt, Study 4

Student loan debt	Monthly payment
$100,000	$1,150.80
$50,000	$575.40
$40,000	$460.32

Note. We used a fixed payment calculation based on a 10-year default repayment period at the prevalent 6.8% fixed annual interest rate at the time of the survey.

Web Appendices

Web Appendix A. Supplemental Study 1

We randomly assigned participants to one of three debt conditions (low debt [$2,000], moderate debt [$31,000] and high debt [$81,000]) using a similar scenario setup as in Study 1. The main design modification is that we replace the control condition with a $2,000 hypothetical low debt condition.

Participants, Method, and Design

We recruited 245 participants from Amazon Mechanical Turk (35% females, mean age = 26.63 years, SD = 5.32) to complete the study. Currently enrolled students and recently graduated young professionals were eligible to participate. Participants read a scenario where they were about to graduate from college. In the scenario, participants were told that they just got a job offer with an annual salary, and visited the dealership to consider a few models for a new car. Participants were randomly assigned to one of the three conditions: high debt ($81,000), moderate debt ($31,000) and low debt ($2,000).

The dependent measure was participants' preference between the two Subaru Impreza models priced at $19,090 and $21,890 (on a 7-point scale; 1 = definitely choose A, 7 = definitely choose B). We coded this variable such that a higher score reflected a preference for the more expensive option. We also counterbalanced the presentation order of the two options, having the premium option randomly appear as either option A or as option B.

On subsequent pages, participants recalled the exact amount of the student loan debt in the scenario. They also reported their actual student loan debt (on a sliding scale from 0–120, in thousands of dollars), their credit card balances (slider from 0–60, in thousands of dollars), and

their household's annual income (slider from 0–200, in thousands of dollars). As a demographics screen, we asked participants to confirm that they were either (a) in college, or (b) had graduated in the past five years. The survey concluded with demographic measures.

Of the 245 participants, 14 participants (5.7%) failed the attention check measure: they either recalled a debt amount more than 20% different from the actual amount, or failed to recall an amount. Further, of the 245 participants, 12 participants (4.9%) failed the demographic screener: they were currently not in college, nor had they graduated in the past five years. We excluded the 24 participants who failed either of these checks (9.8% of the participants; two participants failed both the attention check measure and the demographic screener). All analyses are for the remaining 221 participants (37% females; average age = 26.71 years, SD = 5.35). Repeating the analyses with the entire sample reveals similar results.

Results

We conducted an ANOVA with participants' preference for the expensive option as the dependent measure and the manipulated debt level (low, moderate or high) as the predictor. The model revealed a significant effect of debt level, $F(2, 218) = 3.27$, $p = .04$.

Planned contrasts revealed that participants with moderate debt were less likely to prefer the expensive option than those with low debt ($M_{moderate\ debt} = 3.15$ vs. $M_{low\ debt} = 4.05$), $F(1, 218) = 6.11$, $p = .01$, supporting H1a. By contrast, participants with high debt were marginally more likely to prefer the expensive option than those with moderate debt ($M_{high\ debt} = 3.82$ vs. $M_{moderate\ debt} = 3.15$), $F(1, 218) = 3.31$, $p = .07$, supporting H2a. The low debt and high debt conditions did not differ significantly from each other, $p > .50$. A focused contrast revealed that participants in

the moderate debt condition were significantly less likely to prefer the expensive option

compared to the other two conditions combined, $F(1, 218) = 6.10$, $p = .01$.

Web Appendix Figure 1. Effect of Hypothetical Student Loan Debt on Preference, Web Appendix Study 1.

Hypothetical Student Debt Condition
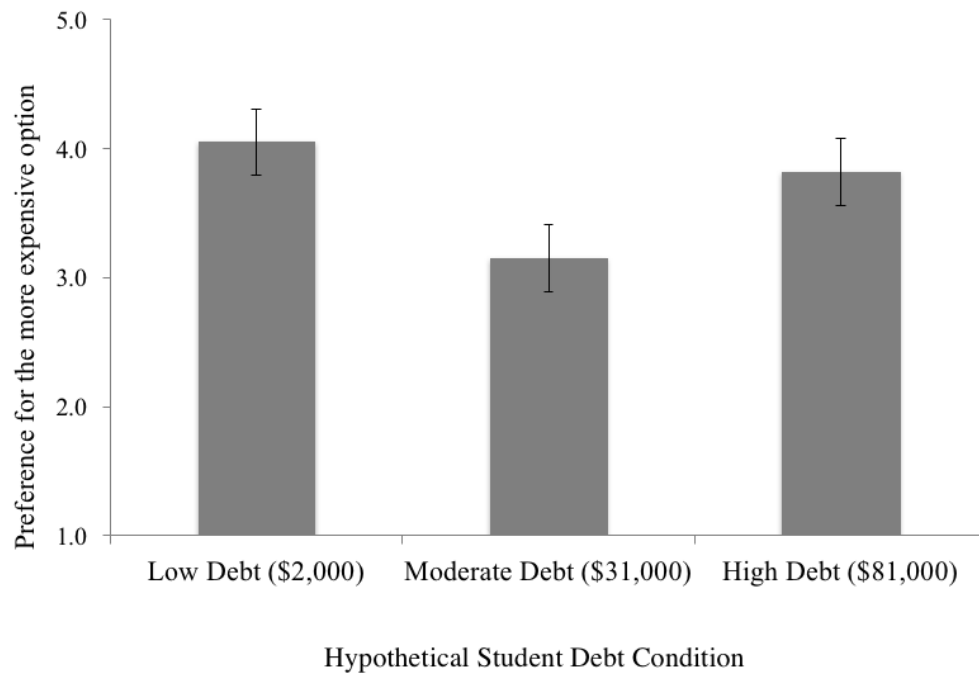
Web Appendix B. Study 4 Conjoint Study Robustness Check

Threshold Effect

As a robustness check, we test whether $40,000 presents a significant threshold above

which students show increased spending propensity by counting the number of posterior draws

generated by Markov Monte Carlo Chain algorithms (Rossi et al. 2005). If the proportion of

draws greater or less than exceeds 95%, we report Bayesian significance at that level.

We specify the following heterogeneity equation at the individual level to simultaneously

test for a linear effect and a threshold effect of student loan debt.

$$\beta_j = \beta_0 + \theta_1 StudentDebt_j + \theta_2 HighDebt_j + \theta_3 NoDebt_j + \tau_j$$

$$\text{where } \tau_j \sim N(0, D) \text{ and } D \text{ is a 3 x 3 matrix} \tag{2}$$

Doing so allows us to test the relative strength of a debt threshold effect versus a linear

debt magnitude effect. We dummy-coded debt levels as High Debt (1 = Debt ≥ $40,000, 0 = all

else) and No Debt (1= No Debt, 0 = all else). θ_2 coefficient captures difference in spending

propensity between participants who have high levels of student loan debt versus those who have

moderate levels of debt. Likewise, θ_3 coefficient captures the difference in spending propensity

between participants who have no debt versus those who have moderate levels of debt.

Web Appendix Table 1 presents the theta covariate coefficients in the heterogeneity

equation for the lump-sum and monthly payment conditions. Participants with high student loan

debt ($40,000 or more) in the lump-sum condition showed greater spending propensity than

those with moderate debt ($39,999 and below), $\theta = .34$, $p < .01$, supporting H2. However, when

student loan debt was presented in monthly payment format, participants with high student loan

debt did not differ in spending propensity from those with moderate debt. The linear term of

student loan debt is also significant, $\theta = -.004$, $p = .02$. Despite a moderate monotonic decrease

in spending propensity as debt level increases, $40,000 presents a notable threshold after which participants showed increase in spending when debt is presented in lump sum format (Figures 5 and 6).

Individual Differences in Spending Propensity

After completing the conjoint exercise, all participants answered a few additional demographic questions such as their expected future income upon graduation (this question was skipped if participants indicated they intended to pursue further education upon graduation). Additionally, participants completed the Status Consumption Scale (Eastman, Goldsmith, and Flynn 1999) to control for individual differences in preference for status products, because automobiles are conspicuous consumption items. They also completed the Spendthrift-Tightwad scale (Rick, Cryder, and Loewenstein 2008) on individual differences in the propensity to control spend. Participants then reported their non-student debt and the funding sources of their undergraduate education (used as a proxy for family socioeconomic standing). They answered demographic information such as age, race, gender, education level, area of study, and currently enrolled institution.

To allow for unobserved heterogeneity of preferences, we allow individual-level parameters to vary across respondents. This means that the attribute-level utilities for each respondent (for instance, β_{price}) are modeled as a linear function of individual-level characteristics as expressed in heterogeneity model (3).

$$\beta_j = \beta_0 + \theta_1 StudentDebt_j + \theta_2 HighDebt_j + \theta_3 NoDebt_j + \theta_4 NonStudentDebt_j + \theta_5 Status_j + \theta_6 Spendthrift_j + \theta_7 ExpectedIncome_j + \theta_8 FamilyContribution_j + \theta_9 Age_j + \theta_{10} Gender_j + \tau_j \text{ where } \tau_j$$

$$\sim N(0, D) \text{ and } D \text{ is a } 10 \times 10 \text{ matrix} \tag{3}$$

Non-student Debt is the self-reported balance of other forms of non-student debt (not including mortgages). Status is a centered sum of scores on the Status Consumption scale (Eastman et al. 1999), with a higher score indicating a greater need for status products. Spendthrift is a centered composite score on the Spendthrift-Tightwad scale (Rick et al. 2008), with a higher score indicating a greater propensity toward spendthrift. Expected Income is a 15-level categorical variable. Family Contribution is recoded from a list of questions surveying various sources of college tuition funding as a proxy for family socioeconomic status. The scores range from 0 (no family support) to 3 (full family support). Age is a 9-level categorical variable, with levels 2 and 3 corresponding to 18–24 years and 25–34 years of age respectively. Gender is coded as 0 for male and 1 for female. The non-monotonic effect of student loan debt on spending as well as the effect of repayment format remained robust after controlling for these individual differences (see Web Appendix Table 2).

Web Appendix Table 1. Mean Theta Coefficients on Spending Propensity, Study 4

Theta Coefficient for Price Attribute	Lump Sum	Monthly Payment
Intercept	−1.05	−1.12
Student Loan Debt (in $1,000)	−.004*	.001
High Debt (debt ≥ $40,000)	.34**	−.18
No Debt	.13*	.25**

Note: [+] Bayesian significance p ≤ .10; * Bayesian significance p ≤ .05; ** Bayesian significance p ≤ .01. Positive coefficient indicates greater spending propensity.

Web Appendix Table 2. Mean Theta Coefficients on Spending Propensity Controlling for Individual Differences, Study 4

Theta Coefficient for Price Utilities	Lump Sum	Monthly Payment
Intercept	−1.49	−1.71
Student Loan Debt (in $1,000)	−.004*	−.0004
High Debt (debt ≥ $40,000)	.29*	−.24[+]
No Debt	.19**	.27**
Non-student Debt (in $1,000)	.003	−.001
Status (Z score)	.12**	.04
Spendthrift (Z score)	.18**	.18**
Expected Income	.03[+]	.04**
Family Contribution	−.03	−.03
Age (categorical)	.05	.10*
Gender (female = 1, male = 0)	.31**	.20**

Note: [+] Bayesian significance p ≤ .10; * Bayesian significance p ≤ .05; ** Bayesian significance p ≤ .01. Positive coefficient indicates greater spending propensity.

Web Appendix Table 3. Utility Estimates and Attribute Importance, Study 4

Attribute levels	Average Utilities (Zero-Centered)	Standard Deviation
BMW sedan	51.74	69.77
BMW coupe	43.17	83.05
Ford Focus sedan	−18.63	50.61
Ford Focus hatchback	−24.73	58.51
Toyota RAV4	−43.13	70.95
Toyota RAV4 SE	−30.11	79.98
Honda Civic	1.26	53.92
Honda Civic hybrid	20.42	63.82
No GPS	−13.46	17.28
GPS	13.46	17.28
Metallic red	−5.75	13.58
Pearl white	−1.58	13.07
Metallic dark blue	4.06	10.98
Black	3.27	12.26
Cloth	−4.31	15.13
Leather	4.31	15.13
Price	−24.98	15.07
None	−53.97	146.94
Attributes	Average Importance	Standard Deviation
Manufacturer	37.59	19.78
Navigation system	6.22	6.17
Paint color	5.18	4.35
Interior trim	4.19	4.69
Price	46.81	23.80