

APPENDIX A: Description of Current U.S. Loan Repayment Options

In the United States, student borrowers typically decide how they will repay their loans when they leave school or drop below half-time status (6 credits per semester). Borrowers have a six-month grace period before they must begin repaying their loans. Current U.S. student borrowers have access to a number of different repayment options, but those who do not make an active choice are defaulted into the standard 10-year repayment plan.¹ Similar to paying a mortgage on a house, this plan requires borrowers to make fixed monthly payments over a 10-year period after which their loan will be repaid with interest. Interest rates are fixed at loan origination so there is no uncertainty over this parameter at the time a borrower is entering repayment.

In 1993, the Department of Education (ED) introduced the first federal income driven repayment (IDR) plan. Current student borrowers have access to four available IDR options: Revised Pay As You Earn (REPAYE), Pay As You Earn (PAYE), Income-Based Repayment (IBR), and Income-Contingent Repayment (ICR). All current federal student borrowers are eligible to participate in REPAYE and ICR. Borrowers must meet certain requirements to participate in PAYE and IBR. Specifically, those who would pay less under PAYE than under the standard plan, first borrowed after September 2007, and took at least one loan disbursement after September 2011 are eligible to participate in PAYE. Borrowers who would pay less under IBR than under the standard plan are eligible to participate in IBR, though the terms vary depending on when the student's borrowing occurred.

The version of IDR in our experiment shares some features with so-called "fixed-length" IDR (also sometimes referred to as an "income-share agreement" or "human capital contract"), in that borrowers are required to make payments (as a share of income) for a set length of time, regardless of the amount repaid in the initial period. Although there are no wide-scale examples of fixed-length IDR currently in existence, there has been substantial interest in such plans both within state governments and at the federal level.² Several universities recently have started to offer fixed-length IDR contracts as an alternative to federal student loans. These include Purdue University ("Back-a-Boiler" program), Lackawanna College, and Clarkson University.³

Under the IDR plans currently available to federal borrowers, monthly payments are set equal to a specified percentage of the borrower's disposable income. REPAYE and PAYE set payments

¹ See <https://studentaid.ed.gov/sa/repay-loans/understand/plans> for details on all available federal loan repayment options.

² <https://www.nytimes.com/2016/04/09/business/dealbook/getting-a-student-loan-with-collateral-from-a-future-job.html>

³ <https://www.insidehighered.com/quicktakes/2017/12/15/more-colleges-try-income-share-agreements>

to 10 percent of discretionary income. IBR sets payments to 10 percent of discretionary income for those who first borrowed on or after July 2014, and to 15 percent for those who first borrowed earlier. ICR sets payments to the lesser of 20 percent of discretionary income and what the borrower “would pay on a repayment plan with fixed payment over the course of 12 years, adjusted according to your income.”⁴ In PAYE and IBR, payments are capped at or below the amount the student would have paid had she initially selected the standard 10-year repayment plan. REPAYE and ICR plans do not cap loan payments.

Borrowers with earnings below a specified threshold are not required to make payments, but if payments under IDR are not sufficient to cover the monthly interest on a borrower’s loan, the unpaid interest is added to the loan principal.⁵ Any remaining balance is forgiven after a set number of years.⁶ Borrowers participating in PAYE are eligible for forgiveness after 20 years of payments. Borrowers who have only undergraduate debt and either are participating in REPAYE or are participating in IBR and first took out loans on or after July 2014 also are eligible for forgiveness after 20 years of payments. The remaining set of borrowers (ICR, REPAYE with graduate loans, and IBR who first borrowed before July 2014) are eligible for forgiveness after 25 years of payments. Borrowers working for public or nonprofit employers have access to the Public Service Loan Forgiveness Program, under which outstanding debt is forgiven after 10 years of active repayment.

Borrowers participating in an IDR plan must “recertify” their income and family size each year, although if their circumstances change before a year has passed (e.g., due to job loss or the birth of a child), the borrower can provide this information earlier and have their payments reduced. Borrowers who don’t recertify are no longer in IDR, but in most cases, they are not defaulted back into the standard plan.

⁴ See <https://studentaid.ed.gov/sa/repay-loans/understand/plans/income-driven> for details.

⁵ Under PAYE and IBR, ED covers unpaid interest on subsidized loans for up to three years after a student enters repayment. Under REPAYE, ED covers unpaid interest on subsidized loans and 50 percent of unpaid interest on unsubsidized loans during this same three-year period. Additionally, ED will cover 50 percent of unpaid interest that accrues to subsidized loans held by borrowers participating in REPAYE for the duration of the required repayment period. See <https://studentaid.ed.gov/sa/sites/default/files/income-driven-repayment-q-and-a.pdf> for additional details.

⁶ Months in which a borrower is required to pay \$0 are counted towards the required months of repayment.

APPENDIX B: Proofs

Proof of Proposition 1: For any $p \in [0,1]$ the expected payoff difference between choosing the Difficult and Easy tasks under FR is

$$\pi_{D,FR}(p) - \pi_{E,FR} = p^2H + p(H - k) - (2L - k)$$

which is increasing in p , negative at $p = 0$, and positive at $p = 1$. Hence there must be a single cutoff, p^{FR} , determining an agent's unique switch point such that $\pi_{D,FR}(p^{FR}) = \pi_{E,FR}$.

Since we assume $L > k$, the following implications follow

$$L(L - H) < k(L - H) \Rightarrow L^2 + LH - Lk < 2LH - Hk \Rightarrow \frac{L^2}{H} + L - \frac{Lk}{H} < 2L - k$$

$$\Rightarrow \pi_{D,FR}(p^*) = p^{*2}H + p^*(H - k) < 2L - k = \pi_{E,FR} \text{ (by plugging } p^* = \frac{L}{H} \text{.)}$$

Then $\pi_{D,FR}(p^*) - \pi_{E,FR} < 0$. Since the expected payoff difference is increasing in p , this implies that $p^{FR} > p^*$.

Proof of Proposition 2: For any $p \in [0,1]$ the expected payoff difference between choosing the Difficult and Easy tasks under IDR is

$$\pi_{D,IDR}(p) - \pi_{E,IDR} = 2pH(1 - i) - 2L(1 - i)$$

By setting $\pi_{D,IDR}(p^{IDR}) = \pi_{E,IDR}$ and solving for p^{IDR} , we have $p^{IDR} = \frac{L}{H} = p^*$.

Proof of Proposition 3: Given the cutoff levels specified by Propositions 1 and 2, $p^{FR} > p^{IDR} = p^*$. Hence, in the absence of regret and gratitude, switching from Easy to Difficult tasks will happen at $p^{IDR} = p^*$ as long as IDR is available to the agent. Note that IDR is available in Treatments *C*, *NC*, and *NCR*, therefore the first characterization of Proposition 3 holds under no regret condition.

To show the second characterization, next we assume there is regret but no gratitude.

Recall that $U_{D,IDR}^{NCR}(p) = 2pH(1 - i) - (1 - p)^2R(2L(1 - i))$ when there is no gratitude. Then $U_{D,IDR}^{NCR}(0) < 0 \leq 2L(1 - i) = U_{E,IDR}^{NCR}$, hence performing the Easy task is better for the agent with success rate of zero; and $U_{D,IDR}^{NCR}(1) = 2H(1 - i) > 2L(1 - i) = U_{E,IDR}^{NCR}$, hence performing the Difficult task is better for the agent with success rate of 1. Moreover, for any $p \in (0,1)$

$$\frac{\partial U_{D,IDR}^{NCR}(p)}{\partial p} = 2H(1-i) + 2(1-p)R(2L(1-i)) > 0.$$

This shows that $U_{D,IDR}^{NCR}(p)$ is strictly increasing in p and therefore there must be a single cutoff, p^{NCR} , such that an agent switches from the Easy task to the Difficult task at this cutoff, i.e.

$$U_{D,IDR}^{NCR}(p^{NCR}) = U_{E,IDR}^{NCR}. \text{ For the efficiency cutoff } p^* = \frac{L}{H}$$

$$U_{D,IDR}^{NCR}(p^*) - U_{E,IDR}^{NCR} = 2\frac{L}{H}H(1-i) - \left(1 - \frac{L}{H}\right)^2 R(2L(1-i)) - 2L(1-i) < 0$$

Therefore, $p^{NCR} > p^*$.

Note also that in this no gratitude case, Treatments NC and NCR are identical for an agent evaluating the Easy and Difficult tasks under IDR. This implies that $p^{NC} = p^{NCR} > p^*$.

Next we will consider Treatment C . Note that if the regret dominates the material payoff, then no agent will take IDR or even the agent with $p = 1$ will prefer Easy task to Difficult task under IDR. Since at $p = 0$, since $U_{D,FR}^C(0) = -R(2L - k) = -R(2L(1-i)) = U_{D,IDR}^C(0) < U_{E,IDR}^C$, is $U_{D,IDR}^C(p)$ a concave function of p and $U_{D,FR}^C(p)$ is a convex function of p and when a convex function intersects a horizontal line ($U_{E,IDR}^C$) at a smaller p than a concave function does, then the concave one is always below the convex one for any p after that intersection point (see the arguments below for concavity of $U_{D,IDR}^C(p)$ and convexity of $U_{D,FR}^C(p)$). Therefore, in the equilibrium where FR is desirable for some agents with high success rate in Difficult task and IDR is desirable for those with mid-range success rate, the cutoff should be determined by $U_{D,IDR}^C(p^C) = U_{E,IDR}^C$.

Note that when an agent anticipates regret but no gratitude, for any $p \in (0,1)$,

$$U_{D,IDR}^C(p) < U_{D,IDR}^{NC}(p) = U_{D,IDR}^{NCR}(p).$$

In particular when $p = p^C$

$$U_{D,IDR}^C(p^C) - U_{E,IDR}^C = 0 < U_{D,IDR}^{NC}(p^C) - U_{E,IDR}^C.$$

Then $p^C > p^{NC} = p^{NCR} > p^*$ when there is regret but no gratitude motivation.

To see the arguments for concavity of $U_{D,IDR}^C(p)$ and convexity of $U_{D,FR}^C(p)$. First,

$$\begin{aligned} U_{D,IDR}^C(p) &= 2pH(1-i) - (1-p)^2R(2L(1-i)) - p(1-p)R(H-k-H(1-i)) \\ &\quad - p^2R(2H-k-2H(1-i)), \end{aligned}$$

and

$$\frac{\partial^2 U_{D,IDR}^C(p)}{\partial p^2} = -2R(2L(1-i)) + 2R(Hi-k) - 2R(2Hi-k) < 0$$

since the first term is negative and the difference between the second and third terms is also negative. Hence, $U_{D,IDR}^C(p)$ is a concave function.

Second,

$$U_{D,FR}^C(p) = p^2(2H-k) + p(1-p)(H-k) - (1-p)pR(H(1-i)) - (1-p)^2R(2L-k).$$

Then,

$$\frac{\partial^2 U_{D,FR}^C(p)}{\partial p^2} = 2(2H-k) - 2(H-k) + 2R(H(1-i)) - 2R(2L-k) > 0,$$

because the first term is greater than the second term and the third term is greater than the fourth term by assumption.

Finally, we need to show the third characterization of Theorem 1, i.e. $p^C > p^{NC} > p^{NCR}$ when there are both regret and gratitude motivations.

Note that the relation between p^{NC} and p^C is not affected from the existence of gratitude and hence, the argument above still holds.

So we only need to show that $p^{NC} > p^{NCR}$. First observe that there is still a single cutoff determining the switch from Easy to Difficult task in NCR:

Recall that when there are both regret and gratitude motives,

$$U_{D,IDR}^{NCR}(p) = 2pH(1-i) - (1-p)^2R(2L(1-i)) + p(1-p)G(R(Hi-k)) + p^2G(R(2Hi-k)).$$

Then $U_{D,IDR}^{NCR}(0) < 0 \leq 2L(1-i) = U_{E,IDR}^{NCR}$, hence performing the Easy task is better for the agent with success rate of zero; and $U_{D,IDR}^{NCR}(1) = 2H(1-i) + G(R(2Hi-k)) > 2L(1-i) = U_{E,IDR}^{NCR}$, hence performing the Difficult task is better for the agent with success rate of 1. Moreover, for any $p \in (0,1)$

$$\frac{\partial U_{D,IDR}^{NCR}(p)}{\partial p} = 2H(1-i) + 2(1-p)R(2L(1-i)) + (1-2p)G(R(Hi-k)) + 2pG(R(2Hi-k)) > 0.$$

This shows that $U_{D,IDR}^{NCR}(p)$ is strictly increasing in p and therefore there must be a single cutoff, p^{NCR} , such that an agent switches from the Easy task to the Difficult task at this cutoff, i.e.

$$U_{D,IDR}^{NCR}(p^{NCR}) = U_{E,IDR}^{NCR}.$$

In order to compare the cutoffs p^{NCR} and p^{NC} , first note that when an agent anticipates regret and gratitude, $U_{D,IDR}^{NC}(p) < U_{D,IDR}^{NCR}(p)$ for any $p \in (0,1)$. In particular when $p = p^{NC}$,

$$U_{D,IDR}^{NC}(p^{NC}) - U_{E,IDR} = 0 < U_{D,IDR}^{NCR}(p^{NC}) - U_{E,IDR}.$$

Hence, $p^{NC} > p^{NCR}$ when there are both regret and gratitude motivations.

APPENDIX C: Experiment Instructions and Additional Information Collection

Welcome to the experiment. The precise rules and procedures that govern the operation of this experiment will be explained to you below. The instructions are simple, and if you follow them carefully and pay attention to your decisions, you may increase the amount you earn. You will receive a \$7 participation fee for completing the experiment and an additional amount that will depend on the decisions you make during the experiment. Note that only your own decisions will affect your final earnings. The experiment will last about 1 hour 30 minutes. **Please do not talk to each other** during the session. If you have any question, please raise your hand and the experimenter will come to your station. The experiment consists of three parts. After completion of each part, you will receive instructions for the next.

Instructions for Part 1

In this part of the experiment, you will be asked to perform two types of tasks.

Type A Tasks: Each task of this type requires you to type a five letter word appearing on your screen. You will have 20 seconds to complete each task. You will perform 30 Type A tasks. Each correctly completed Type A task pays \$0.10. At the end of this part of the experiment a report screen will tell you how many Type A tasks you completed correctly.

Once you complete the Type A tasks, you will begin the Type B tasks.

Type B Tasks: Each task of this type requires you to reason out and provide the answer to a question. You will have 1 minute to answer each question. You will perform 30 Type B tasks. Each correctly completed Type B task pays \$0.10. At the end of this part of the experiment, a report screen will tell you how many Type B tasks you completed correctly.

You should try to complete the tasks you are given as accurately as you can. Having more correctly completed tasks not only will increase your earnings in this part of the experiment but also will have a positive and significant impact on your earnings in the next part of the experiment.

Instructions for Part 2 [for Treatment C]

In order to participate in Part 2 of the experiment, you must borrow \$2 from the experimenter. To pay this loan back, you will need to earn money in the following two rounds. Your earnings in this part of the experiment will be determined by your performance on the tasks in Part 1 of the experiment and the loan repayment plan you choose.

Available Loan Repayment Plans:

There are two loan repayment plans that you can choose from.

Plan 1: Under this plan, you are required to pay back \$3.20 in the first round. All of your remaining earnings from the first round as well as your total earnings from the second round will be yours to keep. However, if you do not earn money in the first round, you will not be able to make your loan repayment. You will be considered to have defaulted on the loan and will not be permitted to continue in the second round of this part of the experiment.

Plan 2: Under this plan, you need to pay back 40% of your earnings in each round. Even if you do not earn any money in the first round, you will continue to the second round.

Earning Money to Repay Your Loan

In order to earn money, you need to decide whether you want your earnings to be determined by your performance on the Type A tasks or the Type B tasks that you performed in Part 1 of the experiment. You will not perform these tasks again. You will just choose the type of task you want to be used to determine your earnings in this part of the experiment.

Once you choose whether you want to use the Type A tasks or the Type B tasks, one of the tasks of that type that you performed in Part 1 will be randomly selected. Each task of the chosen type has an equal chance of being selected. If you performed the selected task correctly, you will earn money for the first round. If you did not perform the selected task correctly, you will earn nothing for the first round. If you continue in the second round, one of the tasks of the chosen type that you completed in Part 1 will again be randomly selected. As in the first round, each task of the given type will have an equal chance of being selected for the second round. The same task may be selected in both rounds.

In each round, you will earn **\$4** for selected Type A task that was correctly completed and **\$10** for a selected Type B task that was correctly completed.

For example, suppose that you choose to use Type B tasks for determining your earnings. In this case, the computer will pick randomly one of the Type B tasks that you performed earlier. Let's say the computer picks task #28 from the Type B tasks that you performed. If you completed that task correctly in Part 1, you will earn \$10 in round 1; otherwise, you will earn \$0 in round 1. Then you will move to round 2 and the computer again will pick a task randomly from the 30 Type B tasks that you performed earlier. Say the computer picks task #13 this time. If you completed that task correctly in Part 1, you will earn \$10 in round 2; otherwise, you will earn \$0 in round 2.

Recall that you typed 30 five-letter-words to complete the Type A tasks and answered 30 cognitive questions to complete the Type B tasks. As an aid to making your decision about which type of task to choose, your screen will show you how many of each type of task you completed correctly in Part 1. For example, a subject who completed 21 out of 30 Type A tasks correctly and 12 out of 30 Type B tasks correctly will see the following on his/her screen:

	Number of Correct Responses	Number of Questions	Probability of Correct Response
Type A	21	30	70%
Type B	12	30	40%

Knowing your performance in Part 1, here's what happens next:

- You will choose a loan repayment plan (Plan 1 or Plan 2).
- You will choose to base your earnings in Part 2 either on the Type A tasks or the Type B tasks you completed in Part 1.
- For each of the two rounds of this second part of the experiment, assuming you are participating in that round, the computer will select a task randomly from among the tasks of the type you chose.
- Your net payout will be calculated as the total earnings across the two rounds (based on whether the randomly selected task(s) of the type you chose were completed correctly) **minus** the total loan repayment (based on your plan).

Note that your overall earnings and loan repayment will depend on the task you choose, your performance on that task in Part 1, and the repayment plan you have selected.

Example 1: If you choose Task A and Plan 1 and you completed the tasks selected in both round 1 and round 2 correctly, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$4	\$3.20	\$0.80
Round 2	\$4	0	\$4
Total	\$8	\$3.20	\$4.80

Example 2: If you choose Task A and Plan 1 and you did not complete the task selected in round 1 correctly, you will earn \$0 and default on your loan. Hence you will not be permitted to continue in the second round. This means you will receive a \$0 net payout:

	Earnings	Loan Repayment	Net Payout
Round 1	\$0	\$0	\$0
Round 2	--	--	--
Total	\$0	\$0	\$0

Example 3: If you choose Task A and Plan 2 and you did not complete the task selected in round 1 correctly but did complete the task selected for round 2 correctly, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$0	\$0	\$0
Round 2	\$4	\$1.60	\$2.40
Total	\$4	\$1.60	\$2.40

Example 4: If you choose Task B and Plan 2 and your answer to the question selected in round 1 was correct but your answer to the question selected in round 2 was wrong, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$10	\$4	\$6
Round 2	\$0	\$0	\$0
Total	\$10	\$4	\$6

Example 5: If you choose Task B and Plan 2 and your answers to the selected questions in both round 1 and round 2 were correct, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$10	\$4	\$6
Round 2	\$10	\$4	\$6
Total	\$20	\$8	\$12

Quiz

- 1) Suppose a subject chooses Task B and Plan 1. Her answer to the randomly selected question from her Task B problems in round 1 was wrong, and in round 2 was correct. Hence she defaulted on her loan in the first round. Fill in the table below for this subject.

	Earnings	Loan Repayment	Net Payout
Round 1			
Round 2			
Total			

- 2) Suppose a subject chooses Task B and Plan 1. Her answers to the randomly selected question from her Task B problems in both round 1 and round 2 were correct. Fill in the table below for this subject,

	Earnings	Loan Repayment	Net Payout
Round 1			
Round 2			
Total			

- 3) Suppose a subject chooses Task A and Plan 2. Her randomly selected task selected from those she performed in Task A was incorrect in round 1 and correct in round 2. Fill in the table below for this subject.

	Earnings	Loan Repayment	Net Profit
Round 1			
Round 2			
Total			

Instructions for Part 2 [for Treatment NC]

In order to participate in Part 2 of the experiment, you must borrow \$2 from the experimenter. To pay this loan back, you will need to earn money in the following two rounds. Your earnings in this part of the experiment will be determined by your performance on the tasks in Part 1 of the experiment and your loan repayment plan.

The Loan Repayment Plan

The loan repayment plan requires you to pay back 40% of your earnings in each round. Even if you do not earn any money in the first round, you will continue to the second round.

Earning Money to Repay Your Loan

In order to earn money, you need to decide whether you want your earnings to be determined by your performance on the Type A tasks or the Type B tasks that you performed in Part 1 of the experiment. You will not perform these tasks again. You will just choose the type of task you want to be used to determine your earnings in this part of the experiment.

Once you choose whether you want to use the Type A tasks or the Type B tasks, one of the tasks of that type that you performed in Part 1 will be randomly selected. Each task of the chosen type has an equal chance of being selected. If you performed the selected task correctly, you will earn money for the first round. If you did not perform the selected task correctly, you will earn nothing for the first round. In the second round, one of the tasks of the chosen type that you completed in Part 1 will again be randomly selected. As in the first round, each task of the given type will have an equal chance of being selected for the second round. The same task may be selected in both rounds.

In each round, you will earn **\$4** for a selected Type A task that was correctly completed and **\$10** for a selected Type B task that was correctly completed.

For example, suppose that you choose to use Type B tasks for determining your earnings. In this case, the computer will pick randomly one of the 30 Type B tasks that you performed earlier. Let's say the computer picks task #28 from the Type B tasks you performed. If you completed that task correctly in Part 1, you will earn \$10 in round 1; otherwise, you will earn \$0 in round 1. Then you will move to round 2 and the computer again will pick a task randomly from the 30 Type B tasks that you performed earlier.

Say the computer picks task #13 this time. If you completed that task correctly in Part 1, you will earn \$10 in round 2; otherwise, you will earn \$0 in round 2.

Recall that you typed 30 five-letter-words to complete the Type A tasks and answered 30 cognitive questions to complete the type B tasks. As an aid to making your decision about which type of task to choose, your screen will show you how many of each type of task you completed correctly in Part 1. For example, a subject who completed 21 out of 30 Type A tasks correctly and 12 out of 30 Type B tasks correctly will see the following on his/her screen:

	Number of Correct Responses	Number of Questions	Probability of Correct Response
Type A	21	30	70%
Type B	12	30	40%

Knowing your performance in Part 1, here's what happens next:

- You will choose to base your earnings in Part 2 either on the Type A tasks or the Type B tasks you completed in Part 1.
- For each of the two rounds of this second part of the experiment, the computer will select a task randomly from among the tasks of the type you chose.
- Your net payout will be calculated as the total earnings across the two rounds (based on whether the randomly selected tasks of the type you chose were completed correctly) minus 40% of your earnings deducted as a loan repayment.

Note that your overall earnings and loan repayment will depend on the task you choose and your performance on that task in Part 1.

Example 1: If you choose Task A and you completed the tasks selected in both round 1 and round 2 correctly, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$4	\$1.60	\$2.40
Round 2	\$4	\$1.60	\$2.40
Total	\$8	\$3.20	\$4.80

Example 2: If you choose Task A and you did not complete the task selected in round 1 correctly but did complete the task selected for round 2 correctly, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$0	\$0	\$0
Round 2	\$4	\$1.60	\$2.40
Total	\$4	\$1.60	\$2.40

Example 3: If you choose Task B and your answers to both of the selected questions were wrong, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$0	\$0	\$0
Round 2	\$0	\$0	\$0
Total	\$0	\$0	\$0

Example 4: If you choose Task B and your answer to the question selected in round 1 was correct but your answer to the question selected in the round 2 was wrong, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$10	\$4	\$6
Round 2	\$0	\$0	\$0
Total	\$10	\$4	\$6

Example 5: If you choose Task B and your answers to the selected questions in both round 1 and round 2 were correct, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$10	\$4	\$6
Round 2	\$10	\$4	\$6
Total	\$20	\$8	\$12

Quiz

- 4) Suppose a subject chooses Task B. Her answer to the randomly selected question from her Task B problems in round 1 was wrong, and in round 2 was correct. Fill in the table below for this subject.

	Earnings	Loan Repayment	Net Payout
Round 1			
Round 2			
Total			

- 5) Suppose a subject chooses Task A. Her randomly selected task selected from those she performed in Task A was correct in round 1 and incorrect in round 2. Fill in the table below for this subject.

	Earnings	Loan Repayment	Net Payout
Round 1			
Round 2			
Total			

Instructions for Part 2 [for Treatment NCR]

In order to participate in Part 2 of the experiment, you must borrow \$2 from the experimenter. To pay this loan back, you will need to earn money in the following two rounds. Your earnings in this part of the experiment will be determined by your performance on the tasks in Part 1 of the experiment and your loan repayment plan.

Loan Repayment Plans:

There are two relevant loan repayment plans.

Plan 1: Under this plan, you are required to pay back \$3.20 in the first round. All of your remaining earnings from the first round as well as your total earnings from the second round will be yours to keep. However, if you do not earn money in the first round, you will not be able to make your loan repayment. You will be considered to have defaulted on the loan and will not be permitted to continue in the second round of this part of the experiment.

Plan 2: Under this plan, you need to pay back 40% of your earnings in each round. Even if you do not earn any money in the first round, you will continue to the second round.

Some of the subjects in the lab will be allowed to choose the loan repayment plan they wish to have. The other subjects will be assigned to Plan 2. The computer will randomly determine whether you are allowed to choose a plan or are assigned to Plan 2.

Earning Money to Repay Your Loan

In order to earn money, you need to decide whether you want your earnings to be determined by your performance on the Type A tasks or the Type B tasks that you performed in Part 1 of the experiment. You will not perform these tasks again. You will just choose the type of task you want to be used to determine your earnings in this part of the experiment.

Once you choose whether you want to use the Type A tasks or the Type B tasks, one of the tasks of that type that you performed in Part 1 will be randomly selected. Each task of the chosen type has an equal chance of being selected. If you performed the selected task correctly, you will earn money for the first round. If you did not perform the selected task correctly, you will earn nothing for the first round. If you continue in the second round, one of the tasks of the chosen type that you completed in Part 1 will again

be randomly selected. As in the first round, each task of the given type will have an equal chance of being selected for the second round. The same task may be selected in both rounds.

In each round, you will earn **\$4** for a selected Type A task that was correctly completed and **\$10** for a selected Type B task that was correctly completed.

For example, suppose that you choose to use Type B tasks for determining your earnings. In this case, the computer will pick randomly one of the Type B tasks that you performed earlier. Let's say the computer picks task #28 from the Type B tasks that you performed. If you completed that task correctly in Part 1, you will earn \$10 in round 1; otherwise, you will earn \$0 in round 1. Then you will move to round 2 and the computer again will pick a task randomly from the 30 Type B tasks that you performed earlier. Say the computer picks task #13 this time. If you completed that task correctly in Part 1, you will earn \$10 in round 2; otherwise, you will earn \$0 in round 2.

Recall that you typed 30 five-letter-words to complete the Type A tasks and answered 30 cognitive questions to complete the Type B tasks. As an aid to making your decision about which type of task to choose, your screen will show you how many of each type of task you completed correctly in Part 1. For example, a subject who completed 21 out of 30 Type A tasks correctly and 12 out of 30 Type B tasks correctly will see the following on his/her screen:

	Number of Correct Responses	Number of Questions	Probability of Correct Response
Type A	21	30	70%
Type B	12	30	40%

Knowing your performance in Part 1, here's what happens next:

- You will learn whether you are allowed to choose a loan repayment plan (Plan 1 or Plan 2) or have been assigned by the computer to Plan 2.
- If you are allowed to choose a loan repayment plan, the computer will ask you to select Plan 1 or Plan 2.
- If you are not allowed to choose a plan, the computer will assign you to Plan 2.
- You will choose to base your earnings in Part 2 either on the Type A tasks or the Type B tasks you completed in Part 1.

- For each of the two rounds of this second part of the experiment, assuming you are participating in that round, the computer will select a task randomly from among the tasks of the type you chose.
- Your net payout will be calculated as the total earnings across the two rounds (based on whether the randomly selected task(s) of the type you chose were completed correctly) **minus** the total loan repayment (based on your plan).

Note that your overall earnings and loan repayment will depend on the task you choose, your performance on that task in Part 1, and the repayment plan you have chosen or been assigned to by the computer.

Example 1: If you choose Task A and Plan 1 and you completed the tasks selected in both round 1 and round 2 correctly, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$4	\$3.20	\$0.80
Round 2	\$4	0	\$4
Total	\$8	\$3.20	\$4.80

Example 2: If you choose Task A and Plan 1 and you did not complete the task selected in round 1 correctly, you will earn \$0 and default on your loan. Hence you will not be permitted to continue in the second round. This means you will receive a \$0 net payout:

	Earnings	Loan Repayment	Net Payout
Round 1	\$0	\$0	\$0
Round 2	--	--	--
Total	\$0	\$0	\$0

Example 3: If you choose Task A; choose or are assigned to Plan 2; and did not complete the task selected in round 1 correctly but did complete the task selected for round 2 correctly, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$0	\$0	\$0
Round 2	\$4	\$1.60	\$2.40
Total	\$4	\$1.60	\$2.40

Example 4: If you choose Task B; choose or are assigned to Plan 2; and your answer to the question selected in round 1 was correct but your answer to the question selected in round 2 was wrong, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$10	\$4	\$6
Round 2	\$0	\$0	\$0
Total	\$10	\$4	\$6

Example 5: If you choose Task B; choose or are assigned to Plan 2; and your answers to the selected questions in both round 1 and round 2 were correct, your net payout will be calculated as follows:

	Earnings	Loan Repayment	Net Payout
Round 1	\$10	\$4	\$6
Round 2	\$10	\$4	\$6
Total	\$20	\$8	\$12

Quiz

- 6) Suppose a subject chooses Task B and Plan 1. Her answer to the randomly selected question from her Task B problems in round 1 was wrong, and in round 2 was correct. Hence she defaulted on her loan in the first round. Fill in the table below for this subject.

	Earnings	Loan Repayment	Net Payout
Round 1			
Round 2			
Total			

- 7) Suppose a subject chooses Task B and Plan 1. Her answers to the randomly selected question from her Task B problems in both round 1 and round 2 were correct. Fill in the table below for this subject,

	Earnings	Loan Repayment	Net Payout
Round 1			
Round 2			
Total			

- 8) Suppose a subject chooses Task A and is assigned to Plan 2. Her randomly selected task selected from those she performed in Task A was incorrect in round 1 and correct in round 2. Fill in the table below for this subject.

	Earnings	Loan Repayment	Net Profit
Round 1			
Round 2			
Total			

Measuring Risk Preference

Period					Remaining time [sec]
1 of 1					0
	Option A	I choose Option A	I choose Option B	Option B	
Decision 1	1/10 of \$2.00, 9/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	1/10 of \$3.85, 9/10 of \$0.10	
Decision 2	2/10 of \$2.00, 8/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	2/10 of \$3.85, 8/10 of \$0.10	
Decision 3	3/10 of \$2.00, 7/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	3/10 of \$3.85, 7/10 of \$0.10	
Decision 4	4/10 of \$2.00, 6/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	4/10 of \$3.85, 6/10 of \$0.10	
Decision 5	5/10 of \$2.00, 5/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	5/10 of \$3.85, 5/10 of \$0.10	
Decision 6	6/10 of \$2.00, 4/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	6/10 of \$3.85, 4/10 of \$0.10	
Decision 7	7/10 of \$2.00, 3/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	7/10 of \$3.85, 3/10 of \$0.10	
Decision 8	8/10 of \$2.00, 2/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	8/10 of \$3.85, 2/10 of \$0.10	
Decision 9	9/10 of \$2.00, 1/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	9/10 of \$3.85, 1/10 of \$0.10	
Decision 10	10/10 of \$2.00, 0/10 of \$1.00	<input type="checkbox"/>	<input type="checkbox"/>	10/10 of \$3.85, 0/10 of \$0.10	

Post-Experiment Questionnaire

1. Do you have any student loan debt in your name (e.g., federal direct or FFEL loans, federal Perkins loans, private loans)? Do not consider loans your parents may have taken out.

Yes

No

2. What is your current outstanding student loan balance, counting student loans from all sources? Only include student loans taken out in your name, not any taken out by your parents. Please answer in whole dollars.

3. Do you have any debt other than student loan debt?

Yes

No

4. What type(s) of other debt do you have?

Credit card debt (other than balances you pay off every month)

Auto loan

Mortgage on a home

Other

5. If you selected "Other" in the previous question, please specify:

6. Suppose you owe \$1,000 on your credit card and the interest rate you are charged is 20% per year compounded annually. If you didn't pay anything off, at this interest rate, how many years would it take for the amount you owe to double?

Less than 2 years

2 to 4 years

5 to 10 years

11 or more years

Not sure

7. Suppose you owe \$3,000 on your credit card. The Annual Percentage Rate (APR) on the balance owed is 12% (or 1% per month). You make a payment of \$30 each month. How many years would it take to eliminate your credit card debt if you made no additional new charges?

Less than 5 years

5 to 10 years

11 to 15 years

More than 15 years

Never, you will continue to be in debt

Not sure

8. In general, how willing are you to take risks in financial matters? Please tick a box on the scale, where the value 0 means: "not at all willing to take risks" and the value 10 means: "very willing to take risks".

9. What is your gender?

10. In what year were you born?

11. What was your SAT score?

12. What was your ACT score?

APPENDIX D: Additional Analysis

Characteristics of experiment participants versus UMD undergraduates

The characteristics of our experimental subject pool align closely with those of the University of Maryland undergraduate student body as a whole. For these comparisons, we use Fall 2015 administrative data on Maryland undergraduates. Some 46.3% of our experiment participants were female, compared to 46.1% percent of Maryland undergraduates. Their average ages also were similar (20.7 years for the experiment participants and 20.4 years for the Maryland undergraduates). Among our experiment participants, 42.3% reported that they held student loans, while 43.3% percent of Maryland undergraduates had obtained loans while enrolled at UMD. Of those with a positive loan balance, the amount outstanding was \$19,150 among the experiment participants compared to \$18,020 for all Maryland undergraduates.

The experiment participants answered two financial literacy questions which also were asked of 4,399 UMD students in a survey administered in 2016 and reported in Abraham et al. (2018). Among the experiment participants, 45% answered at least one of those questions correctly, compared to 47% of the survey participants. The average Maryland undergraduate for whom an SAT score was reported to the university scored at the 81.8th percentile. Because we do not know when the experiment participants who reported their scores to us took the test, we cannot be certain about their score percentiles. We use the 2011 score distribution made available by the College Board to convert the scores reported by the experiment participants to a percentile measure and estimate that the average experiment subject scored at the 82.3rd percentile.

Table D1. Percentages of Choosing Difficult Task by Treatment and Success Rate

Prob. of Success in Difficult Task	Treatment C	Treatment NC	Treatment NCR
$p \leq 0.33$	0%	0%	0%
$0.33 < p < 0.66$	42.9%	58.5%	81.4%
$p \geq 0.66$	93.9 %	100%	100%
All	61.4%	68.2%	81.6%