

DISCUSSION PAPER SERIES

IZA DP No. 15367

Study More Tomorrow

Todd Pugatch
Elizabeth Schroeder
Nicholas Wilson

JUNE 2022

DISCUSSION PAPER SERIES

IZA DP No. 15367

Study More Tomorrow

Todd Pugatch

Oregon State University and IZA

Elizabeth Schroeder

Oregon State University

Nicholas Wilson

Robinhood

JUNE 2022

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Study More Tomorrow*

We design a commitment contract for college students, “Study More Tomorrow,” and conduct a randomized control trial testing a model of its demand. The contract commits students to attend peer tutoring if their midterm grade falls below a prespecified threshold. The contract carries a financial penalty for noncompliance, in contrast to other commitment devices for studying tested in the literature. We find demand for the contract, with take-up of 10% among students randomly assigned a contract offer. Contract demand is not higher among students randomly assigned to a lower contract price, plausibly because a lower contract price also means a lower commitment benefit of the contract. Students with the highest perceived utility for peer tutoring have greater demand for commitment, consistent with our model. Contrary to the model’s predictions, we fail to find evidence of increased demand among present-biased students or among those with higher self-reported tendency to procrastinate. Our results show that college students are willing to pay for study commitment devices. The sources of this demand do not align fully with behavioral theories, however.

JEL Classification: D91, I21, I23

Keywords: economics of education, higher education, commitment contracts, randomized control trials

Corresponding author:

Todd Pugatch
School of Public Policy
Oregon State University
303 Ballard Extension Hall
Corvallis, OR 97331
USA

E-mail: todd.pugatch@oregonstate.edu

* We thank Jon Chesbro, Camille Nelson, Mike Nelson, Beau Olen, Laura Relyea, and Gail Udell for their assistance. Research with human subjects approved by Oregon State University Institutional Review Board, Study 8402. Financial support provided by Oregon State University via an FY19 Individual Learning Innovation Grant. Declarations of interest: none.

1 Introduction

Nearly two of every five students who enroll in college fail to graduate within 6 years (National Center for Education Statistics 2020). College students who perform poorly often exhibit ineffective study habits, such as studying less than intended or cramming for exams (Oreopoulos and Petronijevic 2019, Beattie, Laliberté, Michaud-Leclerc and Oreopoulos 2019). Procrastination, as measured by delays in registering for courses, is associated with lower grades (Banerjee and Duflo 2014, De Paola and Scoppa 2015, Pugatch and Wilson 2018). These patterns suggest that self-control problems may help to explain poor academic outcomes among college students.

Outside of education, researchers have attempted to counter the presence of time-inconsistent preferences by offering commitment contracts to encourage savings (Thaler and Benartzi 2004, Ashraf, Karlan and Yin 2006) or promote healthy behaviors (Rogers, Milkman and Volpp 2014). Several studies have demonstrated that commitment devices can improve performance of university students (Ariely and Wertenbroch 2002, Patterson 2018, Himmler, Jäckle and Weinschenk 2019, Felkey, Dziadula, Chiang and Vazquez 2021). Yet each of these studies offered a single type of contract to all treated students, thereby identifying only one point on the demand curve. The nature of student demand for commitment contracts remains largely unknown.

This study introduces “Study More Tomorrow,” a commitment device for college students. The program allows college students to pre-commit to changing future study habits. Signing the contract commits students to attend course-specific tutoring if their midterm score falls below a pre-specified threshold. Failure to honor the contract leads to loss of an economic incentive, in this case entries in a textbook scholarship lottery. We randomly assign an offer to enroll in Study More Tomorrow to students enrolled in introductory economics courses at Oregon State University. Offers also randomly varied the contract price (i.e. number of lottery entries lost for noncompliance).

Among students randomly assigned the contract, 10% accepted. To our knowledge, this is the first demonstration of willingness to pay for commitment among college students. Demand does not slope downward in the contract price, plausibly because a lower contract price also means a lower commitment benefit of the contract. Students with the highest perceived utility for peer tutoring have greater demand for commitment, consistent with

our model of contract demand. However, contrary to the model’s predictions, we fail to find evidence of increased demand among present-biased students or among those with higher self-reported tendency to procrastinate. Our results show that college students are willing to pay for study commitment devices. The sources of this demand do not align fully with behavioral theories, however, consistent with evidence from other populations (Carrera, Royer, Stehr, Sydnor and Taubinsky 2022).

The name and structure of the program deliberately echo “Save More Tomorrow,” the seminal retirement savings commitment device (Thaler and Benartzi 2004). Like that program, “Study More Tomorrow” attempts to leverage the likely behavioral biases in our study population. First, college students procrastinate. Yet college students may also be particularly likely to be aware of their tendency to procrastinate, leading to demand for commitment. Second, college students are loss averse; the original demonstration of the endowment effect involved college students trading (or failing to trade) coffee mugs (Kahneman, Knetsch and Thaler 1990). Endowing students with opportunities to win textbook scholarships attempts to channel this loss aversion.

We build on previous studies of commitment devices among university students in two ways. First, we test if students are willing to pay in explicitly monetary terms (in expectation) for a commitment device. In contrast, Patterson (2018) and Himmler et al. (2019) offered “soft” commitment contracts which impose no penalty for noncompliance, Felkey et al. (2021) used social accountability, and Ariely and Wertenbroch (2002) penalized student grades. “[E]xperimental participants who are willing to make commitments are rarely willing to pay to make those commitments. In other words, some experimental participants are willing to restrict their choice set, but these subjects are usually not willing to pay for this privilege” (Laibson 2018, p. 5). Finding positive take-up of our commitment device therefore is notable. Second, we experimentally vary the contract price. This variation allows us to measure multiple points on the demand curve for commitment.

2 Model

We model a student’s choice to sign a commitment contract, denoted by the indicator variable D , for studying. Without the commitment contract, the student’s utility is:

$$U(D = 0) = \pi(\beta v - c) \tag{1}$$

where π is the student’s subjective probability of studying later in the term; β is the hyperbolic discount rate, where $\beta = 1$ represents time-consistent preferences and $\beta < 1$ reflects time inconsistency;¹ v is the perceived value of studying; and c is the cost of studying. We normalize utility of not studying to zero.

Two parameters characterize the commitment contract: Δ , the perceived increase in the probability of studying from signing the contract; and p , the contract price (in utils), paid only if the student reneges on the contract by not studying. Utility after signing the contract is:

$$U(D = 1) = (\pi + \Delta)(\beta v - c) - (1 - [\pi + \Delta])p \tag{2}$$

The student signs the commitment contract if $U(D = 1) \geq U(D = 0)$. The necessary condition is:

$$\frac{\Delta(\beta v - c)}{1 - (\pi + \Delta)} \geq p \tag{3}$$

Several predictions follow from this condition. First, signing the contract is suboptimal if the student does not value it ($\Delta = 0$). Students who are unaware of their tendency to procrastinate (“naifs”) and students who do not procrastinate should fall into this category. By contrast, students aware of their tendency to procrastinate (“sophisticates”) will be candidates to sign the contract, for sufficiently high Δ (O’Donoghue and Rabin 1999).

Second, contract demand will be increasing in the perceived value of studying v ; baseline probability of studying without the contract π ; and decreasing in the contract price p . All else equal, students with time-inconsistent preferences ($\beta < 1$) will have lower demand for the contract. However, sophistication about this time inconsistency, represented by a higher value of Δ , can mitigate this effect and lead time inconsistent students to demand the contract.

¹We assume $\beta - \delta$ preferences (Laibson 1997), with $\delta = 1$ for simplicity.

3 Experiment

The study took place in introductory microeconomics and macroeconomics courses on the main campus of Oregon State University, the largest university in the state. These courses fulfill university requirements for 40 academic majors and 15 minors. Six course sections participated in the study, five in the winter quarter of 2020 and one in fall 2020. The final week of winter 2020 was conducted remotely due to the COVID-19 pandemic, while fall 2020 was entirely remote.

All students in the participating sections were informed of the “Study More Tomorrow” commitment contract and told they were entered into a lottery for two textbook scholarships, valued at \$80 each. All students were reminded of the lottery by email. The contract was a commitment to attend free peer tutoring for the course if the student scored below 80% on the midterm exam. The contract price was loss of chances to win the textbook scholarship if the student scored below the threshold but failed to attend peer tutoring by the end of the course.

In week three of the ten-week quarter, we randomly assigned students into three groups:

1. Control: no commitment contract offer
2. Study More Tomorrow contract offer, half price
3. Study More Tomorrow contract offer, full price

The half and full price treatments refer to loss of half or all lottery chances if the contract was signed but not honored. We stratified treatment by class year, with equal probability of assignment to each group within strata. Students assigned to the contract offer were informed by email 1-2 weeks before the midterm exam (depending on each section’s midterm schedule), with a reminder email in the following week. Emails explained the contract offer, with [video link](#) and signing deadline (Figure 1). Students who signed the contract but scored below 80% on the midterm were informed via email and reminded of their commitment to attend tutoring.

4 Data and Results

The sample includes students who completed a baseline survey and consented to participate, resulting in a sample size of 861 observations. The survey, conducted in the first two weeks of each term, asked students several questions related to our model of demand for study commitment. Students rated themselves on a scale from “very unlikely” to “very likely” to procrastinate, a measure of their sophistication and a proxy for Δ in our model. Students also rated the usefulness of tutoring on a five-point scale, a measure of v , with an additional option to report they were unsure. Students reported time preferences over hypothetical monetary rewards, which we code into a present bias dummy for students reporting time-inconsistent preferences, corresponding to $\beta < 1$. Finally, students reported the grade they expected to earn in the class. F-tests for the joint significance of these variables in predicting assignment to the treatment groups find no evidence of baseline imbalance (p -values of 0.33 and 0.22 for the half and full price treatments compared to the control, respectively).

Figure 2 shows contract take-up by treatment arm. Eight percent of students who were offered the half-price treatment entered the contract. Among students who were offered the full-price treatment, 11 percent entered the contract. There was no contamination of the control group. To our knowledge, these results are the first demonstration of demand for costly commitment devices among college students.

To formally test for heterogeneity in take-up, we regress an indicator for entering the contract onto an indicator for being offered the high price, dummy variables for each category of baseline characteristics, and interactions between these variables and an indicator for having received any treatment. All regressions additionally control for randomization strata and course section.

Results are presented in Table 1. Column 1 reports the full model, and Columns 2 through 7 show the results of including each set of interactions one at a time. Column 8 presents the results of regressing the take-up indicator on contract price and baseline student characteristics over the subsample of students who received any treatment. Results are consistent across specifications. In Columns 1 and 8, students who were offered the contract at the higher price were 4.2 percentage points more likely to take it up than those offered the low price, significant at 10%. The results imply an upward-sloping demand curve for the commitment contract, although the coefficient is not robust to a specification with

fewer controls in Column 3. Nonetheless, we fail to find evidence of a downward-sloping demand curve for commitment.

Across specifications, students' perceived usefulness of tutoring and expected course grade were also associated with take-up. Students who rated the usefulness of tutoring as a five out of five were around 12 percentage points more likely to enter the contract than those who were unsure of tutoring's usefulness, significant at 5% and consistent with our model. Expecting an A or a B in the class increased the probability of entering the contract by 11 to 12 percentage points, compared to students who expected a C or lower. Although grade expectations do not enter our model, this result might reflect greater concern in the event of a low midterm grade among students expecting higher grades.

No other student characteristic had a statistically significant impact on take-up. Notably, neither present bias nor tendency to procrastinate was associated with demand for commitment, contrary to the model. Although surprising, these results are consistent with other findings on demand for commitment which contradict behavioral models (Carrera et al. 2022).

5 Conclusion

We designed a commitment contract for college students, "Study More Tomorrow," and conducted a randomized controlled trial testing a model of its demand. Our results reveal substantial demand for "Study More Tomorrow," with nearly 10% of students accepting the randomly offered contract, all of whom paid a positive monetary price in expectation. We find several surprising results when predicting demand. Future research should further explore demand for and the effects of commitment contracts among students.

References

- Ariely, Dan and Klaus Wertenbroch, “Procrastination, Deadlines, and Performance: Self-Control by Precommitment,” *Psychological Science*, May 2002, *13* (3), 219–224.
- Ashraf, Nava, Dean Karlan, and Wesley Yin, “Tying Odysseus to the mast: Evidence from a commitment savings product in the Philippines,” *The Quarterly Journal of Economics*, 2006, *121* (2), 635–672.
- Banerjee, Abhijit V. and Esther Duflo, “(Dis) organization and Success in an Economics MOOC,” *The American Economic Review Papers and Proceedings*, 2014, *104* (5), 514–518.
- Beattie, Graham, Jean-William P. Laliberté, Catherine Michaud-Leclerc, and Philip Oreopoulos, “What sets college thrivers and divers apart? A contrast in study habits, attitudes, and mental health,” *Economics letters*, 2019, *178*, 50–53. Publisher: Elsevier.
- Carrera, Mariana, Heather Royer, Mark Stehr, Justin Sydnor, and Dmitry Taubinsky, “Who Chooses Commitment? Evidence and Welfare Implications,” *The Review of Economic Studies*, May 2022, *89* (3), 1205–1244.
- Felkey, Amanda J., Eva Dziadula, Eric P. Chiang, and Jose Vazquez, “Microcommitments: The Effect of Small Commitments on Student Success,” *AEA Papers and Proceedings*, May 2021, *111*, 92–96.
- Himmler, Oliver, Robert Jäckle, and Philipp Weinschenk, “Soft commitments, reminders, and academic performance,” *American Economic Journal: Applied Economics*, 2019, *11* (2), 114–42.
- Kahneman, Daniel, Jack L. Knetsch, and Richard H. Thaler, “Experimental Tests of the Endowment Effect and the Coase Theorem,” *Journal of Political Economy*, December 1990, *98* (6), 1325–1348.
- Laibson, David, “Golden Eggs and Hyperbolic Discounting,” *The Quarterly Journal of Economics*, May 1997, *112* (2), 443–478.

- , “Private Paternalism, the Commitment Puzzle, and Model-Free Equilibrium,” *AEA Papers and Proceedings*, 2018, *108*, 1–21.
- National Center for Education Statistics, “Digest of Education Statistics,” 2020.
- O’Donoghue, Ted and Matthew Rabin, “Doing It Now or Later,” *American Economic Review*, March 1999, *89* (1), 103–124.
- Oreopoulos, Philip and Uros Petronijevic, “The Remarkable Unresponsiveness of College Students to Nudging And What We Can Learn from It,” Working Paper 26059, National Bureau of Economic Research July 2019.
- Paola, Maria De and Vincenzo Scoppa, “Procrastination, academic success and the effectiveness of a remedial program,” *Journal of Economic Behavior & Organization*, July 2015, *115*, 217–236.
- Patterson, Richard W., “Can behavioral tools improve online student outcomes? Experimental evidence from a massive open online course,” *Journal of Economic Behavior & Organization*, 2018, *153*, 293–321.
- Pugatch, Todd and Nicholas Wilson, “Nudging study habits: A field experiment on peer tutoring in higher education,” *Economics of Education Review*, February 2018, *62* (Supplement C), 151–161.
- Rogers, Todd, Katherine L. Milkman, and Kevin G. Volpp, “Commitment Devices: Using Initiatives to Change Behavior,” *JAMA*, May 2014, *311* (20), 2065–2066.
- Thaler, Richard H. and Shlomo Benartzi, “Save more tomorrow™: Using behavioral economics to increase employee saving,” *Journal of Political Economy*, 2004, *112* (S1), S164–S187.

6 Tables and Figures

Figure 1: Study More Tomorrow contract offer

Register now for Study More Tomorrow in your ECON 201 course!
1 message

OSU Economics <todd.pugatch@oregonstate.edu> Wed, Oct 14, 2020 at 10:00 AM
To: todd.pugatch@oregonstate.edu

Having trouble reading this? To view this email as a web page, [click here](#).

Hello Todd,

The Economics Department is offering **Study More Tomorrow**, a tool to help you commit to studying in ECON 201.

- **How does it work?** If you score below 80% on any midterm, you commit to go to the Economics Tutoring Lab at least once before the term ends. (Tutoring is free.)
- **What happens if I score below 80% on the midterm and don't visit the tutoring lab?** You lose all ten of your entries in a lottery for a textbook scholarship in this course. (Two scholarships per qualifying section. We sent you an email about this lottery on October 7.)
- **What do I do now?** Follow this link to learn more and choose whether to participate in **Study More Tomorrow**. The deadline to participate is Friday, October 23.

[Find out more!](#)

or click on this link: https://oregonstate.qualtrics.com/jfe/form/SV_d7nV8wV9DwpGDsh?Q_DL=hYwAAPUFZEU4Glp_d7nV8wV9DwpGDsh_MLRP_8pj9SiGDjhI3qUR&Q_CHL=gl

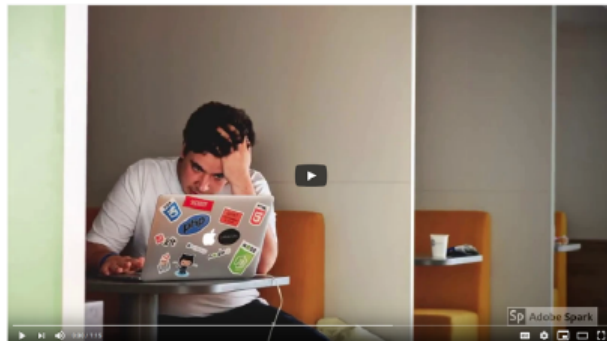


Figure 2: Study More Tomorrow take-up

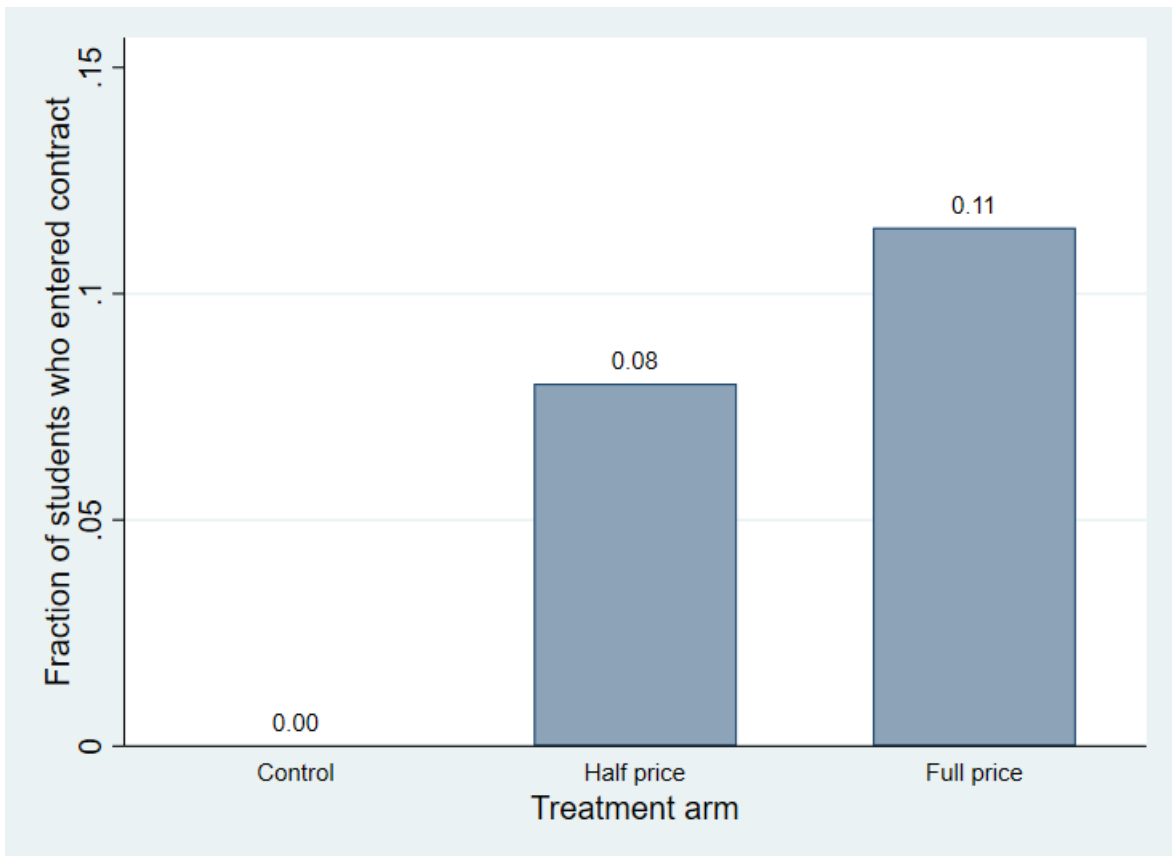


Table 1: Study More Tomorrow take-up

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	All	Treated	Price	Present bias	Procrastinate	Tutor	Expected grade	Treated
	interactions	interactions	interaction	interaction	interactions	interactions	interactions	subsample
treated (any)	-0.016 (0.084)	0.098*** (0.013)	0.080*** (0.016)	0.096*** (0.013)	0.156** (0.075)	0.070*** (0.025)	-0.014 (0.012)	0.042* (0.025)
high price (* treated)	0.042* (0.025)		0.036 (0.025)					0.025 (0.039)
present biased * treated	0.015 (0.039)			0.024 (0.039)				-0.062 (0.078)
unlikely to procrastinate * treated	-0.058 (0.079)			-0.061 (0.077)				-0.049 (0.079)
likely to procrastinate * treated	-0.049 (0.080)			-0.051 (0.077)				-0.079 (0.082)
very likely to procrastinate * treated	-0.076 (0.084)			-0.087 (0.081)				0.101 (0.126)
usefulness of tutoring: 1 * treated	0.102 (0.125)					0.095 (0.122)		0.068 (0.055)
usefulness of tutoring: 2 * treated	0.072 (0.054)					0.063 (0.054)		0.010 (0.034)
usefulness of tutoring: 3 * treated	0.006 (0.034)					0.002 (0.033)		0.013 (0.033)
usefulness of tutoring: 4 * treated	0.015 (0.033)					0.011 (0.032)		0.118** (0.049)
usefulness of tutoring: 5 * treated	0.123** (0.049)					0.115** (0.049)		0.109*** (0.024)
expected grade: A * treated	0.114*** (0.026)						0.118*** (0.022)	0.120*** (0.026)
expected grade: B * treated	0.119*** (0.028)						0.114*** (0.024)	
Observations	861	861	861	861	861	861	861	575
mean of y	0.0650	0.0650	0.0650	0.0650	0.0650	0.0650	0.0650	0.0974

Dependent variable is an indicator for entering the SMT contract. All regressions include the levels of baseline characteristic variables, dummies for strata and dummies for course section. Column 8 shows regression over the subsample of students in the treatment group, so the coefficients represent the main effect of each variable. Robust standard errors in parentheses. *** p < 0.01, ** p < 0.05, * p < 0.1