NBER WORKING PAPER SERIES

GOAL SETTING, ACADEMIC REMINDERS, AND COLLEGE SUCCESS: A LARGE-SCALE FIELD EXPERIMENT

Christopher R. Dobronyi
Philip Oreopoulos
Uros Petronijevic

Working Paper 23738
http://www.nber.org/papers/w23738

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2017

This RCT was registered in the American Economic Association Registry for randomized control trials under Trial number AEARCTR-0000810. We are very grateful to Jordan Peterson for helping create the goal-setting and growth mindset exercise used in this study, and to Dominique Morisano for providing constructive (yet dissenting) feedback. Helpful comments were provided from participants at seminars given at the economics departments of Dartmouth University, Duke University, the State University of New York (SUNY), Science Po, the Paris School of Economics, and at the OECD, the Canadian Institute For Advanced Research, and Ideas42 Behavioral Insights Consulting. We are also grateful to Aaron de Mello for programming our web-site and texting platform and to the first-year economics instructors at the University of Toronto, Mississauga for generously incorporating the exercise into their syllabus. Thanks also to Jean-William Laliberté for outstanding research assistance. Funding was provided from the Social Sciences and Humanities Research Council (#435-2015-0180) and the Jamal Poverty Action Lab. All errors, omissions, and conclusions are our own. The views expressed herein are those of the authors and do not necessarily reflect the views of the National Bureau of Economic Research.

Goal Setting, Academic Reminders, and College Success: A Large-Scale Field Experiment
Christopher R. Dobronyi, Philip Oreopoulos, and Uros Petronijevic
NBER Working Paper No. 23738
August 2017
JEL No. I23,J24

ABSTRACT

This paper presents an independent large-scale experimental evaluation of two online goal-setting interventions. Both interventions are based on promising findings from the field of social psychology. Approximately 1,400 first-year undergraduate students at a large Canadian university were randomly assigned to complete one of two online goal-setting treatments or a control task. Additionally, half of treated participants also were offered the opportunity to receive follow-up goal-oriented reminders through e-mail or text messages in an attempt to test a cost-effective method for increasing the saliency of treatment. Across all treatment groups, we observe no evidence of an effect on GPA, course credits, or second year persistence. Our estimates are precise enough to discern a seven percent standardized performance effect at a five percent significance level. Our results hold by subsample, for various outcome variables, and across a number of specifications.

Christopher R. Dobronyi
University of Toronto
150 St. George St.
Toronto, Ontario, Canada
M5S3G7
christopher.dobronyi@mail.utoronto.ca

Philip Oreopoulos
Department of Economics
University of Toronto
150 St. George Street
Toronto, ON M5S 3G7
CANADA
and NBER
philip.oreopoulos@utoronto.ca

Uros Petronijevic
Department of Economics
York University
Vari Hall
4700 Keele Street
Toronto, Ontario, Canada
M3J 1P3
upetroni@yorku.ca

A randomized controlled trials registry entry is available at
https://www.socialscienceregistry.org/trials/810

An online appendix is available at
http://www.nber.org/data-appendix/w23736

I. Introduction

Having earned acceptance into college, most students intend to earn good grades and keep options open for graduate school (Beattie, Laliberté, & Oreopoulos, 2016). Despite these intentions, many attain low grades and drop out. In the province of Ontario, for example, thirty percent of college students withdraw from their program within the first year, with factors relating to grades and motivation playing the largest roles (Finnie, Childs, & Qiu, 2010). Two-thirds of these students do not switch into another program. Among all four-year colleges in the United States, only fifty-six percent of college students graduate in six years or less (Symonds, Schwartz, & Ferguson, 2011).

Studies suggest that financial aid, structured coaching, tutoring, and group activities help students complete college (Scrivener et al., 2015). Financial aid helps relax credit constraints and allow students to focus more on studying instead of working (Belley and Lochner, 2007), while structured coaching, tutoring, and group activities teach effective study habits and, correspondingly, help students achieve good grades (Cook, 2014; Oreopoulos, Lavecchia, & Brown, forthcoming). While incorporating such services into college students' curriculum and requiring students to enroll full-time has been show to double completion rates (Scrivener et al. 2015), such programs are costly to implement and therefore difficult to scale to large student populations (Bloom, 1984).

Promising research from social psychology suggests that brief one-time interventions can produce effects comparable to traditional services (Yeager and Walton, 2011; Cohen and Garcia, 2014; Walton, 2014). These interventions are effective because they challenge unhelpful perspectives about school—for example, Yeager et al. (2016) find that struggling students get better grades after completing an online exercise aimed to promote a growth mindset: The belief that intellect can

be developed. Although the saliency of treatment fades over time, an effective intervention affects recursive processes, altering a student's long-term trajectory (Yeager & Walton, 2011). Often, these brief one-time interventions are inexpensive and can be scaled.

Morisano et al. (2010) find that struggling college students earn higher grades when they write about personal goals at the beginning of the school year: Students randomly assigned to complete a brief online goal-setting intervention experienced a large increase in Grade Point Average (GPA) relative to a control group, and a higher likelihood of maintaining a full course load. It is believed that salient goals affect action (Locke & Latham, 1990, 2002; Locke et al., 1981), and that goal-setting affects performance by improving focus, effort, enthusiasm, and persistence, while leading students to more efficient strategies for achieving desired outcomes (Locke & Latham, 2002). Online goal-setting interventions are inexpensive and can be scaled, with the potential to help students earn better grades and complete college.

Most studies that evaluate the efficacy of goal-setting interventions either have small sample sizes (e.g. Morisano et al., 2010) or use quasi-experimental approaches with observational data (e.g. Schippers, Sheepers & Peterson, 2015), making it difficult to credibly identify treatment effects. In contrast, this paper presents an independent large-scale experimental evaluation of the effect of two goal-setting exercises on grades and retention rates in college.

We randomly assign approximately 1,400 undergraduate students from a representative commuter campus in suburban Toronto to control or treatment. Treated students completed an online goal-setting exercise similar to that of Shippers, Sheepers & Peterson (2015) and related to Morisano et al. (2010), or a condensed version of this goal-setting exercise and a short mindset exercise

designed to foster the belief that intellect can be developed.[1] To test a cost-effective way to increase the saliency of treatment, half of the treated students were offered the opportunity to regularly receive e-mail or text message reminders, which made explicit references to the goals each student described during the completion of initial treatment. All experimental materials, documented in the appendices A through C, were generously provided by Jordan Peterson (Morisano et al., 2010; Peterson and Mar, 2013; Schippers, Scheepers, & Peterson, 2015), and are similar to that of Schippers et al. (2015). Grades and registration status were monitored for two years after treatment.

II. Theory and Evidence

Students who do not complete college often begin to struggle shortly after the start of their first term (Adelman, 1999, 2006; Ishitani & DesJardins, 2002). In part, the struggles stem from inadequate preparation (Kuh et al., 2007), which makes it difficult to complete coursework and keep up in a fast-paced, competitive environment (Pennebaker, Colder & Sharp, 1990). All else equal, students who devote adequate time and effort to their studies perform well (Burks et al., 2015) and complete college (Pascarella and Terezini, 2005). But many students do not study enough to earn good grades (Beattie, Laliberté, & Oreopoulos, 2016). Non-cognitive factors like attitude, procrastination, and persistence predict how much schooling a student attains nearly as well as cognitive skill (Kautz et al., 2014).

Studies suggest that non-academic services help students by fostering motivation, effort, and good study habits (Robbins et al., 2003; Lotkowski, Robbins & Noeth, 2004; Lazowski & Hulleman, 2015). First-year seminars (Schnell, Louis, & Doetkott, 2003), cognitive behavioral therapy (Heller et al., 2013; Cook et al., 2014), and coaching (Oreopoulos, Lavecchia & Brown, forthcoming) have all been shown to

[1] We outline below how our intervention differs from that in Morisano et al. (2010).

improve a number of academic outcomes. An emerging recent literature suggests that goal-setting interventions also help students earn better grades (Morisano, 2008).

Goals represent conscious and meaningful objectives that people pursue (Elliot et al., 2001), believed to affect both thought and action (Locke & Latham, 1990, 2002; Locke et al., 1981; Wiese & Freund, 2005). It is believed that people regulate their lives through meaningful thought (Bandura, 1997; Locke & Latham, 2002).[2] If students are present-biased, prompting them to think more carefully about their future may help reduce the bias by increasing focus, effort, motivation, and persistence (Locke & Latham, 2002; Locke et al., 1981; Smith, Locke, & Barry, 1990, Lavecchia, Liu, and Oreopoulos, 2016). This leads to the discovery of relevant knowledge and the use of more efficient strategies for achieving desired outcomes. Goal-setting is also believed to decrease stress (Elovainio & Kivimäki, 1996) and increase working memory (see Morisano [2008] for an overview), making students with clear goals more likely to complete college (Braxton et al., 2004; Kirby & Sharpe, 2001).

Simply making a list of goals is not sufficient for helping students reach desired outcomes (Koestner et al., 2002).[3] For goal setting to be effective, goals must be meaningful, challenging, specific, and attainable. Individuals are more likely to put in effort when a goal is meaningful and difficult (Koestner et al., 2002; Ryan et al., 1996; Locke & Latham, 2002), and making goals specific tends to reduce variation in performance (Locke et al., 1989).[4] Moreover, people who believe that they are making progress toward a goal perform better (Diener, 1984; Koestner et al., 2002). As a result, performance is improved when a large or complex goal is

[2] More than four hundred studies find a correlation between goal-setting and task performance (Locke & Latham, 1990, 2002, 2007).
[3] See Morisano and Shore (2010) for a detailed overview of conditions related to successful goal setting (pp. 253).
[4] As one might expect, the probability of goal attainment declines as goal difficulty progressively exceeds individual ability (Bandura, 1977; Perrone et al., 2004; Schunk, 1991), as perceived obstacles present too great a challenge to attainment (Lent, Brown, & Hackett, 2000).

split into smaller goals because regular feedback on progress is then readily available (Latham & Seijts, 1999; Locke & Latham, 2002). For similar reasons, it is important for people to set a timeline, create a detailed plan for attaining their goal, list the consequences of their goal, and create alternative plans for when they reach obstacles (Gollwitzer, 1999; Bandura, 1977; Schunk, 1991). Goal-setting interventions guide students through this process in great detail.

Morisano et al. (2010) construct a randomized experimental evaluation of the effects of a one-time goal-setting intervention on the academic performance of struggling undergraduate students at McGill University in Montreal. Interested participants were self-nominated academically struggling students with GPA's below 3.0. They were qualitatively screened for inclusion and assessed for feelings of academic struggle, with a total of eighty-five students meeting the participation criteria and being included in the study. Students were offered financial remuneration for their time.

Randomly selected treated students were then guided through a sequence of eight online goal-setting exercises, adapted for young adult students from an intervention by Peterson and Mar (2004). Students were instructed that the exercise would take 2 to 2.5 hours. At the outset, they were asked to think about their values and futures and what they hoped to accomplish in a general sense. They were then asked to define seven or eight specific goals and to examine each goal carefully, explaining why each was important and vividly describing potential obstacles and strategies for overcoming them. The treatment group (n=45) exhibited a large and statistically significant increase in mean GPA from 2.25 to 2.91, (an increase of about 70 percent of a standard deviation) while the control group (n=40) experienced no discernible change. No treated participant dropped below a full course load, while eight of the students in the control group did—two students from the control group withdrew from the university entirely. Subsequent goal-setting interventions have found heterogeneous treatment effects (Schippers,

Scheepers, & Peterson, 2015), and effects on retention rates but not on GPA (Finnie et al., 2017).

Most goal-setting interventions have a small sample size (e.g. Morisano et al., 2010), use observational data, or rely on pre-post quasi-experimental designs (e.g. Schippers, Sheepers & Peterson, 2015). Given the dramatic estimated effects and the scalability of these interventions, a primary purpose of this study is to test the external validity of these studies with a similar intervention in an experimental setting with a sufficiently large sample size.

A brief goal-setting intervention can push students in the right direction, but it is important for students to maintain confidence in their abilities to reach their goals (Bandura, 1977, 1993). Students with low confidence seek to maintain positive judgments of their ability (Elliot & Dweck, 1988; Leondari & Gialamas, 2002; Robins & Pals, 2002) and often tend to perform poorly because they do not embrace challenges as opportunities for learning more effective strategies for goal attainment (Diener & Dweck, 1978, 1980). In contrast, students who believe that ability is to be developed along a journey treat challenges and setbacks as learning experiences, using them to form better strategies and, ultimately, performing better (Dweck & Leggett, 1988).

Many studies find a positive association between academic performance and a growth mindset – the belief that intellectual abilities can be developed (Stipek & Gralinski, 1996; Dweck, 2000; Blackwell, Trzesniewski, & Dweck, 2007; Romero et al., 2014; Claro et al., 2016). A growth mindset is believed to foster the perception that difficult tasks are a medium for growth (Blackwell et al., 2007), encouraging challenging learning experiences (Mueller & Dweck, 1998; Romero et al., 2014). Students who are taught the science behind the malleability of the brain and the benefits associated with a growth mindset perform better than their peers (Aronson Fried, and Good, 2002).

Paunesku et al. (2015) conduct a randomized experimental evaluation of a one-time, online growth mindset intervention on the academic performance of high school students. A total of 1,594 students from 13 high schools in the United States participated. The growth mindset treatment guided students through an article that explained how the brain is able to grow through practice and hard work, citing relevant findings from the field of neuroscience. Students were then asked to either summarize the article in their own words, or to advise a hypothetical discouraged student. The treatment module was designed to last 45 minutes. The authors find a statistically significant interaction between treatment and an indicator for whether the student was at risk prior to treatment. A follow up study by Yeager et al. (2016) attempts to improve the efficacy of this intervention by making it more relevant for high school students: The authors find that struggling high school students assigned to complete the revised growth mindset intervention experienced a 0.13 unit increase in GPA, on average.

While these interventions are small in terms of resources and costs, a well-designed intervention makes use of novel mechanisms and targets relevant subjective beliefs to create an impactful experience from the perspective of the student (Yeager & Walton, 2011). Moreover, Morisano et al. (2010) and Paunesku et al. (2015) use the act of writing to encourage students to internalize treatment—writing requires complex reasoning (Sugiyama, 2001) and has been shown to increase working memory and improve grade point average (Klein & Boals, 2001).[5] While the saliency of treatment fades over time, an effective intervention will affect recursive processes (Yeager & Walton, 2011).

This paper tests a new goal-setting treatment additionally intended to foster a growth mindset, developed by Jordan Peterson (Morisano et al., 2010; Peterson and Mar, 2013; and Schippers, Scheepers, and Peterson, 2015). Some treated participants are also randomly assigned to regularly receive personalized goal-

[5] See Smyth (1998) for an overview of the benefits associated with expressive writing.

oriented e-mails or text messages in attempt to increase the saliency of the treatment in a cost-effective way. A number of studies have shown that periodically reminding parents about their student's academic progress increases parental engagement and student achievement (Kraft & Dougherty, 2013; Bergman, 2016; Kraft & Rogers, 2014; Mayer et al., 2015). Other studies have used text messages to increase the probability of students renewing financial aid (Castleman & Page, 2014), and improve academic outcomes (Castleman & Meyer, 2016).

We hypothesize that goal-setting treatments will positively affect grades and retention rates and that the effect will be larger for students experiencing academic difficulty. We also hypothesize that this effect will fade over time and will fade slower for students assigned to receive reminders.

III. Methodology

Setting, Participants, and Experimental Procedures

We conducted our experiment at beginning of the 2014-2015 academic year at the University of Toronto's satellite campus in Mississauga (UTM). UTM is primarily a commuter campus with approximately 12,500 undergraduate students. Roughly eighty percent of students at UTM live at home with their parent(s), slightly less than a quarter identify the campus as their first choice, and the majority plan to work at least part-time while attending. Entry grades range from about 75 to 90 percent, with the median entry high school grade 82 percent. Many of the students are immigrants or children of immigrants. Among those who entered in 2001, only 38 percent completed a degree in four years, while the six-year graduation rate was about 70 percent. The rate for students from the lowest quantile of high school grades is 55 percent (Angrist, Lang, and Oreopoulos, 2009).

At the beginning of the 2014-2015 academic year, all undergraduate students enrolled in an introductory economics course at UTM were asked to participate in an online exercise for two percent of their final grade. Students completed the exercise online during the first two weeks of the fall semester and 1,505 students registered to take the exercise. Only 4 percent of students enrolled in first year economics did not register (and did not receive participation grade) and only 13 students total did not provide consent for using their data for external research, leaving 1,492 students for our baseline sample. Student-level administrative data was collected for every consenting student through the University of Toronto's centralized student information service. Academic outcomes were monitored for two years after the intervention.

All participating students were required to create an online account and complete a preliminary survey eliciting background information, study habits, and attitudes. Upon completion of the survey, forty percent of participating students were randomly assigned to the control group, while the remaining sixty percent were assigned to treatment.

Among students assigned to treatment, fifty percent were allocated to complete a goal-setting treatment similar to that of Schippers et al. (2015) and related to Morisano et al. (2010). The other fifty percent of treated students were given a condensed version of the goal-setting treatment, in addition to an exercise designed to foster a growth mindset. Ensuing completion of the designated exercise, fifty percent of all treated participants were then assigned to regularly receive personalized goal-oriented reminders through e-mail, and offered the opportunity to receive reminders through text messages; roughly seventy-five percent of students who were offered opportunity provided a phone number. (See Figure 1 for a visual representation of the complete randomization procedure.) All participants were e-mailed a copy of the answers that they had provided throughout the exercise.

In Table 1, we fail to reject the null hypothesis that the realized proportions of students assigned to control and treatment groups differ from the intended proportions at any reasonable significance level. This result is expected, since we maintain the full sample of participating students prior to randomization for our analysis. Tables 2 and 3 illustrate that there does not exist a statistically significant difference between the sample means of any baseline characteristics across control and treatment groups, as expected with random assignment. In terms of the descriptive characteristics of this sample, forty-nine percent of participants are female, seventy-three percent are first-year students, fifty-seven percent are non-native English speakers, fifty-seven percent are not Canadian citizens, and the average age is nearly nineteen. Seventeen percent of participating students lived in residence in the year of the initial treatment, and the mean high school average was eighty-two percent.

Treatments

The goal-setting intervention was designed to help students imagine a roadmap for achieving their goals. This intervention was developed using theory on goal-setting, expressive writing (Smyth, 1998), and creativity models (Simonton, 1999). Students were required to provide answers in writing. Minimum word counts and time restrictions were imposed to encourage participants to give each answer an appropriate amount of consideration — to encourage students to write freely, we made clear we would delete their written thoughts after emailing their completed exercise for reference. Responses to part of a similar exercise reported in Oreopoulos and Petronijevic (2017) suggest that virtually all students took the task very seriously, writing in personal detail. The entire module was designed to take two hours to complete.

The goal-setting treatment encouraged students to set goals that are meaningful, specific, challenging, and attainable. Students were asked to write about one thing that they could do better, things that they would like to learn in the near and distant future, and their current habits. Students were also asked to envision their future social life, future family life, future career, and to write about how to maintain a balanced life. They were required to list role models and create a title and description for both an ideal future and a future that they would like to avoid.

Next, students were encouraged to identify specific goals and envision steps that they could take in order to induce the realization of their preferred future. Students were asked to describe their ideal future in detail, identify and prioritize goals from their answers so far, and evaluate their motives for each of these goals. This process was meant to help students identify specific goals that are meaningful to them, and to help students avoid the natural tendency to set too many goals at once or goals that conflict with each other (Baumeister & Heatherton, 1996; Koestner et al., 2002). Students were then asked to consider consequences of their goals, create detailed plans for attaining their goals, and to identify benchmarks for monitoring their progress along the way.

As a point of clarification, our treatment and that from Schippers et al. (2015) differs from Morisano et al. (2010) in three main ways. First, regarding content, Morisano et al. (2010) did not ask students to write about their future social life, future family life, future leisure activities, or a future to avoid, and they did not ask students to create a title for their ideal future; in addition, they asked students to ascertain their levels of commitment to each of their chosen goals. Second, Morisano et al. (2010) did not impose minimum word counts or required writing times, but instead hand-checked that the exercises were given sufficient consideration. The authors also asked that students write for a minimum of 2 and a maximum of 2.5 hours in one sitting and without taking breaks. Third, the exercises were presented in a different order than in the current study. We discuss the

likelihood that these differences explain our contrasting findings in Section V below. All experimental materials for this treatment group are provided in Appendix A.

The goal-setting-plus-mindset treatment replaced the requirement for students to define eight specific future goals with an introduction to growth mindset theory – the belief that intellect can be developed. The growth mindset treatment guided students through an article that explained how the brain is able to grow through practice and hard work, citing relevant findings from the field of neuroscience. Students were then asked to recall related experiences in which hard work led to success, and to identify ways that they may apply a growth mindset to deal with obstacles in the future. This treatment aimed to discourage the belief that ability is innate, and to encourage students to recognize effort as an effective way to achieve success and to take on challenging learning experiences. This treatment was made with the intention of combining the cores of prior goal-setting and mindset interventions, both of which have been shown to be effective at improving student outcomes. All experimental materials for this treatment group are provided in Appendix B.

To increase the saliency of treatment, half of the treated students were offered the opportunity to receive reminders. Reminders were sent through e-mail and text messages. These reminder messages consisted mainly of academic tips and motivational support. For students who competed the full goal-setting treatment, some reminders were personalized with goal-oriented messages, making explicit reference to the individual-specific goals each student provided during the completion of the initial treatment. Appendix D documents all the messages we sent throughout the experiment. Students were allowed to choose the frequency of reminders, and were allowed to discontinue reminders at any time, although only four chose to opt out. Text messages were brief, typically three lines in length; e-mails were longer and more detailed. For the 75 percent of students who provided a cell phone number to contact, each text message was sent together with an email

containing similar information but with more detail. Students could respond to either email or text, though we did not prompt them and few actually did.

The control group was given a personality test measuring the Big Five personality traits. This exercise was intended to require an equivalent amount of time and effort as the treatments but without affecting grades or retention rates, thus making it an appropriate control group exercise and making our results comparable to other goal-setting interventions. All experimental materials for the control group are provided in Appendix C.

IV. Results

Empirical Strategy

We estimate treatment effects by comparing means in a regression framework. Since randomization was successful (see Tables 1 to 3), the ordinary least squares estimator for each coefficient is a consistent estimator of the average causal effect of being offered the opportunity to complete the corresponding treatment on the outcome of interest relative to the control group. Since 1,399 out of a total of 1,492 registered students completed the exercise, these estimates are likely close to the unconditional average treatment effects.

Our primary specification estimates the effect of any treatment. We also estimate the effect of the goal-setting treatment, the effect of the goal-setting plus mindset treatment, the effect of any treatment with reminders, the effect of any treatment without reminders, and the effect of each treatment with and without reminders. We also present results by subsamples more at risk of poor academic performance, and results corresponding to alternative specifications that account for student characteristics, and student characteristics and course fixed effects.

Our main outcomes of interest are course grades and registration status. Course grades are increasing in student performance on a scale ranging from zero to one hundred, and recorded at the end of every semester. Registration status is a binary outcome equal to one if and only if the participant is officially registered as a student at the University of Toronto. Registration status is recorded at the beginning of every school year. In part, course grades were chosen because evidence suggests that grades proxy for knowledge retention and are the best predictor of college completion (Pascarella & Terezini, 2005). While registration status is a standard outcome variable within the existing literature on goal-setting interventions, Morisano et al. (2010) focus on GPA instead of grades. But course grades provide us with more power to estimate treatment effects and allow for us to control for course difficulty with course fixed effects. To be sure that this does not affect the results, we estimate treatment effects for an array of alternative dependent variables, including GPA.

When the dependent variable is course grades, reported course grades are stacked for every student, the regression is run at the course-student level, and standard errors are clustered by student identification numbers. All other specifications are run at the student level.

Main Results

Table 4 presents the estimated effect of each treatment on two years of course grades by semester, and registration status in the year following treatment. Each row is associated with a particular outcome variable. Each element of column (1) reports the mean and standard deviation of the corresponding outcome variable for the control group. Columns (2) through (10) present the estimated average causal effect of each treatment relative to the control group, and the corresponding standard error. We observe no evidence of an effect of treatment with estimates precise enough to discern a one percentage point increase in course grades at a five

percent significance level—this is equivalent to a seven percent standardized performance effect.

Figures 3 and 4 illustrate the distributions of grades by treatment group. There is no observable effect of treatment on the distribution of grades and a Kolmogorov-Smirnov test fails to reject the null hypothesis that control and treatment group grade distributions are the same.

Heterogeneous Treatment Effects, Alternative Outcomes, and Alternative Specifications

Tables 5 and 6 provide the estimated effect of each treatment on all grades in the year of initial treatment by administrative subsample and survey subsample, respectively. Table 7 reports treatment effects by quantiles of high school grades. We explore treatment effects across various subsamples to be thorough with the analysis, to explore whether the effects of personal goal setting are stronger for native English speakers as found in Morisano et al. (2010), and to explore whether the interventions are more effective in subsamples that are a better reflection of the self-nominated, academically struggling sample of participants in Morisano et al. (2010).

The estimates presented in Tables 5 through 7 generally do not show a positive effect associated with treatment—only 8 out of 306 estimated effects are statistically different from zero at a five percent significance level, five of which are negative. At the five percent significance level, we would expect that about 15 of the 306 estimated effects would be significant because of sampling error. Therefore, while some treatment effects are positive for students whose mother tongue is English, given the null findings overall, we are uncomfortable concluding that these estimates reflect the treatment being more effective for native English speakers, as in Morisano et al. (2010). It may be the case that they are simply an artifact of a multiple hypothesis testing problem. We also find that the interventions are

ineffective for students in the bottom quantile of the incoming high school grades distribution.[6] Since high school grades are a strong predictor of college success, it is therefore unlikely that the treatments are effective in a subsample of struggling college students, as in Morisano et al. (2010).

Overall, these results suggest that none of the treatments were able to improve students' academic outcomes, both in the full sample and across several student subgroups. Table 8 reports the estimated effect of treatment on alternative outcomes: We observe no discernible effect of treatment on first year GPA, quantiles of GPA, the number of credits taken, the number of credits failed, or the number of credits received.

All results hold independent of the chosen specification. We continue to observe no evidence of any effects when we control for a broad range of student characteristics, or when we control for student characteristics and course fixed effects. See the online appendix for all results under these secondary and tertiary specifications.

V. Discussion

One-time online interventions may provide a cost-effective way to help students perform better and complete college. But we find no effect associated with an intervention designed to help college students set good goals and guide them through the process of developing detailed plans for achieving their goals. We also find no effect associated with a new intervention in which students set goals and complete an exercise aimed to foster a growth mindset. Moreover, goal-oriented

[6] In addition, treatment effects for the top quantile of students are not statistically different from zero at the five percent significance level. The bottom quantile of students had a high school average of 77 percent and the top quantile of students had an average of 88 percent.

reminders were not able to induce a positive effect. These results hold by subsample, for various outcome variables, and across a number of specifications.

Morisano et al. (2010) test a related intervention on a sample of McGill students with GPAs less than 3.0, and report a treatment effect on GPA of more than half a standard deviation. We find no effects. To be clear, our intervention does differ from the intervention tested in Morisano et al. (2010). Designed by Jordan Peterson, the goal setting intervention tested in this paper is similar to the intervention in Schippers et al. (2015) and is closely related to the Self Authoring modules of Peterson, Higgins, Pihl, and Schippers.[7] While these modules overlap to a large degree with the intervention in Morisano et al. (2010), they are different in the ways described above and it is possible that these differences explain our null findings. We believe, however, that the discrepancies between the two interventions are very slight, and it therefore seems unlikely that they would generate such strikingly different results.

There are at least four other potential explanations for the contrast between our results and the pilot study by Morisano et al. (2010). First, the students in our study are mainly first-year students enrolled in an economics course and were not self-nominated as struggling or screened for inclusion. While Morisano et al. (2010) do not have any first-year students in their sample, Schippers et al. (2015) find effects for first year students. We provide evidence that our results do not depend on the fact that our sample mainly consists of first-year students (see Table 5). The Morisano et al. study recruited volunteers with GPAs below 3.0 who acknowledged they were experiencing academic difficulty. Although our estimated null effects hold for the bottom quantile of students, it is possible that self-nomination is important, or that UTM's entrance criterion truncates the sample of students that would have been affected by the treatment. This seems unlikely, however, because

[7] The Self Authoring modules can be found at https://www.selfauthoring.com/.

UTM's entrance criterion is significantly lower than McGill's, where Morisano et al. conduct their study.

Second, despite effort to preserve the feel of the intervention in the pilot study, and in addition to the differences already documented above, there may exist further unknown, but crucial, differences in design. If so, this only accentuates the difficulties associated with scaling interventions. Third, it may be the case that the results of the pilot study are spurious. We have nearly eighty times the number of observations and sufficient power to discern a seven percent standardized performance effect at a five percent significance level. Fourth, it is possible that the results of the pilot study stem from an error in data collection or estimation, or an unintentional treatment effect associated with recruitment or design.

The fact that our mindset treatment did not produce an effect does not necessarily contrast the existing literature on growth mindset interventions. Our mindset treatment was short and may not have been long enough to induce an effect. Moreover, combining treatments does not always increase the magnitude of the effect of a treatment (Good, Aronson, & Inzlicht, 2003; Yeager et al., 2014; Paunesku et al., 2015). In general, a growth mindset is associated with better goals (Elliot & Dweck, 1988; Leondari & Gialamas, 2002; Robins & Pals, 2002), but our mindset treatment was placed at the end of the exercise, making it unable to affect the goals that students set. It is also possible that students were cognitively exhausted by the time that they had reached the mindset exercise.

The reminders aimed to increase the saliency of the initial treatment. But the initial treatment had no effect on student performance. As a result, it is unreasonable to believe that reminders would induce a positive effect. Moreover, messaging campaigns are not always effective at improving the types of academic outcomes considered in this paper. For example, Oreopoulos and Petronijevic (2017) show that a text messaging campaign is unable to replicate the effects of an academic coaching program.

Despite the contrast with some of the existing social-psychology literature, our findings are not necessarily surprising. A meta-analysis of 100 publications in psychology journals finds that when effects are replicated with well-powered designs, the mean effect size is half that of the pilot study, on average (Open Science Collaboration, 2015). Furthermore, while ninety-seven percent of pilot studies had statistically significant results, only thirty-six percent of replications had significant results. Social psychology interventions are no exception (Dee, 2015; Hanselman et al., 2016).

This paper represents a step toward identifying what works and what does not in goal-setting interventions. These interventions are attractive for their low cost and easy scalability but more research is required to evaluate the conditions by which goal-setting interventions can be used to help college students perform well and complete college.

References

Adelman, Clifford, 1999. “Answers in the Toolbox: Academic Intensity, Attendance Patterns, and Bachelor’s Degree Attainment. Washington, DC: Office of Educational Research and Improvement, U.S. Department of Education.

Adelman, Clifford, 2006. “The Toolbox Revisited: Paths to Degree Completion from High School Through College.” Washington, DC: U.S. Department of Education.

Angrist, Joshua, Daniel Lang, and Philip Oreopoulos, 2009. “Incentives And Services For College Achievement: Evidence from a Randomized Trial.” American Economic Journal: Applied Economics, 1(1): 136-163.

Aronson, Joshua, Carrie Fried, Catherine Good, 2002. “Reducing the Effects of Stereotype Threat on African American College Students by Shaping Theories of Intelligence.” Journal of Experimental Social Psychology, 38: 113-125.

Bandura, Albert, 1977. “Self-Efficacy: Toward a Unifying Theory of Behavioral Change.” Psychological Review, 84: 191-215.

Bandura, Albert, 1993. “Perceived Self-Efficacy in Cognitive Development and Functioning.” Educational Psychologist, 28(2): 117-148.

Bandura, Albert, 1997. “Self-Efficacy: The Exercise of Control.” New York: Freeman.

Baumeister, R, and T Heatherton, “Self-Regulation Failure: An Overview.” Psychological Inquiry, 7: 1-15.

Beattie, Graham, Jean-Willian Laliberte, and Philip Oreopoulos, 2016. "Thrivers and Divers: Using Non-Academic Measures to Predict College Success and Failure." NBER Working Papers 22629, National Bureau of Economic Research, Inc.

Belley, Philippe, and Lance Lochner, 2007. "The Changing Role of Family Income and Ability in Determining Educational Achievement." Journal of Human Capital, University of Chicago Press, 1(1): 37-89.

Bergman, Peter, 2016. “Parent-Child Information Frictions and Human Capital Investment: Evidence from a Field Experiment.” Columbia University Working Paper.

Blackwell, Lisa, Kali Trzesniewski, and Carol Dweck, 2007. " Implicit Theories of Intelligence Predict Achievement Across an Adolescent Transition: A Longitudinal Study and an Intervention." Child Development, 78(1): 246-263.

Bloom, Benjamin, 1984. "The 2 Sigma Problem: The Search for Methods of Group Instruction as Effective as One-to-One Tutoring." Educational Researcher, 13(6): 4-16.

Braxton, John, Amy Hirschy, and Shederick McClendon, 2004. "Understanding and Reducing College Student Departure." ASHE-ERIC Higher Education Reports, 30(3): 1-97.

Castleman, Benjamin, and Lindsay Page, 2014. "Freshman Year Financial Aid Nudges: An Experiment to Increase FAFSA Renewal and College Persistence." Center for Education Policy and Workforce Competitiveness Working Paper No. 28. Charlottesville, VA: University of Virginia.

Castleman, Benjamin, and Katharine Meyer, 2016. "Can Text Message Nudges Improve Academic Outcomes in College? Evidence from a West Virginia Initiative." Center for Education Policy and Workforce Competitiveness Working Paper No. 43. Charlottesville, VA: University of Virginia.

Claro, Susana, David Paunesku, Carol Dweck, 2016. "Growth Mindset Tempers the Effects of Poverty on Academic Achievement." PNAS, 113(31): 8664-8668.

Cohen, Geoffrey and Julio Garcia, 2014. "Educational Theory, Practice, and Policy and the Wisdom of Social Psychology." Policy Insights from the Behavioral and Brain Sciences,1(1): 13-20.

Cook, Philip J., Kenneth Dodge, George Farkas, Roland G. Fryer, Jr, Jonathan Guryan, Jens Ludwig, Susan Mayer, Harold Pollack, Laurence Steinberg, 2014. "The (Surprising) Efficacy of Academic and Behavioral Intervention with Disadvantaged Youth: Results from a Randomized Experiment in Chicago." NBER Working Papers 19862, National Bureau of Economic Research, Inc.

Dee, Thomas, 2015. "Social Identity and Achievement Gaps: Evidence From an Affirmation Intervention." Journal of Research on Educational Effectiveness, 8: 149-168.

Diener, Carol, and Carol Dweck, 1978. "An Analysis of Learned Helplessness: Continuous Changes in Performance, Strategy, and Achievement Cognitions Following Failure." Journal of Personality and Social Psychology, 36(5): 451-462.

Diener, Carol, and Carol Dweck, 1980. "An Analysis of Learned Helplessness: II. The Processing of Success." Journal of Personality and Social Psychology, 39(5): 940-952.

Diener, Ed, 1984. "Subjective Well-Being." Psychological Bulletin, 95: 542-575.

Dweck, Carol, 2000. "Self-Theories: Their Role in Motivation, Personality and Development." Taylor and Francis: Philadelphia, PA.

Dweck, Carol, and Ellen Leggett, 1988. "A Social Cognitive Approach to Motivation and Personality." Psychological Review, 95(2): 256-273.

Elliot, Andrew, Valary Chirkov, Kennon Sheldon, and Youngmee Kim, 2001. "A Cross-Cultural Analysis of Avoidance (Relative to Approach) Personal Goals." Psychological Science, 12(6): 505-510.

Elliot, Elaine, and Carol Dweck, 1988. "Goals: An Approach to Motivation and Achievement." Journal of Personality and Social Psychology, 54(1): 5-12.

Elovainio, Marko, and Mika Kivimäki, 1996. "Occupational Stresses, Goal Clarity, Control, and Strain Among Nurses in the Finnish Health Care System." Research in Nursing and Health, 19: 517-524.

Finnie, Ross, Stephen Childs, and Theresa Qiu, 2010. "The patterns of persistence in post-Secondary education among college students in Ontario: New evidence from longitudinal data." Report prepared for Colleges Ontario.

Finnie, Ross, Wayne Poirier, Eda Bozkurt, Jordan Peterson, Tim Fricker, Megan Pratt, 2017. "Using Future Authoring to Improve Student Outcomes." Toronto: Higher Education Quality Council of Ontario.

Gollwitzer, Peter, 1999. "Implementation Intentions: Strong Effects of Simple Plans." American Psychologist, 54: 493-503.

Good, Catherine, Joshua Aronson, and Michael Inzlicht, 2003. "Improving Adolescents' Standardized Test Performance: An Intervention to Reduce the Effects of Stereotype Threat." Applied Developmental Psychology, 24: 645-662.

Hanselman, Paul, Christopher Rozek, Jeffrey Grigg, and Geoffrey Borman, 2016. "New Evidence on Self-Affirmation Effects and Theorized Sources of Heterogeneity From Large-Scale Replications." Journal of Educational Psychology: Advance Online Publication.

Heller, Sara, Harold Pollack, Roseanna Ander, and Jens Ludwig, 2013. "Preventing Youth Violence and Dropout: A Randomized Field Experiment, NBER Working Papers 19014, National Bureau of Economic Research, Inc.

Ishitani, Terry, and Stephen DesJardins, 2002. "A Longitudinal Investigation of Dropout from College in the United States." Journal of College Student Retention: Research, Theory, and Practice, 4(2): 173-201.

Kautz, Tim, James Heckman, Ron Diris, Bas ter Weel, Lex Borghans, 2014. "Fostering and Measuring Skills: Improving Cognitive and Non-Cognitive Skills to Promote Lifetime Success." Organisation for Economic Cooperation and Development.

Kirby, Dale, and Dennis Sharpe, 2001. "Student Attrition from Newfoundland and Labrador's Public College." Alberta Journal of Educational Research, 47: 353-368.

Klein, Kitty and Adriel Boals, 2001. "Expressive Writing Can Increase Working Memory Capacity." Journal of Experimental Psychology: General, 130: 520-533.

Koestner, Richard, Natasha Lekes, Theodore Powers, and Emanuel Chicoine, 2002. "Attaining Personal Goals: Self-Concordance Plus Implementation Intentions Equals Success." Journal of Personality and Social Psychology, 83: 231-244.

Kraft, Matthew, and Shaun Dougherty, 2013. "The Effect of Teacher–Family Communication on Student Engagement: Evidence from a Randomized Field Experiment." Journal of Research on Educational Effectiveness, 6(3): 199-222.

Kraft, Matthew, and Todd Rogers, 2014. "The Underutilized Potential of Teacher-to-Parent Communication: Evidence from a Field Experiment." Harvard Kennedy School Faculty Research Working Paper Series, RWP-14-049.

Kuh, George, Jillian Kinzie, Jennifer Buckley, Brian Bridges, John Hayek, 2007. Piecing Together the Student Success Puzzle: Research Propositions, and Recommendations." ASHE Higher Education Report, 32(5): 1-182.

Latham, Gary, and Gerard Seijts, 1999. "The Effects of Proximal and Distal Goals on Performance on a Moderately Complex Task." Journal of Organizational Behavior, 20: 421-429.

Lavecchia, Adam, Heidi Liu, and Philip Oreopoulos, 2016. "Behavioral Economics of Education: Progress and Possibilities." Handbook of the Economics of Education, 5: 1-74.

Lazowski, Rory, and Chris Hullman, 2016. "Motivation Interventions in Education: A Meta-Analytic Review." Review of Educational Research, 86(2): 602-640.

Lent, Robert, Steven Brown, and Gail Hackett, 2000. "Contextual Supports and Barriers to Career Choice: A Social Cognitive Analysis." Journal of Counseling Psychology, 47: 36-49.

Leondari, Angeliki, and Vasilios Gialamas, 2002. "Implicit Theories, Goal Orientations, and Perceived Competence: Impact on Students' Achievement Behavior." Psychology in the Schools, 39(3): 279-291.

Locke, Edwin, and Gary Latham, 1990. "A Theory of Goal Setting and Task Performance. " Englewood Cliffs, NJ: Prentice-Hall.

Locke, Edwin, and Gary Latham, 2002. "Building a practically useful theory of goal setting and task motivation: A 35-year odyssey." American Psychologist, 57: 705-717.

Locke, Edwin, and Gary Latham, 2006. "New Direction in goal-setting theory." Current Directions in Psychological Science, 15: 265-268.

Locke, Edwin, and Gary Latham, 2007. "New Developments in and Directions for Goal-Setting Research." European Psychologist, 12: 290-300.

Locke, Edwin, Dong-Ok Chah, Scott Harrison, Nancy Lustgarten, 1989. "Separating the Effects of Goal Specificity from Goal Level." Organizational Behavior and Human Performance, 43: 270-287.

Locke, Edwin, Karyll Shaw, Lise Saari, and Gary Latham, 1981. "Goal Setting and Task Performance: 1969-1980." Psychological Bulletin, 90: 125-152.

Lotkowski, Veronica, Steven Robbins, and Richard Noeth, 2004. "The Role of Academic and Non-Academic Factors in Improving College Retention." ACT Policy Report.

Mayer, Susan, Ariel Kalil, Philip Oreopoulos, and Sebastian Gallegos, 2015. “Using Behavioral Insights to Increase Parental Engagement: The Parents and Children Together (PACT) Intervention.” National Bureau of Economic Research Working Paper 21602. Cambridge, Mass.

Morisano, Dominique, 2008. "Personal Goal-Setting in University Students: Effects on Academic Achievement, Executive Functioning, Personality, and Mood." Department of Educational and Counseling Psychology: McGill University.

Morisano, Dominique, and Bruce Shore, 2010. "Can Personal Goal Setting Tap the Potential of the Gifted Underachiever?" Roeper Review, 32: 249-253.

Morisano, Dominique, Jacob B. Hirsh, Jordan B. Peterson, Robert O. Pihl, and Bruce M. Shore, 2010. "Setting, Elaborating, and Reflecting on Personal Goals Improves Academic Performance." Journal of Applied Psychology, 95(2): 255-264.

Mueller, Claudia, and Carol Dweck, 1998. "Praise for Intelligence Can Undermine Children's Motivation and Performance." Journal of Personality and Social Psychology, 75(1): 33-52.

Open Science Collaboration, 2015. "Estimating the Reproducibility of Psychological Science." Science, 349(6251).

Oreopoulos, Philip, Robert S. Brown, and Adam M. Lavecchia, 2014. "Pathways to Education: An Integrated Approach to Helping At-Risk High School Students." NBER Working Papers 20430, National Bureau of Economic Research, Inc.

Oreopoulos, Philip, and Uros Petronijevic, 2017. "Student Coaching: How Far Can Technology Go?" Journal of Human Resources, 52(2).

Pascarella, Ernest, and Patrick Terenzini, 2005. "How College Afects Students: A Third Decade of Research." San Fransisco: Jossey-Bass.

Paunesku, David, Gregory Walton, Carissa Romero, Eric Smith, David Yeager, and Carol Dweck, 2015. "Mind-Set Interventions Are a Scalable Treatment for Academic Underachievement." Psychological Science: 1-10.

Pennebaker, James, Michelle Colder, and Lisa Sharp, 1990. "Accelerating the Coping Process." Journal of Personality and Social Psychology, 58: 528-537.

Perrone, Kristin, Christine Civiletto, L. Kay Webb, and Jenelle Fitch, 2004. "Perceived Barriers to and Supports of the Attainment of Career and Family Goals Among Academically Talented Individuals." International Journal of Stress Management, 11: 114-131.

Peterson, Jordan, and Raymond Mar, 2013. "The Benefits of Writing."

Robbins, S., M. Davenport, J. Anderson, W. Kliewer, K. Ingram, and N. Smith, 2003. "The Role of Motivation and Self-Regulatory Behaviors on First-Year College Adjustment." Unpublished Manuscript, Iowa City, IA: ACT.

Robins, Richard, and Jennifer Pals, 2002. "Implicit Self-Theories in the Academic Domain: Implications for Goal Orientation, Attributions, Affect, and Self-Esteem Change." Self and Identity, 1: 313-336.

Romero, Carissa, Allison Master, David Paunesku, Carol Dweck, and James Gross, 2014. "Academic and Emotional Functioning in Middle School: The Role of Implicit Theories." Emotion, 14(2): 227-234.

Ryan, Richard, Kennon Sheldon, Tim Kasser, Edward Deci, 1996. "All Goals Are Not Created Equal: An Organismic Perspective on the Nature of Goals and their Regulation." The Psychology of Action: Linking Cognition and Motivation to Behavior, 7-26.

Scrivener, Susan, Michael J. Weiss, Alyssa Ratledge, Timothy Rudd, Colleen Sommo, Hannah Fresques, 2015. "Doubling Graduation Rates." MRDC.

Schippers, Michaéla, Ad Scheepers, and Jordan Peterson, 2015. "A Scalable Goal-Setting Intervention Closes Both the Gender and Ethnic Minority Achievement Gap." Palgrave Communications, 1: Article Number 15014.

Schnell, Carolyn, Karen Louis, and Curt Doetkott, 2003. "The First-Year Seminar as a Means of Improving College Graduation Rates." Journal of the First-Year Experience and Students in Transition, 24: 53-76.

Schunk, Dale, 1991. "Self-Efficacy and Academic Motivation." Educational Psychologist, 26: 207-231.

Simonton, Dean, 1999. "Origins of Genius: Darwinian Perspectives on Creativity." Oxford University Press: New York.

Smith, Joshua, 1998. "Written Emotional Expression: Effect Sizes, Outcome Types, and Moderating Variables." Journal of Consulting and Clinical Psychology, 66(1): 174-184.

Smith, Ken, Edwin Locke, and David Barry, 1990. "Goal Setting, Planning and Organizational Performance: An Experimental Simulation." Organizational Behavior and Human Decision Processes, 46: 118-134.

Stipek, Deborah, and Heidi Gralinski, 1996. "Children's Beliefs About Intelligence and School Performance." Journal of Educational Psychology, 88(3): 397-407.

Sugiyama, Michelle, 2001. "Food, Foragers, and Folklore: The Role of Narrative in Human Subsistence." Evolution and Human Behavior, 22: 221-240.

Symonds, William, Robert Schwartz, and Ronald Ferguson, 2011. "Pathways to prosperity: Meeting the challenge of preparing young Americans for the 21st century." Cambridge, MA: Pathways to Prosperity Project, Harvard University Graduate School of Education.

Walton, Gregory M., 2014. "The New Science of Wise Psychological Interventions." Current Directions in Psychological Science, 23(1): 73-82.

Wiese, Bettina, and Alexandra Freund, 2005. "Goal Progress Makes One Happy, or Does It? Longitudinal Findings from the Work Domain." Journal of Occupational and Organizational Psychology, 78: 287-304.

Yeager, David, Gregory Walton, 2011. "Social-Psychological Interventions in Education: They're Not Magic." Review of Economic Research, 81(2): 267-301.

Yeager, David, Carissa Romero, Dave Paunesku, Christopher S. Hulleman, Barbara Schneider, Cintia Hinojosa, Hae Yeon Lee, Joseph O'Brien, Kate Flint, Alice Roberts, Jill Trott, Daniel Greene, Gregory Walton, and Carol Dweck, 2016. "Using Design Thinking to Improve Psychological Interventions: The Case of the Growth Mindset During the Transition to High School." Journal of Educational Psychology, 108(3): 374–391.

Yeager, David, Gregory Walton, M Brady, E Akcinar, David Paunesku, L Keane,…, Carol Dweck, 2014. "Brief Psychological Interventions Can Reduce Post-Secondary Achievement Gaps at Scale." Manuscript Submitted for Publication.

1 Figures

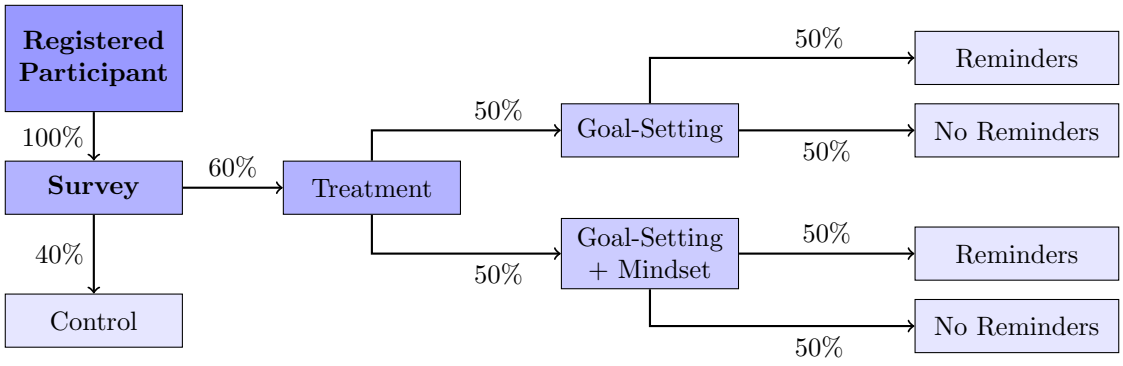

Figure 1: Flow chart illustrating the randomization of registered participants into treatment and control groups.

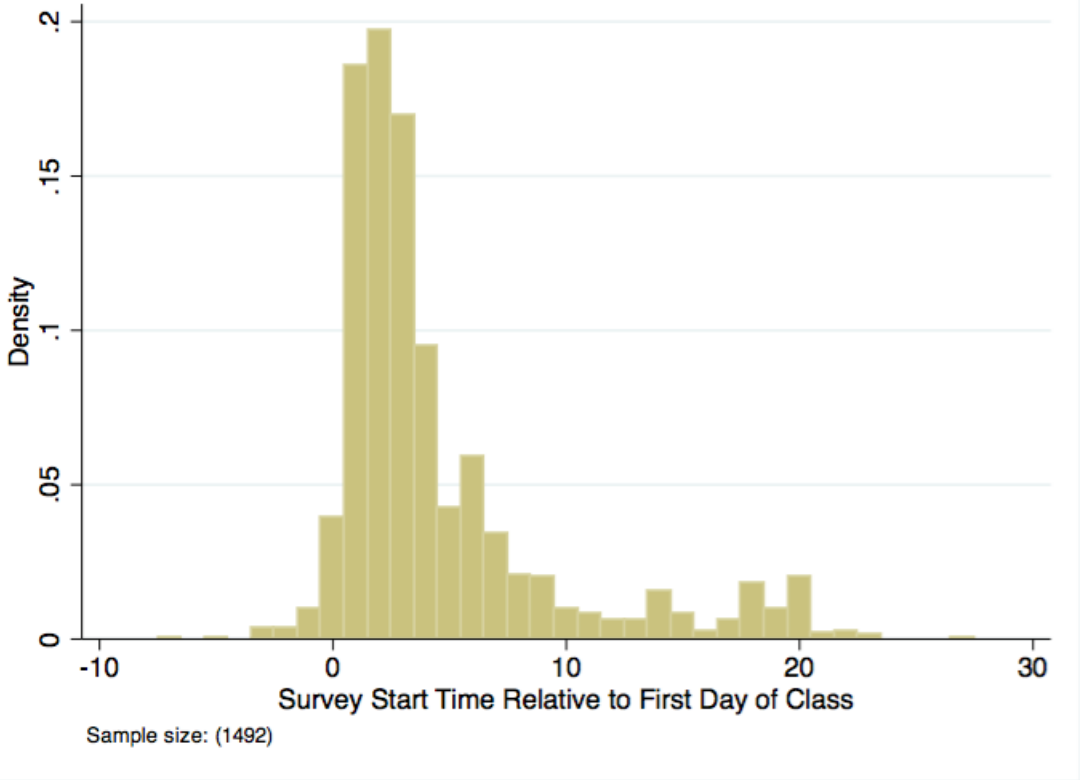

Figure 2: Histogram of the number of days each student took to start the survey relative to the first day of class.

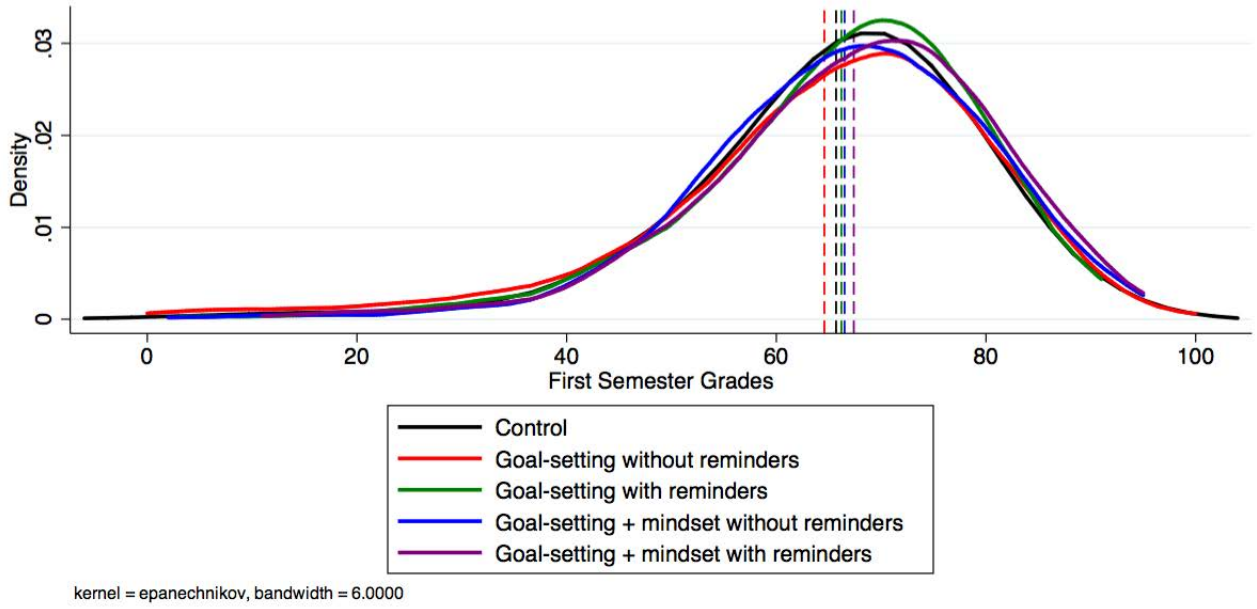

Figure 3: Kernel density of first semester (2014-2015) grades by treatment group. Dashed lines represent group means.

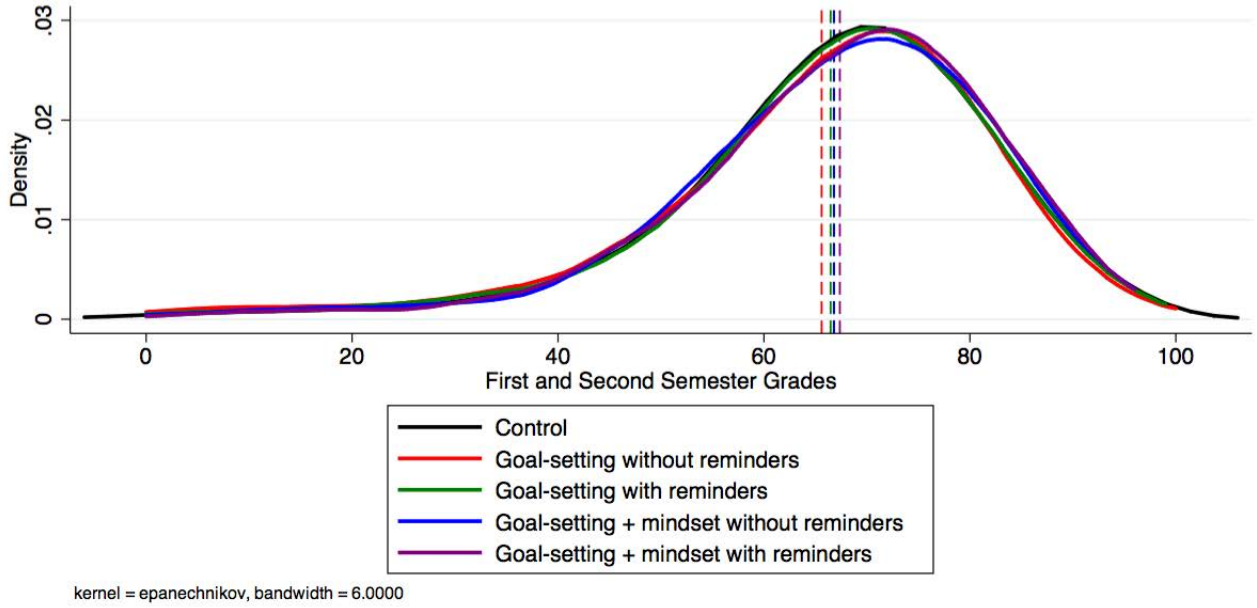

Figure 4: Kernel density of all 2014-2015 grades by treatment group. Dashed lines represent group means.

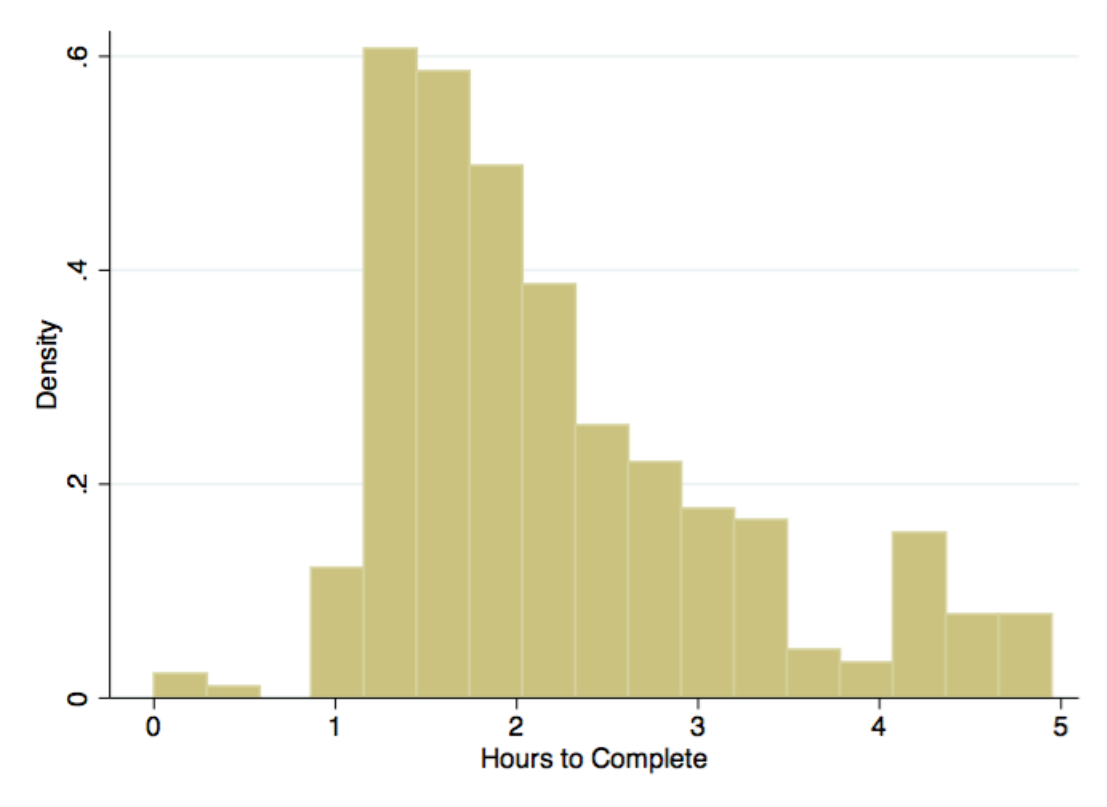

Figure 5: Histogram of the number of hours each student took to complete treatment conditional on completion and truncated at 5 hours.

2 Tables

Table 1: Intended and realized proportions of students assigned to control and treatment groups.

	Treatment Group				
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment. NR: No reminders; R: Reminders.				
	Control	**G**	**G**	**GM**	**GM**
		NR	R	NR	R
Number of Students	601	216	225	221	229
(i) Fraction of Total	40.28%	14.47%	15.08%	14.81%	15.34%
(ii) Intended Fraction	40.00%	15.00%	15.00%	15.00%	15.00%
P-Value of (i) = (ii)	0.8253	0.5664	0.9310	0.8372	0.7130

Table 2: Descriptive statistics with administrative data.

	Treatment Group					
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment. NR: No reminders; R: Reminders.					
	Control	**G**	**G**	**GM**	**GM**	
		NR	R	NR	R	
	Sample Mean [s.d.]	Difference with Control [s.e.]	Difference with Control [s.e.]	Difference with Control [s.e.]	Difference with Control [s.e.]	F-Stat: No Difference
Female	0.493 [0.500]	0.017 [0.040]	-0.026 [0.039]	0.010 [0.039]	-0.017 [0.039]	0.28
Age	18.752 [1.339]	0.216* [0.119]	-0.103 [0.117]	0.126 [0.118]	0.078 [0.117]	1.56
High School Average	84.186 [4.431]	0.090 [0.362]	-0.097 [0.357]	0.303 [0.358]	-0.165 [0.356]	0.36
Non-English Mother Tongue	0.572 [0.495]	0.048 [0.039]	-0.030 [0.039]	0.002 [0.039]	-0.022 [0.038]	0.83
Non-Canadan Citizenship	0.581 [0.494]	0.049 [0.039]	−0.070* [0.039]	0.003 [0.039]	-0.061 [0.038]	2.28
First Year Student	0.739 [0.440]	−0.067* [0.035]	0.016 [0.035]	-0.001 [0.035]	-0.005 [0.034]	1.21
Living in Residence	0.163 [0.370]	0.008 [0.030]	0.041 [0.029]	0.018 [0.029]	-0.045 [0.029]	1.67

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 3: Descriptive statistics with survey data.

	Treatment Group					
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment. NR: No reminders; R: Reminders.					
	Control	**G**	**G**	**GM**	**GM**	
		NR	R	NR	R	
	Sample Mean [s.d.]	Difference with Control [s.e.]	Difference with Control [s.e.]	Difference with Control [s.e.]	Difference with Control [s.e.]	F-Stat: No Difference
Expects to Get More Than Undergraduate Degree	0.488 [0.500]	-0.014 [0.040]	0.010 [0.039]	-0.029 [0.039]	-0.017 [0.039]	0.23
First Generation Student	0.382 [0.486]	0.014 [0.041]	-0.008 [0.040]	0.066 [0.040]	0.039 [0.040]	0.91
Expects Average ≥ 80	0.564 [0.496]	-0.010 [0.040]	-0.034 [0.039]	0.004 [0.039]	0.008 [0.039]	0.28
Expected Hours Spent Studying	20.944 [12.881]	-0.048 [1.022]	-0.214 [1.005]	-0.713 [1.010]	-0.372 [0.995]	0.14
Expects to Work ≥ 8 hrs/week	0.463 [0.499]	0.044 [0.040]	-0.032 [0.039]	-0.027 [0.039]	-0.035 [0.039]	1.00
Tends to Procrastinate (1-5)	2.976 [0.934]	0.038 [0.074]	0.028 [0.073]	0.064 [0.073]	0.072 [0.072]	0.35
Sure About Program of Study (1-3)	2.382 [0.601]	-0.035 [0.048]	-0.019 [0.047]	-0.028 [0.048]	-0.007 [0.047]	0.18
Sure About Career (1-3)	2.261 [0.618]	-0.101^{*} [0.052]	-0.046 [0.051]	-0.043 [0.051]	-0.064 [0.050]	1.12

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 4: Treatment effects on grades and registration status. Standard errors clustered by student identification number.

	Treatment Group									
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment; G+GM: G and GM combined. NR: No reminders; R: Reminders; NR+R: NR and R combined.									
	Control	**G**	**G**	**G**	**GM**	**GM**	**GM**	**G+GM**	**G+GM**	**G+GM**
		NR	R	NR+R	NR	R	NR+R	NR	R	NR+R
Dependent Variable	Mean [s.d.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Sample Size
First Semester (2014-2015) Grades	65.700 [13.368]	-1.120 [1.176]	0.513 [0.982]	-0.268 [0.845]	0.814 [1.006]	1.690 [1.052]	1.259 [0.816]	-0.131 [0.855]	1.098 [0.809]	0.501 [0.693]	2,304
Second Semester (2014-2015) Grades	69.399 [14.228]	-1.967 [1.502]	-1.833 [1.336]	−1.897* [1.098]	0.614 [1.240]	-0.680 [1.252]	-0.053 [0.992]	-0.656 [1.075]	-1.249 [1.021]	-0.962 [0.867]	2,040
All Grades (2014-2015)	66.798 [14.925]	-1.197 [1.106]	-0.329 [1.024]	-0.743 [0.827]	-0.009 [0.983]	0.569 [0.941]	0.281 [0.763]	-0.589 [0.815]	0.112 [0.778]	-0.229 [0.661]	6,671
Registration Status (2015-2016)	0.852 [0.355]	-0.060* [0.031]	-0.003 [0.028]	-0.031 [0.023]	-0.001 [0.028]	-0.031 [0.029]	-0.017 [0.023]	-0.031 [0.023]	-0.017 [0.023]	-0.024 [0.019]	1,493
First Semester (2015-2016) Grades	69.453 [13.928]	0.195 [1.062]	-0.172 [1.122]	0.001 [0.871]	0.019 [1.073]	-0.987 [1.122]	-0.486 [0.873]	0.103 [0.854]	-0.575 [0.888]	-0.246 [0.734]	2,935
Second Semester (2015-2016) Grades	68.910 [14.211]	0.188 [1.099]	0.886 [1.158]	0.551 [0.896]	0.362 [1.207]	0.856 [1.036]	0.614 [0.889]	0.274 [0.909]	0.871 [0.877]	0.582 [0.749]	3,160
All Grades (2015-2016)	68.775 [14.320]	-0.059 [0.927]	0.349 [1.054]	0.152 [0.781]	0.021 [0.987]	0.107 [0.889]	0.065 [0.742]	-0.018 [0.755]	0.228 [0.766]	0.108 [0.633]	7,712

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 5: Treatment effects on all 2014-2015 grades by administrative subsample. Standard errors clustered by student identification number.

	Treatment Group										
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment; G+GM: G and GM combined. NR: No reminders; R: Reminders; NR+R: NR and R combined.										
	Control	**G**	**G**	**G**	**GM**	**GM**	**GM**	**G+GM**	**G+GM**	**G+GM**	
		NR	R	NR+R	NR	NR+R	C	NR	R	NR+R	
Subsample	Mean [s.d.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Sample Size
Full Sample	66.798 [14.925]	-1.197 [1.106]	-0.329 [1.024]	-0.743 [0.827]	-0.009 [0.983]	0.569 [0.941]	0.281 [0.763]	-0.589 [0.815]	0.112 [0.778]	-0.229 [0.661]	6,671
Female	66.936 [14.449]	-0.552 [1.408]	0.503 [1.371]	-0.03 [1.092]	1.035 [1.225]	2.303* [1.211]	1.671* [0.985]	0.246 [1.048]	1.421 [1.032]	0.831 [0.876]	3,382
Male	66.653 [15.413]	-1.932 [1.736]	-1.047 [1.504]	-1.442 [1.242]	-1.095 [1.547]	-1.211 [1.419]	-1.154 [1.163]	-1.495 [1.263]	-1.125 [1.154]	-1.299 [0.989]	3,289
20 or Older	63.344 [17.550]	-0.914 [2.971]	-0.918 [2.912]	-0.916 [2.252]	0.566 [2.361]	0.413 [2.406]	0.494 [1.890]	-0.104 [2.054]	-0.19 [2.055]	-0.145 [1.687]	1,325
19 or Younger	67.625 [14.104]	-1.217 [1.154]	-0.35 [1.065]	-0.753 [0.866]	0.041 [1.063]	0.689 [0.998]	0.372 [0.818]	-0.585 [0.869]	0.147 [0.822]	-0.202 [0.703]	5,346
HS Avg. Above Median	68.643 [14.540]	-1.902 [1.719]	-0.013 [1.614]	-0.977 [1.285]	1.826 [1.418]	1.609 [1.242]	1.715 [1.065]	-0.071 [1.238]	0.817 [1.133]	0.373 [0.978]	2,976
HS Avg. Below Median	64.161 [14.898]	-1.166 [1.391]	-0.49 [1.440]	-0.781 [1.132]	-1.759 [1.409]	-0.032 [1.461]	-0.93 [1.134]	-1.488 [1.115]	-0.282 [1.145]	-0.855 [0.947]	2,805
English Mother Tongue	67.341 [14.020]	-1.213 [1.777]	0.754 [1.258]	-0.114 [1.158]	0.117 [1.350]	2.789** [1.253]	1.504 [1.041]	-0.494 [1.196]	1.773* [1.012]	0.726 [0.913]	3,380
Non-English Mother Tongue	66.237 [15.790]	-1.072 [1.395]	-1.532 [1.622]	-1.298 [1.178]	-0.137 [1.435]	-2.123 [1.367]	-1.101 [1.113]	-0.618 [1.118]	-1.816 [1.178]	-1.203 [0.953]	3,291
Canadian Citizen	67.858 [13.378]	-1.519 [1.608]	0.015 [1.208]	-0.598 [1.064]	0.532 [1.313]	1.746 [1.270]	1.177 [1.017]	-0.359 [1.114]	0.873 [0.986]	0.335 [0.862]	3,421
Non-Canadian Citizen	65.755 [16.242]	-0.686 [1.527]	-1.154 [1.734]	-0.896 [1.261]	-0.695 [1.457]	-1.482 [1.317]	-1.064 [1.121]	-0.69 [1.184]	-1.313 [1.217]	-0.976 [0.999]	3,250
First Year Student	67.241 [14.106]	-0.85 [1.400]	-0.394 [1.117]	-0.597 [0.956]	-0.012 [1.134]	1.096 [1.058]	0.549 [0.864]	-0.4 [0.968]	0.331 [0.862]	-0.012 [0.748]	5,007
Non-First Year Student	65.437 [17.137]	-1.56 [1.774]	-0.311 [2.430]	-1.017 [1.650]	-0.01 [1.941]	-1.254 [1.945]	-0.622 [1.579]	-0.864 [1.522]	-0.789 [1.737]	-0.829 [1.384]	1,664

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Table 6: Treatment effects on all 2014-2015 grades by survey subsample. Standard errors clustered by student identification number.

	Treatment Group									
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment; G+GM: G and GM combined. NR: No reminders; R: Reminders; NR+R: NR and R combined.									
	Control	**G**	**G**	**G**	**GM**	**GM**	**GM**	**G+GM**	**G+GM**	**G+GM**
		NR	R	NR+R	NR	R	NR+R	NR	R	NR+R
Subsample	Mean [s.d.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Sample Size
Full Sample	66.798 [14.925]	-1.197 [1.106]	-0.329 [1.024]	-0.743 [0.827]	-0.009 [0.983]	0.569 [0.941]	0.281 [0.763]	-0.589 [0.815]	0.112 [0.778]	-0.229 [0.661]	6,671
Expects to Get More Than Undergraduate Degree	67.495 [14.112]	1.409 [1.447]	-0.128 [1.296]	0.598 [1.074]	1.558 [1.245]	2.002 [1.279]	1.783* [1.007]	1.484 [1.061]	0.900 [1.027]	1.182 [0.872]	3,453
Does Not Expect More Than Undergraduate Degree	66.257 [15.560]	−4.294*** [1.629]	-0.671 [1.620]	−2.401* [1.265]	-1.507 [1.497]	-1.021 [1.362]	-1.264 [1.135]	−2.831** [1.221]	-0.847 [1.175]	−1.816* [0.991]	3,164
First Generation Student	65.764 [14.538]	-2.184 [1.960]	-1.546 [1.859]	-1.849 [1.466]	-2.395 [1.834]	0.666 [1.505]	-0.908 [1.334]	-2.299 [1.459]	-0.428 [1.334]	-1.355 [1.146]	2,128
Not First Generation Student	67.361 [14.987]	-0.261 [1.325]	0.163 [1.358]	-0.042 [1.053]	2.053* [1.196]	0.029 [1.355]	1.049 [1.012]	0.878 [1.007]	0.1 [1.063]	0.483 [0.862]	3,874
Lives in Residence	69.078 [12.686]	-3.81 [2.483]	-1.632 [1.957]	-2.632 [1.716]	-1.186 [2.245]	-1.817 [1.622]	-1.433 [1.663]	-2.476 [1.827]	-1.699 [1.545]	-2.107 [1.407]	1,170
Does Not Live in Residence	66.302 [15.326]	-0.625 [1.235]	-0.081 [1.182]	-0.342 [0.938]	0.235 [1.092]	1.078 [1.052]	0.676 [0.852]	-0.184 [0.910]	0.518 [0.881]	0.182 [0.743]	5,501
Expects Average ≥ 80	68.836 [13.945]	-2.282 [1.606]	-0.402 [1.348]	-1.324 [1.135]	-1.802 [1.312]	-0.877 [1.188]	-1.326 [0.986]	−2.034* [1.119]	-0.65 [0.995]	-1.325 [0.866]	3,908
Expects Average < 80	64.060 [15.574]	0.06 [1.403]	0.129 [1.536]	0.098 [1.178]	2.581* [1.458]	2.359 [1.514]	2.473** [1.177]	1.346 [1.148]	1.139 [1.212]	1.239 [0.991]	2,709
Expects Study Hours ≥ 30	67.218 [15.239]	1.687 [2.452]	2.032 [2.090]	1.885 [1.782]	2.566 [2.474]	5.159** [2.051]	3.820** [1.816]	2.167 [1.929]	3.459** [1.693]	2.850* [1.513]	1,266
Expects Study Hours < 30	66.858 [14.691]	-1.998 [1.232]	-1.046 [1.170]	-1.508 [0.929]	-0.674 [1.058]	-0.564 [1.037]	-0.618 [0.832]	-1.327 [0.895]	-0.804 [0.869]	-1.059 [0.730]	5,351
Procrastinates	65.950 [15.770]	-0.68 [2.240]	-0.257 [2.063]	-0.464 [1.718]	-2.154 [2.091]	-0.613 [1.731]	-1.318 [1.561]	-1.43 [1.728]	-0.449 [1.553]	-0.912 [1.407]	1,624
Does Not Procrastinate	67.221 [14.492]	-1.588 [1.280]	-0.45 [1.186]	-0.985 [0.948]	0.66 [1.100]	0.967 [1.124]	0.811 [0.872]	-0.428 [0.923]	0.225 [0.904]	-0.095 [0.748]	4,993
Sure About Program of Study	68.123 [13.536]	−2.912* [1.563]	0.353 [1.346]	-1.192 [1.120]	-1.995 [1.444]	-0.277 [1.308]	-1.096 [1.063]	−2.438** [1.147]	0.03 [1.032]	-1.143 [0.883]	2,983
Not Sure About Program of Study	65.898 [15.745]	-0.107 [1.555]	-0.883 [1.478]	-0.514 [1.190]	1.549 [1.343]	1.044 [1.337]	1.302 [1.080]	0.741 [1.148]	0.035 [1.132]	0.383 [0.959]	3,634

Sure About Career	66.512	-1.64	0.236	-0.705	-0.894	0.337	-0.271	-1.276	0.286	-0.491	2,322
	[13.653]	[1.793]	[1.581]	[1.300]	[1.843]	[1.665]	[1.338]	[1.382]	[1.254]	[1.061]	
Not Sure About Career	67.164	-1.223	-0.768	-0.977	0.348	0.469	0.409	-0.393	-0.16	-0.272	4,295
	[15.402]	[1.409]	[1.328]	[1.068]	[1.150]	[1.138]	[0.928]	[1.010]	[0.990]	[0.841]	
Expects to Work $\geq$ 8 hrs/week	65.375	-1.600	0.561	-0.548	-0.417	1.976	0.784	-1.031	1.263	0.103	2,891
	[15.616]	[1.594]	[1.622]	[1.268]	[1.554]	[1.320]	[1.166]	[1.247]	[1.189]	[1.028]	
Expects to Work $<$ 8 hrs/week	68.105	-0.86	-1.171	-1.033	0.219	-0.726	-0.259	-0.275	-0.953	-0.635	3,726
	[14.044]	[1.539]	[1.323]	[1.091]	[1.248]	[1.311]	[1.002]	[1.067]	[1.026]	[0.855]	
Registered Early	67.707	1.241	1.173	1.203	0.005	1.47	0.708	0.57	1.311	0.955	4,323
	[14.327]	[1.130]	[1.074]	[0.881]	[1.162]	[1.128]	[0.912]	[0.913]	[0.880]	[0.756]	
Registered Late	64.927	-4.059^{**}	-3.402	-3.753^{**}	0.059	-0.311	-0.142	-2.157	-1.736	-1.945	2,348
	[15.931]	[2.042]	[2.089]	[1.589]	[1.810]	[1.599]	[1.351]	[1.529]	[1.442]	[1.221]	

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 7: Treatment effects on all 2014-2015 grades by ability. Standard errors clustered by student identification number.

	Treatment Group									
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment; G+GM: G and GM combined. NR: No reminders; R: Reminders; NR+R: NR and R combined.									
	Control	**G**	**G**	**G**	**GM**	**GM**	**GM**	**G+GM**	**G+GM**	**G+GM**
		NR	R	NR+R	NR	R	NR+R	NR	R	NR+R
Subsample	Mean [s.d.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Sample Size
Full Sample	66.798	-1.197	-0.329	-0.743	-0.009	0.569	0.281	-0.589	0.112	-0.229	6,671
	[14.925]	[1.106]	[1.024]	[0.827]	[0.983]	[0.941]	[0.763]	[0.815]	[0.778]	[0.661]	
Bottom Quantile	63.018	-1.258	-0.961	-1.075	-3.547^{*}	-0.476	-1.822	-2.399	-0.746	-1.423	1,400
	[15.307]	[2.039]	[1.821]	[1.543]	[2.022]	[1.921]	[1.580]	[1.627]	[1.511]	[1.328]	

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Table 8: Treatment effects on alternative 2014-2015 outcomes. Standard errors clustered by student identification number.

	Treatment Group									
	G: Goal-setting treatment; GM: Goal-setting + Mindset treatment; G+GM: G and GM combined. NR: No reminders; R: Reminders; NR+R: NR and R combined.									
	Control	**G**	**G**	**G**	**GM**	**GM**	**GM**	**G+GM**	**G+GM**	**G+GM**
		NR	R	NR+R	NR	R	NR+R	NR	R	NR+R
Dependent Variable	Mean [s.d.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Effect [s.e.]	Sample Size
First Year GPA	2.248 [1.002]	-0.056 [0.085]	0.022 [0.084]	-0.016 [0.067]	-0.061 [0.084]	-0.040 [0.083]	-0.051 [0.067]	-0.059 [0.067]	-0.009 [0.067]	-0.034 [0.057]	1,351
Number of First Year Credits Taken by End of First Year	3.080 [1.321]	-0.026 [0.106]	0.137 [0.104]	0.058 [0.084]	0.020 [0.105]	-0.026 [0.104]	-0.003 [0.083]	-0.002 [0.084]	0.055 [0.083]	0.027 [0.071]	1,351
Number of First Year Credits Failed	0.307 [0.632]	0.053 [0.055]	0.032 [0.054]	0.042 [0.043]	0.012 [0.054]	-0.020 [0.054]	-0.004 [0.043]	0.032 [0.043]	0.006 [0.043]	0.019 [0.036]	1,351
Number of First Year Credits Received	2.774 [1.496]	-0.078 [0.121]	0.104 [0.119]	0.015 [0.096]	0.009 [0.120]	-0.007 [0.119]	0.001 [0.095]	-0.034 [0.096]	0.049 [0.095]	0.008 [0.081]	1,351
2014-2015 GPA ≥ 1	0.878 [0.328]	0.009 [0.028]	-0.005 [0.028]	0.002 [0.022]	-0.034 [0.028]	-0.021 [0.027]	-0.027 [0.022]	-0.013 [0.022]	-0.013 [0.022]	-0.013 [0.019]	1,351
2014-2015 GPA ≥ 1.5	0.787 [0.410]	-0.039 [0.035]	-0.007 [0.035]	-0.023 [0.028]	-0.055 [0.035]	-0.016 [0.034]	-0.035 [0.028]	-0.047^{*} [0.028]	-0.012 [0.028]	-0.029 [0.023]	1,351
2014-2015 GPA ≥ 2	0.642 [0.480]	-0.023 [0.040]	0.005 [0.040]	-0.009 [0.032]	-0.008 [0.040]	-0.001 [0.039]	-0.004 [0.031]	-0.015 [0.032]	0.002 [0.031]	-0.006 [0.027]	1,351
2014-2015 GPA ≥ 2.5	0.434 [0.496]	0.009 [0.042]	0.007 [0.041]	0.008 [0.033]	-0.010 [0.041]	0.016 [0.040]	0.003 [0.032]	-0.001 [0.033]	0.011 [0.032]	0.006 [0.028]	1,351
2014-2015 GPA ≥ 3	0.252 [0.438]	-0.020 [0.037]	0.012 [0.036]	-0.004 [0.029]	0.026 [0.036]	-0.004 [0.036]	0.011 [0.028]	0.003 [0.029]	0.004 [0.029]	0.004 [0.024]	1,351

$^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.