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Working Paper:

Nudging at a National Scale: Experimental Evidence from a FAFSA Completion Campaign

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Despite substantial and growing interest in behavioral science interventions in education, we currently lack evidence about whether nudge interventions that have generated positive impacts on postsecondary outcomes at a local level can be scaled—and can maintain efficacy—nationally. We also have little evidence about the specific mechanisms underlying the positive impacts of promising smaller-scale nudges. We investigate, through a randomized controlled trial, the impact of a national information-only financial aid nudge campaign that reached over 450,000 high school seniors who had registered with the Common Application, a national non-profit organization through which students can apply to multiple colleges and universities in one application. In this version of the paper we report on the impact of three different variations in nudge content—concretizing the financial benefits of FAFSA completion, positive trait activation, or providing concrete planning prompts—on students' initial college enrollment outcomes. We find that providing students with concrete planning prompts about when and how to complete the FAFSA increased college enrollment by 1.1 percentage points overall, and by 1.7 percentage points for first-generation college students. Messages that take a traditional human capital investments approach of emphasizing the financial benefits associated with FAFSA completion do not appear to increase college enrollment. At a per-student cost of $0.50, the impact to cost ratio of this national nudge campaign exceeds that of other interventions to improve college enrollment among low-income and first-generation students.

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NUDGING AT A NATIONAL SCALE: EXPERIMENTAL EVIDENCE FROM A FAFSA COMPLETION CAMPAIGN

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I. Introduction

Across a variety of domains, from supplemental nutrition assistance to retirement planning, complicated application processes and complex eligibility information interfere with peoples' tendency to access beneficial resources and programs (Bertrand, Mullainathan, and Shafir, 2004; Hastings and Weinstein, 2008; Madrian and Shea, 2001). Behavioral science strategies to increase participation in social programs have become increasingly integrated into public policy at various levels, including the federal government (Executive Office of the President, 2016). In the context of postsecondary education, researchers have long recognized that complexities associated with the Free Application for Federal Student Aid (FAFSA) can deter college-ready students from enrolling or succeeding in higher education (Dynarski and Scott-Clayton, 2006; King, 2004). More recent research highlights how sensitive students' college enrollment decisions are to small shifts in college-related costs, like the time required to travel to a college entrance exam test site or the small fee associated with sending college entrance exam scores to additional institutions (Bulman, 2015; Pallais, 2015). Because FAFSA completion is a critical step for students on the path to enrollment, these studies have catalyzed a range of policy interventions to support families to complete the FAFSA, including federal initiatives like the FAFSA Completion Pilot, which provided school districts with regularly-updated student-level data on FAFSA completion; integration of FAFSA completion into the tax preparation process; and community-wide promotional efforts to increase FAFSA visibility (Bettinger et al., 2012; Owen, 2012).

Even with concerted efforts to increase FAFSA completion rates, a substantial share of students still do not apply for financial aid. In the 2011-12 academic year, for every nine college students who received a Pell grant, there was one student who would have received a Pell grant had they applied, but did not submit a FAFSA (Bird, 2016). Among the largest school districts in the country, 35 – 50 percent of high school seniors do not complete the FAFSA prior to graduation.[1] Behaviorally-informed messaging campaigns have become increasingly popular within

[1] Authors' calculations based on school-level FAFSA completion data available from Federal Student Aid.

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education as a strategy to help people overcome informational and behavioral barriers that improved achievement and attainment (Bergman, 2013; Castleman, 2015; ideas42, 2016; Kraft and Rogers, 2014: Loeb and York, 2015). Specific to financial aid, several research studies demonstrate that text and/or email messages sent to students at critical financial aid junctures, such as when high school graduates are finalizing financial aid before matriculating to college or when college students need to renew their aid for the subsequent year, can generate substantial improvements in college enrollment and persistence, at an investment of only several dollars per student served (Castleman and Page, 2015; Castleman and Page, 2016; ideas42, 2016; Page, Castleman, and Meyer, 2016).

Based on the sizable impacts of these studies and the low implementation cost, these messaging campaigns have substantial scale potential. Prior research, however, has primarily evaluated text and email campaigns implemented at a relatively small scale, by one or a small set of educational agenices or organizations. Prior efforts to implement information-only interventions focused on financial aid and college affordability at a large scale have failed to generate improvements in college or financial aid outcomes (Bergman, Denning, and Manoli, 2016; Bettinger et al., 2012). Furthermore, important open questions remain about the mechanisms that drive these campaigns' effect on student outcomes. For instance, many nudge campaigns in postsecondary education provide one-on-one advising available to all students who responded to messages they received, or use some form of financial incentive to encourage student engagement with informational materials and/or with advising (Carrell and Sacerdote, 2013; Castleman and Page, 2015; Castleman and Page, 2016; Hoxby and Turner, 2013). It is difficult, therefore, to disentangle how much of the impact observed in past research stems from simplified information, ongoing reminders, reduced barriers to professional advising, or from eliminating near-term costs (e.g. application fee waivers).

We contribute new evidence about the mechanisms underlying informational campaigns' efficacy by evaluating, through a randomized controlled trial, a national financial aid nudge initiative that reached over 450,000 high school seniors who had registered with the Common Application, a national non-profit organization through which students can apply to multiple colleges and universities in one application. From October 2015 through February 2016, we sent messages to encourage lower-income and first-generation students across the country to complete the FAFSA early in the calendar year in order to maximize the amount of financial aid they received, and in turn increase the share of lower-income and first generation students enrolling in college. The intervention consisted of two cohorts: students who registered with the Common Application by October 2015 received two emails from the Common App in the Fall as well as a six-week messaging campaign

starting in early January 2016; the second cohort consisted of students who registered with the Common Application between October and December 2015 who only received the six-week campaign messages. We randomly varied the messages we sent students along multiple dimensions, including the behavioral frame through which we tried to influence students' decisions about whether and when to complete the FAFSA; the delivery channel through which we messaged students (mail, email, and/or text message); and whether we offered students one-on-one advising assistance with FAFSA. We also randomly varied whether we nudged only the individual student to complete the FAFSA, or whether we nudged students to encourage their peers to complete FAFSA as well.

In this version of the paper we focus on the behavioral frame of our materials, and test the impact of three different variations in nudge content—concretizing the financial benefits of FAFSA completion, positive trait activation, or providing concrete planning prompts—on students' initial college enrollment outcomes, using National Student Clearinghouse (NSC) data matched to a random subset of approximately ten percent of the overall experimental sample. In subsequent versions of the paper we will incorporate additional NSC data to increase the precision of our analyses and to measure impacts of the intervention on college persistence; we will also report on the full set of treatment variations described below.

To preview our initial results, we find that providing students with concrete planning prompts about when and how to complete the FAFSA led to modest but significant increases in college enrollment. Students who received planning prompts were 1.1 percentage points more likely to enroll in college than students in a control group that received several general emails about completing the FAFSA. The impacts of the planning prompts were most pronounced for first-generation college students, who were 1.7 percentage points more likely to enroll in college than first-generation students in the control group, and for students in the combined fall and winter cohort, who were two percentage points more likely to enroll in college than students in the winter only cohort. Enrollment impacts are primarily driven by inducing students who applied to college through the Common Application but who would not have enrolled in college to attend a two-year college. Impacts of the financial benefits and positive trait activation variations are smaller in magnitude and not consistently precise, though we do find some evidence that the positive trait activation nudge increased enrollment at two-year institutions as well.

The remainder of our paper is organized as follows. In section II we provide a conceptual framework for our intervention. In section III we provide details about our intervention design. In

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section IV we detail our empirical strategy. In section V we present our results. In section VI we discuss our findings and their implications for future research, practice, and policy.

II. Conceptual Framework

Students and their families must navigate a series of critical junctures to receive and maintain financial aid. Submitting the FAFSA is the first step in the financial aid process, but many students also have to complete additional, equally complex tasks in order to actually receive financial aid, such as verifying that the income and asset information that they provided on the FAFSA is accurate, or completing supplementary financial aid forms required by states or institutions. Once students matriculate in college, they have to refile the FAFSA every year to maintain their financial aid. While the United States Department of Education has introduced several modifications in recent years to simplify the financial aid application process, the FAFSA remains a complex and onerous application for families to complete.

This complexity notwithstanding, completing the FAFSA potentially qualifies students for thousands of dollars in financial aid. Students must file the FAFSA in order to receive the Pell grant or subsidized Stafford loans, the two largest need-based aid programs. Many states and colleges and universities also require students to file the FAFSA in order to be eligible for their need-based aid programs, which can account for a large percentage of a student's financial aid package. For instance, students from families making up to $48,000 per year receive an average of $16,000 in grant aid from four-year colleges and universities.[2]

Behavioral science theory and empirical evidence suggests several strategies to motivate students to complete the FAFSA and receive the financial aid for which they are eligible.

Make salient the benefits of FAFSA relative to the costs to complete it

Foundational research in behavioral economics demonstrated that people tend to prefer certain benefits over potential gains (Kahneman and Tversky, 1979). Students from low-income families tend to overestimate their net cost of college, suggesting they may not have a precise understanding of the financial aid for which they are eligible (Avery and Kane, 2004; Grodsky and Jones, 2007). Especially for students who have limited opportunity to visit colleges and experience the non-pecuniary benefits of pursuing higher education, college may feel like a particularly risky gamble relative to the certainty of their current work opportunities, relationships and environment

[2] Source: author's calculations using the Integrated Postsecondary Education Data System (IPEDS).

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(Castleman, 2015). This suggests that making the financial benefits associated with FAFSA completion more salient—particularly relative to the amount of time necessary to complete the FAFSA—may motivate some students on the margin of FAFSA completion to invest the time necessary to apply for financial aid.

Associate a positive identity with FAFSA completion

A wealth of research has shown that individuals' identities have strong effects on their attitudes and behaviors (Baumeister 1987). Individuals have a vested interest in preserving positive perceptions of themselves, and thus, are likely to behave in a manner consistent with positive past behaviors (Swann, Jr. and Ely 1984,) showing a robust "self-consistency bias." Important for the present intervention, individuals are not always certain about the degree to which they display certain traits (Baumgardner 1990; DeMarree, Petty and Brinol 2007), making it possible for external nudges to activate desirable identities. If students embrace an externally-activated identity (such as a nudge that reinforces the motivation they have shown by starting their college applications), they are more likely to take actions that are framed as identity-consistent. Such nudges are likely to be particularly effective among students in late adolescence, whose self-concept clarity is lower than it will be later in life (Lerner & Steinberg 2009; Meuus 2011). Further, since identity-related cognitions are generally transmitted from parents to their children (Crocetti et al. 2015), first-generation college students, whose parents may not hold strong college-related identities, may show strong sensitivity to the activation of positive identities.

Provide concrete planning prompts to complete FAFSA

Some students who recognize the benefits of FAFSA completion and who are motivated to complete it may nonetheless miss important deadlines because they are occupied with more immediate pressing demands, have limited attention to devote to FAFSA, or because they underestimate the time and information required to complete the FAFSA (Thaler and Bernartzi, 2004; Karlan et al., 2010; Ross et al., 2013). Researchers demonstrate that providing people with concrete planning prompts and guidance can increase follow through on various actions, from voting to getting a flu vaccination (Nickerson and Rogers, 2010; Milkman et al., 2012). Especially for adolescents, who are more likely to struggle with organization, planning, and time management (Casey and Somerville, 2011), guiding students to form concrete implementation intentions for when, how, and with whom they will complete FAFSA may further contribute to increased filing rates.

III. Intervention Design

Our outreach consisted of two sequential, cumulative campaigns: a fall email campaign, encouraging students to consider college affordability when deciding where to apply, and a multi-modal (email, text message, and postal) winter campaign encouraging students to complete the Free Application for Federal Student Aid (FAFSA) as early in the calendar year as possible to maximize their financial aid. The fall email campaign reached 187,482 students who had registered with the Common Application by October 2015. The winter campaign targeted these students as well as the additional lower-income students who registered with the Common Application by December 1, for a total of 454,243 students. Students in the October cohort received their first email message between October 26 and October 30, 2015. The Common Application sent a follow-up e-mail message designed to reinforce each participant's assigned condition between November 11 and November 16th, 2015. The Common Application sent the first winter email during the week of January 11th, 2016 and a second email the week of February 1st, 2016. For students who entered in the Fall cohort, these were in practice their third or fourth emails.

The Common Application sent a generic introductory text message on January 10, 2016 out to all students assigned to a texting condition, simply informing them that they would receive a set of messages over the following weeks and encouraging them to save the number associated with the text so that it would be recognized by their phone. Text messages tailored to assigned experimental treatments were then sent on January 17, January 24, January 31, February 7 and February 14. Roughly one-third of students also received a three-page postal mailer during mid-January 2016.

Intervention content

To investigate the hypotheses we describe above for different behavioral strategies to encourage students to complete the FAFSA, we designed the following content variations. In Appendix A we present the text message content and postal mailers associated with each treatment variation. The emails we sent to students were essentially a combination of the textual and visual content in the text messages and postal mailers, and are available upon request.

Financial benefits of FAFSA completion

The financial benefits treatment variation focused on making the monetary gains associated with FAFSA completion highly salient to students. We highlighted that the average student from a lower-income student earns thousands of dollars in grant aid, and that students tend to earn more grant aid

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by filing FAFSA as early in the calendar year as possible. To make the financial gain associated with FAFSA particularly salient, we provided a visual comparison of how many hours they'd have to work in a job to earn the same amount of money for college that they would receive by investing a few hours to complete the FAFSA. The financial benefits treatment arm also used the potential financial gain associated with FAFSA as a motivation for students to pursue the steps necessary to file their FAFSA and finalize their financial aid applications (e.g. "$1000s could be waiting for you, but submitting the FAFSA is just step 1…To learn the steps that may be required to get your aid: http://bit.ly/fafsanext.")

Positive Identity Activation

We designed messages in this treatment condition to prompt students to behave in ways consistent with a desirable identity—in this case, the identity of a motivated student. Messages identified the student as having behaved in a goal-oriented manner by completing their college applications, and provided graphical evidence of the student's history of completing college-related tasks successfully. Messages primed students towards internal consistency by explicitly connecting the traits necessary for completing college applications to FAFSA submission (e.g. "You're the kind of student who cares about their future: that's why you applied to college. Now take action to control your financial future—submit the FAFSA.") The identity activation condition also prompted students to complete FAFSA early in the calendar year by associating a forced social choice with early FAFSA completion: "Do you want to be in the group of students who maximize their financial aid award OR Are you OK being in the group that receives less financial aid?" Finally, message framing throughout the identity activation variation continually reinforced positive traits for students (e.g. "Hard-working students like you…"; "You're the type of student who knows the value of time…").

Planning Prompts

The planning treatment arms encouraged students to think about the logistics and time needed to complete the FAFSA, and to make a concrete plan for when and how they would work on the FAFSA. Planning messages acknowledged that students led busy lives, and that this business made it important to have a detailed plan for when they would complete FAFSA. Messages leveraged graphic representations to convey the importance and benefit of making a concrete plan for FAFSA completion. Separate visuals explicitly directed students to identify a specific date and time when they could spend 90 minutes working on FAFSA, and to set an alarm in their phone to remind them of

this time. Finally, the planning treatment variation provided more detailed step-by-step guidance on how to complete the FAFSA (e.g. "Do you have a plan for completing the FAFSA? Step #1 is creating an FSA ID: http://bit.ly/myfsaid.").

Control condition

Students assigned to the control condition received the same number of emails as the other content variations (four total for students in the fall and winter campaign; two for students in the winter-only campaign) providing general information about and encouragement to complete the FAFSA. The control emails informed students that completing the FAFSA could qualify them for grant aid for college and that completing the FAFSA early in the calendar year tended to qualify students for additional grant aid. The control emails directed students to the fafsa.gov website to learn more about the FAFSA or to begin their application.

IV. Research Design

Randomization Procedure

We randomly assigned students to one of the experimental conditions described above in two phases. In October 2015, we identified students who had by that time registered with the Common Application and who met at least one of the three following "low socio-economic status" (low-SES) criteria[3]:

1. Indicated on their application that they qualified for a need-based application fee waiver
2. Indicated that they were the first in their family to go to college
3. Indicated that they intended to apply for need-based financial aid AND attended a high school where at least 40 percent of students qualified for free or reduced price lunch[4]

For the October cohort, we excluded students with a reported SAT score of at least 1230 for the math and verbal sections, or a reported ACT score of at least 28 (n=36,632) because these students were receiving a different and concurrent intervention from the Common Application focused on college applications. The resulting sample size for the October cohort was 187,482 students. To perform the

[3] We excluded from our sample 18,602 low-SES students attending high schools participating in a similar messaging intervention.

[4] Using high-school level data from NCES's Common Core of Data (CCD), we calculated percent of students who qualified for free or reduced priced lunch during the 2013-14 academic year. . We were able to match this information from CCD to the Common App data for 95.3% of public school students (90.4% of public schools). .

randomization for the October cohort, we first randomly selected 2,000 students to receive the additional offer of one-on-one advising (we will report on the details and impacts of the advising intervention in a subsequent version of the paper).[5] We did so by randomly selecting 2,000 schools to designate as "advising schools", and then randomly selecting one student per advising school to receive advising. To ensure that students selected for the advising condition were representative of this population of low-SES Common Applicants, we set the probability for whether a high school was randomly selected directly proportional to the proportion of low-SES Common Applicants attending that high school. For each student assigned to the advising, we then randomly assigned one of three content variations to pair with the offer of advising (i.e. Advising + Financial Benefit, Advising + Identity/Norms, and Advising + Planning). Finally, we randomly assigned the remaining 185,482 students to the other four experimental conditions (Control, Financial Benefit, Identity/Norms, Planning) in equal proportions. We performed this randomization *within high school* in order to increase the precision of our estimates by controlling for school level differences in student outcomes.

We conducted the second phase of the randomization in mid-December 2015 to determine receipt of winter emails, text messages, and postal mailers. We included all students from the October cohort in the winter campaign, with the exception of 259 students who terminated their accounts with Common App prior to the December randomization. Also included in the winter campaign were low-SES students who registered with Common App between October and December, and the low-SES high-achievers previously excluded from the October cohort. This process resulted in an additional 267,020 students for the winter campaign. All students in the October cohort maintained their student-level content variation assignment. For the December cohort, we randomly assigned students to one of four content variations (Control, Financial Benefit, Identity/Norms, or Planning) in equal proportions. Again, we performed this student-level randomization *within high-school*. All students in the winter campaign received email messages. All treated students were also eligible to receive text messages; Over 99% of students provided cell phone numbers. Roughly one-third of students were randomly assigned to receive postal mailers.

Empirical strategy

Our evaluation of the impact of the nudge campaign on college applications and enrollment outcomes relies on student-level college application data provided by Common Application and

[5] This relatively small sample size for the Advising experimental condition was due to the high resource nature of the one-on-one advising offered.

college enrollment data provided by the National Student Clearinghouse. We do not have access to student-level FAFSA filing data, so are unable to directly observe the impact of our intervention on FAFSA completion. While Federal Student Aid makes school-level FAFSA filing data publicly available, given our student-level randomization, we were unable to incorporate this data into our analysis. We elaborate on this in Appendix B.

For each outcome we construct, we run two primary regressions to estimate the impact of our treatments:

$$Y_{isw} = \beta_0 + \beta_1 Plan_{isw} + \beta_2 Norms_{isw} + \beta_3 Financial_{isw} + \delta_{sw} + \epsilon_{isw} \quad (1)$$

Here, *Y* is a given outcome for student *i* in high school *s* first treated in wave *w* (fall or winter of senior year). *Plan*, *Norms* and *Financial* indicate which content treatment arm the student was assigned to, with the omitted category being the control condition. All regressions include high school by treatment wave fixed effects given that the randomization was conducted within such strata. We cluster standard errors by high school to account for potentially unobserved correlations in the error terms across high school classmates. We show separately that controlling for further demographics has little impact on our estimates due to the randomization.

In Table 1, we present results of regression (1) run using various student covariates as outcomes, to show that the experimental conditions were balanced at baseline. Aside from isolated covariate imbalances which we would expect to arise probabilistically with multiple tests, the treatment arms are balanced on gender, students' prior SAT or ACT scores, the probability of having such a score, first generation status, whether the student applied for an application fee waiver and whether they intend to apply for financial aid.

V. Results

We study three main sets of outcomes: the college application behavior of students through the Common Application, the probability of enrolling in college, and the average quality and costs of the colleges in which students enrolled.

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Application Behavior

We begin by examining application behavior, noting that we observe only applications that students submitted through The Common Application.[6] To explore whether the campaign affected the type of institutions to which students applied, we merge onto the student-level application data institution-level information on college affordability and quality taken from the Integrated Postsecondary Education Data System.

The messaging campaign appears not to have affected college application behavior in any observable way, as shown in Table 2. We observe no statistically significant impacts on the probability of applying to any college or on the number of applications. We observe no impacts on the average characteristics of colleges applied to, including the fraction of students receiving grant aid, the admissions rate, the six-year graduation rate and the probability that all colleges applied to were public. The lack of impact of the intervention on college application outcomes is not altogether surprising given the focus of the intervention on FAFSA completion and college affordability. The vast majority of students completed their Common App applications by early January, before the winter portion of the intervention commenced. Even for students in the combined fall and winter campaign, they only received two emails in 2015, with the content of these messages focused primarily on college affordability and on the importance of starting FAFSA as early in the calendar year as possible.

College Enrollment and Enrollment Quality

We measure college enrollment through data from the National Student Clearinghouse, with enrollment measured as of November of the year following high school graduation. Table 3 shows that students in the planning condition were 1.1 percentage points more likely to enroll in college, relative to a fairly high control group enrollment rate of 83.2 percent. This enrollment increase was driven primarily by inducing students who would have not enrolled in college to attend a two-year institution; enrollment at two-year institutions increased by one percentage point among students in the planning condition. The point estimates for the impact positive identity activation and financial benefits conditions on overall college enrollment were less than half as large and not significant. In the case of the identify activation condition, messaging may have induced a shift from four-year to two-year institutions: two-year enrollment increased by a significant one percentage point while four-year enrollment declined by a non-significant 0.5 percentage points. None of the aforementioned

[6] That is, we do not observe whether students submitted an application outside of The Common Application, for example to a local community college or to an institution that does not accept The Common Application.

results on college enrollment are sensitive to the inclusion of demographic controls, as shown in Table 3A.

We see little evidence that messaging changed the average characteristics of the colleges in which students enrolled. As shown in Table 4, the messaging content variations had no impact on the chosen college's admissions rate, median SAT score, six-year graduation rate or net price. As Table 4A shows, these results are not sensitive to inclusion of demographic controls.

Heterogeneity

As we show in Table 5, the impact of the nudges appears to be larger for first generation students than for students with at least one parent who had gone to college. For first-generation students, the planning condition increased college enrollment by 1.7 percentage points, with most of this increase (1.2 percentage points) driven by increased two-year enrollment. The point estimate for the impact of the identity activation condition among first-generation students is also over one percentage point but below the margin of significance. For non-first generation students, point estimates on enrollment are much closer to zero and not statistically significant. This pattern of results suggests that nudges—and in particular planning prompts—may be especially important for students whose families are less likely to have detailed information about or personal experience with the financial aid application process.

Second, we see in Table 6 stronger treatment impacts for students in the combined fall and winter campaign than for students in the winter-only campaign. Students in the combined fall and winter planning condition were 1.8 percentage points more likely to enroll in any college at all, with most of this effect (1.3 percentage points) driven by enrollment at a two-year institution. Students in the identity activation treatment in the fall and winter campaign were 1.4 percentage points more likely to attend a two-year institution, though the impact of this treatment on overall enrollment for students in the fall and winter campaign was not significant. Impacts for students in the winter-only campaign are smaller and not significant. The differential impact between the fall and winter and winter-only campaign could arise from two sources. Students in the Fall cohort were systematically different on observed characteristics, due to the facts that students in the Fall cohort started their college applications sooner, and therefore likely differ from students in the winter-only group on unobservable characteristics such as motivation, organizational skills, or support systems. These details led the Fall cohort to contain a greater percentage of first generation students and female students, compared to the Winter only cohort. These differences contributed to different baseline

college-going patterns—combined fall and winter students in the control group were more likely to attend four-year colleges—and may have also affected how students responded to the intervention content. Another possibility is that the additional fall messages and earlier outreach to students may have contributed to improved enrollment outcomes, perhaps by motivating students to complete FAFSA earlier in the calendar year and to receive more grant aid.

VI. Discussion

Despite substantial and growing interest in behavioral science interventions in education at various levels of government, we currently lack evidence about whether nudge interventions that have generated positive impacts on postsecondary outcomes at a local level can be scaled—and can maintain efficacy—to a national level. In fact, existing evidence suggests that large-scale information-only interventions do not affect students' college or financial aid outcomes (Bergman, Denning, and Manoli, 2016; Bettinger et al., 2012). We also have little evidence about the specific mechanisms underlying the positive impacts of promising smaller-scale nudges.

Our paper demonstrates that informational nudges implemented at a large scale—450,000 high school seniors across the country—can generate meaningful improvements in college enrollment, but that the framing of these nudges may matter considerably. Messages that take a traditional human capital investments approach of emphasizing the financial benefits associated with FAFSA completion do not appear to increase college enrollment. On the other hand, providing students with concrete planning prompts about when and how to complete the FAFSA—down to the level of encouraging them to identify a specific day and time when they can work on the FAFSA for 90 minutes—increased college enrollment by approximately two percentage points for first-generation students and for students in the combined fall and winter campaign. The modest, significant impacts of the planning condition build on a strong body of literature in economics and psychology which finds that providing people with concrete planning prompts helps them follow through on their intentions (e.g. to vote or get a flu vaccination). In the context of FAFSA, this suggests that some students recognize the benefits of FAFSA filing, but need additional planning guidance for when and how to complete.

While two percentage points is a modest increase in college enrollment, relative to the cost of the intervention—roughly $0.50 per student served—the impact to cost ratios exceed all other rigorously-evaluated interventions of which we are aware. Our estimates of the planning condition's impact may also understate its true effect, since our comparison is a control group which also received several general messages about FAFSA completion. Moreover, the high rate of college enrollment in

the Common Application sample (over 83 percent among the control group) means there was relatively little margin for influencing students' college enrollment decisions. The same interventions we tested with this sample might have even more pronounced impacts among a national sample with lower rates of college enrollment.

In subsequent versions of this paper we will obtain college enrollment data for additional students in our sample, thereby increasing our precision, and will also follow these samples longitudinally to investigate whether the nudge campaign also positively influences college persistence. We will also report on the impacts of additional variations we tested in the experiment, including whether students had access to one-on-one advising and variations in delivery method for intervention content.

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Table 1 - Covariate Balance and Sample Means

	Female	SAT	ACT	No score	First Generation	Fee Waiver	Intent to apply for aid
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Planning	0.004	2.324	-0.197	0.0058	-0.0022	0.0089	0.0024
	(0.007)	(5.281)	(0.164)	(0.007)	(0.006)	(0.007)	(0.007)
Identity/Norms	0.0015	3.929	0.089	0.0052	0.0025	-0.0045	0.0008
	(0.007)	(5.150)	(0.168)	(0.007)	(0.006)	(0.007)	(0.007)
Financial Benefit	0.0033	-3.837	-0.158	-0.0032	0.0029	0.0092	0.0067
	(0.007)	(5.123)	(0.165)	(0.007)	(0.006)	(0.007)	(0.007)
Control group mean	0.602	1104	25.3	0.387	0.656	0.434	0.733
N	48,635	19,496	16,556	48,635	48,635	48,635	48,635
Full sample mean	0.607	1104	25.2	0.390	0.659	0.431	0.731
Full sample N	454,243	454,243	454,243	454,243	454,243	454,243	454,243

Heteroskedasticity robust standard errors are clustered at the high school-by-treatment wave level (* p< 0.1 ** p < 0.05 *** p < 0.01). Each column shows the results from a separate student-level regression of the specified outcome on treatment indicators and high school-by-treatment wave (Fall or Winter) fixed effects. Outcomes, from the Common Application data, are characteristics of the students at the time of registering on the Common Application website. Listed below each column are the control mean and sample size of the analysis sample, as well as of the full sample of students in the original experiment.

Table 2 - College Application Behavior

	Applied anywhere	Number of applications	Fraction with grants	Admission rate	Six-year grad. rate	All public
	(1)	(2)	(3)	(4)	(5)	(6)
Planning	0.0002	0.0108	-0.0004	-0.0000	0.0004	-0.0017
	(0.0017)	(0.0149)	(0.0007)	(0.0000)	(0.0005)	(0.0016)
Identity/Norms	-0.0012	0.0163	0.0002	-0.0000	0.0003	-0.0023
	(0.0017)	(0.0146)	(0.0007)	(0.0000)	(0.0005)	(0.0016)
Financial Benefit	0.0007	0.0121	0.0001	-0.0000	0.0002	-0.0016
	(0.0017)	(0.0147)	(0.0007)	(0.0000)	(0.0005)	(0.0016)
Control group mean	0.78	3.76	0.702	0.549	0.715	0.15
N	454,243	454,243	352,264	351,140	352,227	352,389

Heteroskedasticity robust standard errors are clustered at the high school-by-treatment wave level (* p< 0.1 ** p < 0.05 *** p < 0.01). Each column shows the results from a separate student-level regression of the specified outcome on treatment indicators and high school-by-treatment wave (Fall or Winter) fixed effects. Outcomes, from the Common Application data, measure application behavior and the average characteristics of colleges applied to through the Common Application.

Table 3 - Overall Impacts on College Enrollment			
	Any college	Four-year college	Two-year college
	(1)	(2)	(3)
Planning	0.011**	0.0016	0.0095**
	(0.006)	(0.006)	(0.004)
Identity/Norms	0.0049	-0.0048	0.0096**
	(0.006)	(0.007)	(0.005)
Financial Benefit	0.0058	-0.0006	0.0063
	(0.006)	(0.006)	(0.004)
Control group mean	0.832	0.766	0.077
N	48,635	48,635	48,635

Heteroskedasticity robust standard errors are clustered at the high school-by-treatment wave level (* p< 0.1 ** p < 0.05 *** p < 0.01). Each column shows the results from a separate student-level regression of the specified outcome on treatment indicators and high school-by-treatment wave (Fall or Winter) fixed effects. Outcomes, from the National Student Clearinghouse, are indicators for enrollment in a given college sector as of the fall following high school graduation. All regressions also include controls for students' SAT or ACT scores, gender, first generation status, and application status for a need-based application waiver.

Table 4 - Overall Impacts on College Quality and Cost				
	Admission rate	Median SAT	Graduation rate	Net price
	(1)	(2)	(3)	(4)
Planning	-0.0011	1.302	-0.0007	-118.4
	(0.003)	(2.520)	(0.003)	(131.3)
Identity/Norms	-0.0015	1.208	-0.000	-66.41
	(0.003)	(2.480)	(0.003)	(130.5)
Financial Benefit	-0.0028	0.74	0.000	44.45
	(0.003)	(2.408)	(0.003)	(135.3)
Control group mean	0.601	1140	0.658	$18,548
N	34,987	30,435	35,605	40,452

Heteroskedasticity robust standard errors are clustered at the high school-by-treatment wave level (* p< 0.1 ** p < 0.05 *** p < 0.01). Each column shows the results from a separate student-level regression of the specified outcome on treatment indicators and high school-by-treatment wave (Fall or Winter) fixed effects. Outcomes, from the National Student Clearinghouse data linked to IPEDS, are characteristics of the college a student first enrolls in as of the fall following high school graduation. All regressions also include controls for students' SAT or ACT scores, gender, first generation status, and application status for a need-based application waiver.

Table 5 - Heterogeneity by First Generation Status

	First generation				Not first generation			
	Any college	Four-year college	Two-year college	Admission rate	Any college	Four-year college	Two-year college	Admission rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Planning	0.0167**	0.0045	0.0122*	-0.0037	-0.0043	-0.0063	0.002	0.0006
	(0.008)	(0.009)	(0.007)	(0.005)	(0.011)	(0.013)	(0.007)	(0.007)
Identity/Norms	0.0127	0.0006	0.0121*	-0.0063	-0.0105	-0.015	0.0046	-0.0004
	(0.008)	(0.010)	(0.007)	(0.005)	(0.011)	(0.013)	(0.007)	(0.007)
Financial Benefit	0.0082	0.0008	0.0075	-0.0012	0.0029	-0.0024	0.0053	-0.0063
	(0.008)	(0.009)	(0.007)	(0.005)	(0.011)	(0.013)	(0.008)	(0.007)
Control group mean	0.817	0.697	0.12	0.618	0.861	0.809	0.052	0.573
N	32,079	32,079	32,079	21,826	16,556	16,556	16,556	13,161

Heteroskedasticity robust standard errors are clustered at the high school-by-treatment wave level (* p< 0.1 ** p < 0.05 *** p < 0.01). Each column shows the results from a separate student-level regression of the specified outcome on treatment indicators and high school-by-treatment wave (Fall or Winter) fixed effects. Columns 1-4 include only first generation students while columns 5-8 include only non-first generation students.

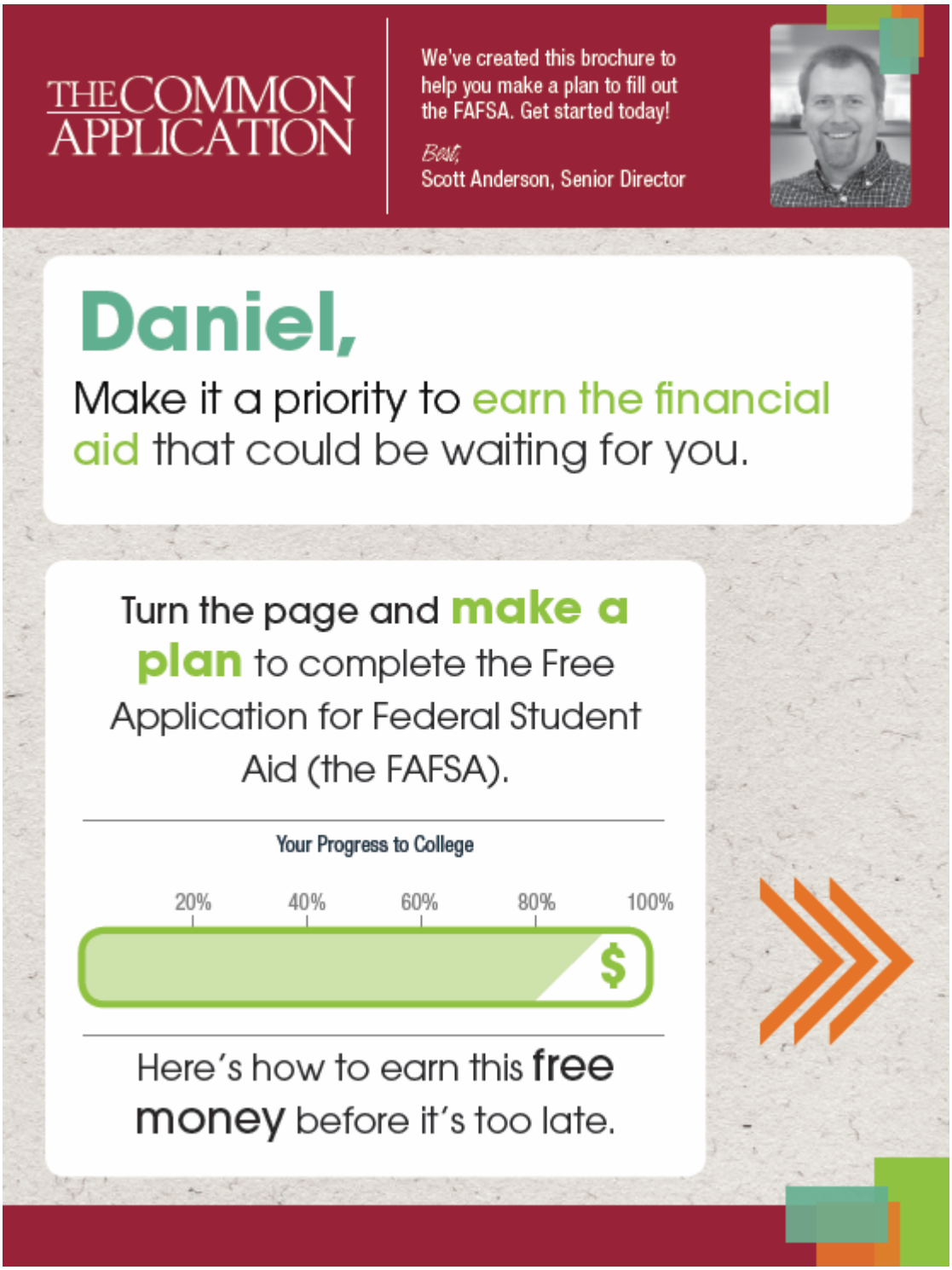
Table 6 - Heterogeneity by Treatment Wave

	Fall treatment wave				Winter treatment wave			
	Any college	Four-year college	Two-year college	Admission rate	Any college	Four-year college	Two-year college	Admission rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Planning	0.0178**	0.0048	0.0132**	-4.59E-05	0.0057	-0.0024	0.0078	-0.0017
	(0.009)	(0.010)	(0.007)	(0.005)	(0.007)	(0.009)	(0.006)	(0.005)
Identity/Norms	0.0063	-0.0078	0.0143**	-0.0022	0.0036	-0.0033	0.0068	-0.0012
	(0.009)	(0.010)	(0.007)	(0.005)	(0.007)	(0.009)	(0.006)	(0.005)
Financial Benefit	0.0078	0.0009	0.0072	-0.0035	0.0041	-0.0032	0.0071	0.0003
	(0.009)	(0.010)	(0.007)	(0.005)	(0.007)	(0.009)	(0.006)	(0.004)
Control group mean	0.843	0.766	0.077	0.607	0.823	0.714	0.110	0.596
N	20,568	20,568	20,568	15,437	28,067	28,067	28,067	19,550

Heteroskedasticity robust standard errors are clustered at the high school-by-treatment wave level (* p< 0.1 ** p < 0.05 *** p < 0.01). Each column shows the results from a separate student-level regression of the specified outcome on treatment indicators and high school fixed effects. Columns 1-4 include only students first treated in the fall of senior year while columns 5-8 include only students first treated in the winter of senior year.

Appendix A: Intervention materials

Planning Mailer



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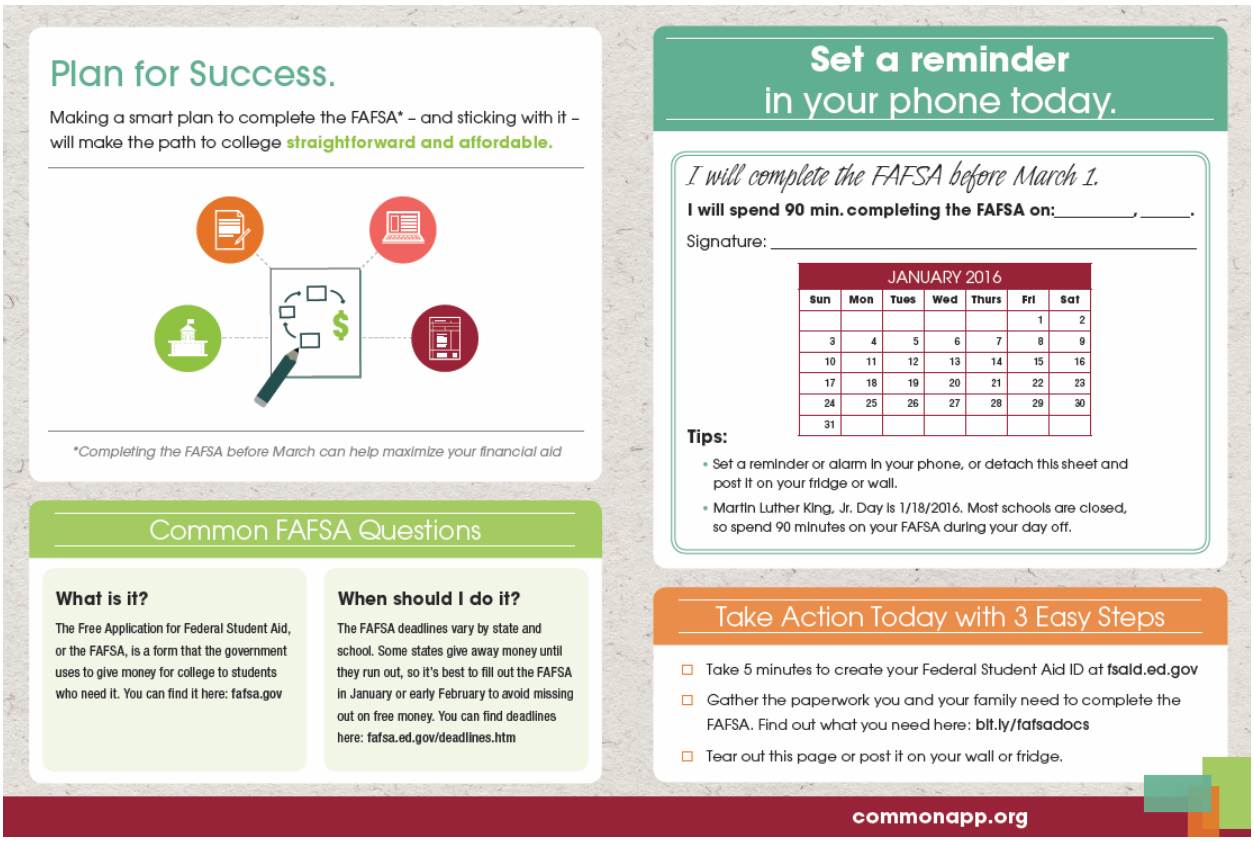
Plan for Success.
Making a smart plan to complete the FAFSA* – and sticking with it – will make the path to college straightforward and affordable.
*Completing the FAFSA before March can help maximize your financial aid
Common FAFSA Questions
What is it?
The Free Application for Federal Student Aid, or the FAFSA, is a form that the government uses to give money for college to students who need it. You can find it here: fafsa.gov
When should I do it?
The FAFSA deadlines vary by state and school. Some states give away money until they run out, so it's best to fill out the FAFSA in January or early February to avoid missing out on free money. You can find deadlines here: fafsa.ed.gov/deadlines.htm
Set a reminder in your phone today.
I will complete the FAFSA before March 1.
I will spend 90 min. completing the FAFSA on:_____, _____.
Signature: _____
JANUARY 2016
Sun Mon Tues Wed Thurs Fri Sat
1 2
3 4 5 6 7 8 9
10 11 12 13 14 15 16
17 18 19 20 21 22 23
24 25 26 27 28 29 30
31
Tips:
Set a reminder or alarm in your phone, or detach this sheet and post it on your fridge or wall.
Martin Luther King, Jr. Day is 1/18/2016. Most schools are closed, so spend 90 minutes on your FAFSA during your day off.
Take Action Today with 3 Easy Steps
Take 5 minutes to create your Federal Student Aid ID at fsaid.ed.gov
Gather the paperwork you and your family need to complete the FAFSA. Find out what you need here: bit.ly/fafsadocs
Tear out this page or post it on your wall or fridge.
commonapp.org

Planning Text Messages

Number	*Text*
1	(1/2) Hi *[first_name],* it's Scott from The Common Application. As the New Year starts we want to make sure you get all the financial aid you're eligible for. (2/2) Stay tuned for texts about key financial aid tasks. Save the # so you know it's us. Learn more: www.commonapp.org/fafsa.
2	(1/2) Hi, it's Scott again (from Common App). Do you have a plan for completing the FAFSA? Step #1 is creating a FAFSA ID: http://bit.ly/myfsaid (2/2) Watch this short 3-minute video to learn the steps to apply for financial aid: http://bit.ly/fafsahow.
3	(1/2) Hi *[first_name]*. You'll need family income info to fill out FAFSA, but you can start even if your family hasn't done 2015 taxes yet. (2/2) For a list of paperwork you need, along w/ other next steps you can take, visit: http://bit.ly/fafsadocs. Add a phone reminder to gather these documents.
4	(1/2) Hey *[first_name]*. How else besides FAFSA can you invest a couple hours of your time to potentially get $1000s in grants you don't pay back? (2/2) Take a minute to think about your schedule, and when you can block out 1-2 hours to start FAFSA: http://fafsa.ed.gov.
5	(1/2) Hi *[first_name]*. Your time is valuable, and there are tools (like pre-populating the FAFSA w/ IRS tax info) that make FAFSA easier & faster. (2/2) Set aside time to work w/ someone on FAFSA. FAFSA has live chat: http://bit.ly/myfafsahelp Or visit www.commonapp.org/fafsa for local resources.
6	(1/2) Hey *[first_name]*. Last financial aid text: After FAFSA colleges will send you letters about how much aid they will award you. (2/2) If you need help understanding the award letter, call the aid office or visit www.commonapp.org/fafsa to find help near you.

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Financial Benefit mailer

THE COMMON APPLICATION

We've created this brochure to show you the financial benefits of completing the FAFSA. Get started today!

Best,
Scott Anderson, Senior Director

Daniel,

Don't miss out on thousands of dollars in financial aid that could be waiting for you.

Students like you earn between **$11,000 and $16,000 on average*** by completing the FAFSA.

Your Progress to College

20% 40% 60% 80% 100%

$

Here's how to earn this **free money** before it's too late.

*see graph on next page for more details

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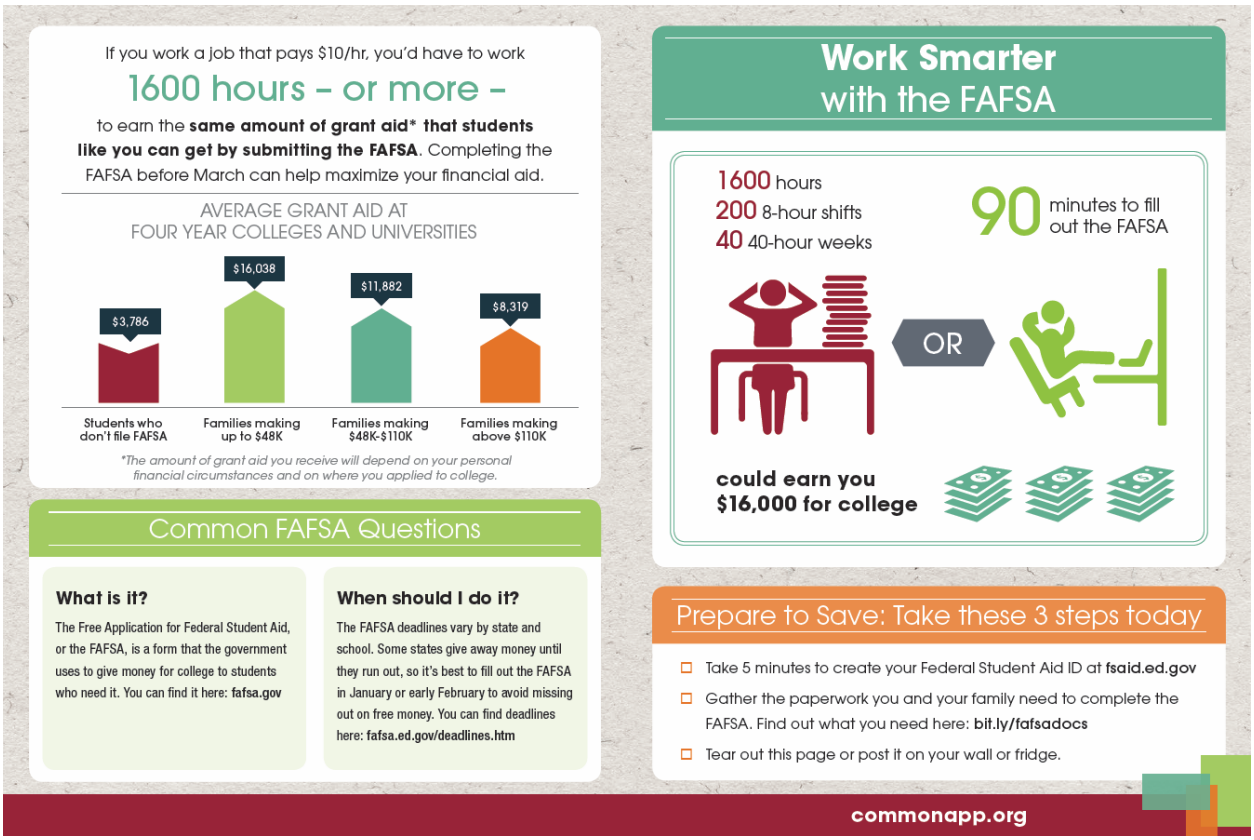
If you work a job that pays $10/hr, you'd have to work
1600 hours – or more –
to earn the same amount of grant aid* that students like you can get by submitting the FAFSA. Completing the FAFSA before March can help maximize your financial aid.
AVERAGE GRANT AID AT FOUR YEAR COLLEGES AND UNIVERSITIES
$3,786
$16,038
$11,882
$8,319
Students who don't file FAFSA
Families making up to $48K
Families making $48K-$110K
Families making above $110K
*The amount of grant aid you receive will depend on your personal financial circumstances and on where you applied to college.
Work Smarter with the FAFSA
1600 hours
200 8-hour shifts
40 40-hour weeks
90 minutes to fill out the FAFSA
OR
could earn you $16,000 for college
Common FAFSA Questions
What is it?
The Free Application for Federal Student Aid, or the FAFSA, is a form that the government uses to give money for college to students who need it. You can find it here: fafsa.gov
When should I do it?
The FAFSA deadlines vary by state and school. Some states give away money until they run out, so it's best to fill out the FAFSA in January or early February to avoid missing out on free money. You can find deadlines here: fafsa.ed.gov/deadlines.htm
Prepare to Save: Take these 3 steps today
Take 5 minutes to create your Federal Student Aid ID at fsaid.ed.gov
Gather the paperwork you and your family need to complete the FAFSA. Find out what you need here: bit.ly/fafsadocs
Tear out this page or post it on your wall or fridge.
commonapp.org

Financial Benefit text messages

Number	*Text*
1	(1/2) Hi *[first_name],* it's Scott from The Common Application. As the New Year starts we want to make sure you get all the financial aid you're eligible for. (2/2) Stay tuned for texts about key financial aid tasks. Save the # so you know it's us. Learn more: www.commonapp.org/fafsa.
2	(1/2) Hi, it's Scott again (from Common App). Don't forget that $1000s in college grant money may be available to you from the Dept. of Education & your state. (2/2) Completing the FAFSA is the first step to getting your share of this financial aid. Step #1: Create your FAFSA ID today: http://bit.ly/myfsaid.
3	(1/2) Hi *[first_name]!* Max your aid by doing FAFSA soon! Students who do FAFSA by March 1 get $1000s more in grants (on average) than students who file later. (2/2) Go to http://fafsa.ed.gov to get started. Visit www.commonapp.org/fafsa to find FAFSA help near you.
4	(1/2) Hey [first_name], how else besides FAFSA can investing a couple hours of your time result in potentially $1000s in free grants?http://fafsa.ed.gov (2/2) For help, live chat with FAFSA: http://bit.ly/myfafsahelp. Hotline 800-4FED-AID. Or visit www.commonapp.org/fafsa for a list of local resources.
5	(1/2) Hi *[first_name]*. $1000's could be waiting for you, but submitting the FAFSA is just step 1. Check your email for info about additional steps. (2/2) To learn the steps that may be required to get your aid: http://bit.ly/fafsanext. For help w/ FAFSA, visit www.commonapp.org/fafsa
6	(1/2) Hi there. Last financial aid text: After FAFSA colleges will send you letters about how much aid they will award you. (2/2) If you need help understanding the award letter, call the aid office or visit www.commonapp.org/fafsa to find help near you.

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Identity/Norms Mailer

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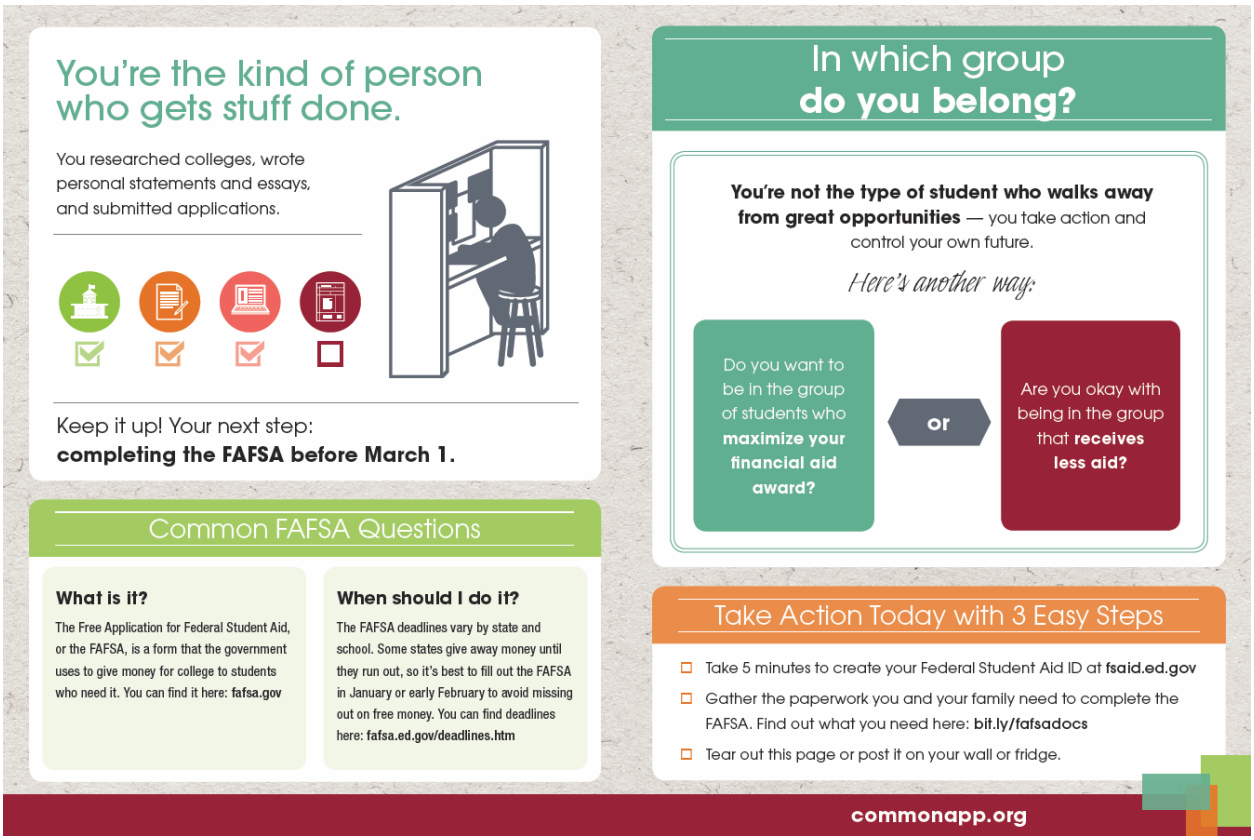

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Identity/Norms text messages

Number	*Text*
1	(1/2) Hi *[first_name],* it's Scott from The Common Application. As the New Year starts we want to make sure you get all the financial aid you're eligible for. (2/2) Stay tuned for texts about key financial aid tasks. Save the # so you know it's us. Learn more: www.commonapp.org/fafsa.
2	(1/2) Hi, it's Scott again (from Common App). We know you're the kind of student who maximizes your potential: now do the same with your financial aid. (2/2) Completing the FAFSA is the first step to getting your share of this aid. Step #1: Create your FAFSA ID today: http://bit.ly/myfsaid.
3	(1/2) Hi *[first_name]*. Activating your motivation to do FAFSA pays off: Students who do FAFSA by March 1 get $1000s more in grants (on average). (2/2) Go to http://fafsa.ed.gov to get started. Visit www.commonapp.org/fafsa to find FAFSA help near you.
4	(1/2) Hi *[first_name]*. You're the type of student that knows the value of time: 1-2 hours on FAFSA opens the door to potentially get $1000s in free grants. (2/2) For help, live chat with FAFSA: http://bit.ly/myfafsahelp. Hotline 800-4FED-AID. Or visit www.commonapp.org/fafsa for a list of local resources.
5	(1/2) Hi *[first_name]*. Hard-working students like you can have $1000s waiting for them: FAFSA is step 1.Check your email for info about additional steps. (2/2) To learn the steps that may be required to receive your aid: http://bit.ly/fafsanext For help w/ FAFSA www.commonapp.org/fafsa
6	(1/2) Hi there. Last financial aid text: After FAFSA colleges will send you info about how much aid they will award you. (2/2) If you need help understanding the award package, call the aid office or visit www.commonapp.org/fafsa to find help near you.

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Appendix B – Estimating treatment impact on FAFSA completion

By virtue of the school-level nature of publicly-available FAFSA completion data, we cannot leverage the student-level experimental design of the intervention, since the randomization was performed within schools. We attempt two methods to estimate the impact of our intervention using the available school-level data; however, these methods were unsuccessful.

First, we attempt a quasi-experimental method to estimate the impact of the intervention on FAFSA completion. Specifically, we use two sources of variation to conduct a quasi-experimental analysis of the impact: variation over time – the pre-intervention year (2015) and the intervention year (2016) – and variation between schools in the share of students that were assigned to any treatment condition. Schools with a larger share of students that were assigned to any treatment condition are likely different from other schools, because by construct these schools have more low-SES Common Applicants. To account for these differences, we incorporated their 2015 FAFSA filing rates into our models. Therefore, we leveraged variation between schools in the share of treated students and variation over time in exposure to the intervention, to estimate the impact of the financial aid nudge campaign on FAFSA completion. The validity of this method depends on schools with different shares of low-SES Common Applicants having parallel trends with respect to FAFSA filing rates. However, using two years of FSA data prior to our intervention to estimate a placebo treatment effect, we find evidence that strongly suggests this is not the case.

Second, we attempt to leverage variation that occurred due to our randomization procedure in the number students who were assigned to any treatment condition. For example, consider two schools that have five students in our overall sample. By virtue of our randomization procedure of these schools may have three students assigned to a treatment condition, while the other school may have four students assigned to a treatment condition. Using this variation, we attempt to estimate the treatment impact by including a number of low-SES Common Applicants fixed effect. While this variation is truly random, the amount of variation that exists across schools within a number of low-SES Common Applicants cell is too small for us to estimate the treatment impacts with any meaningful level of precision.

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