

## Customized nudging to improve FAFSA completion and income verification<sup>1</sup>

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### **Abstract**

For most students from low- or moderate-income families, successfully completing the Free Application for Federal Student Aid (FAFSA) is a crucial gateway on the path to college access. Yet, researchers have long recognized that the complexity of the FAFSA can serve as a barrier to students applying for—and in turn receiving—financial aid. We investigate the impact of a texting campaign specifically to address the informational and behavioral barriers associated with initial FAFSA filing. We advance beyond prior work by designing a texting system that leveraged regularly-updated administrative data on the status of students' FAFSA submissions to provide students with personalized outreach and updates on their FAFSA completion status. Students were able to write back for one-on-one, text-based assistance. We implemented the intervention in two distinct locations. In partnership with a set of eight school districts in Texas that together serve over 17,000 high school seniors, we tested the impact of this intervention through a school-level randomized trial. In partnership with the state of Delaware, we offered the text-based outreach to all high school seniors in Delaware public high schools, and we tested the impact of this statewide effort using a quasi-experimental matching strategy. Evidence from both sites indicates that the text-based outreach serves to improve FAFSA filing outcomes. In Delaware, rates of FAFSA completion were improved overall. In Texas, students filed the FAFSA earlier as a result of the outreach. In Texas, where we are able to observe subsequent college enrollment, the outreach impacted immediate college matriculation by four percentage points. We consider two potential mechanisms beyond simply completing the FAFSA through which the intervention could have improved rates of college enrollment. First, as a result of earlier filing, students may have accessed more generous financial aid. Second, the messaging may have made more salient the income verification process for the sizeable share of filers selected for verification. Earlier filing also may have afforded these students more time to navigate the verification process. We provide evidence to support both of these potential channels.

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### I. Introduction

For most students from low- or moderate-income families, successfully completing the Free Application for Federal Student Aid (FAFSA) is a crucial gateway on the path to college access. It is through filing the FAFSA that students can qualify for need-based federal aid, including the Pell Grant and Stafford loans. In addition, completion of the FAFSA is a requirement for many other scholarship funds that are primarily merit- rather than need-based.<sup>2</sup>

Yet, researchers have long recognized that the complexity of the FAFSA can serve as a barrier to students applying for—and in turn receiving—financial aid (Dynarski & Scott-Clayton, 2006; Dynarski, Scott-Clayton & Wiederspan, 2013; Bill & Melinda Gates Foundation, 2015). Experimental research indicates that providing families with individual assistance completing the FAFSA can lead to substantial increases in rates of FAFSA submission as well as college attendance and persistence (Bettinger, Long, Oreopoulos & Sanbonmatsu, 2012). Nevertheless, many students and families lack access to this type of professional assistance with the FAFSA, which can contribute to the substantial share of financially-eligible students who do not apply for financial aid (King, 2004; Kofoed, 2014).

Of those who do *submit* a FAFSA, a substantial portion may not actually receive financial aid as result of often-overlooked complexities that arise between when students submit the FAFSA and when they receive their financial aid offers from colleges. For instance, some students fail to fully complete the FAFSA because they miss simple steps like providing an electronic signature. Even among those who complete the FAFSA, many low-income students are required by the United States Department of Education or by the institutions to which they apply to verify the income and asset information they provide on their application. Students need to complete separate verification processes with each

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<sup>2</sup> For example, application for college funds from the Pittsburgh Promise, available to graduates from the Pittsburgh Public Schools who meet academic performance and school attendance eligibility criteria, also includes completion of the FAFSA.

institution to which they have applied, and each institution has unique verification forms to complete (Castleman and Page, 2014a). This additional step in the financial aid process may delay or even prevent FAFSA filers from receiving award packages from the colleges and universities to which they are accepted.

If students are hindered in completing all steps in the financial aid application process, they may miss out on aid entirely; receive less than they are eligible for because they file after priority deadlines; or not receive aid until just weeks before the start of the fall semester. Indeed, failure to complete the FAFSA in a timely way during the spring of a student's high school senior year is a contributor to summer melt, the phenomenon that college-intending students fail to transition successfully to postsecondary education in the fall after high school graduation (Castleman & Page, 2014a; 2014b).

Given the broad recognition of FAFSA as a challenging but critical step in the college-going process, there are numerous efforts at the local, state and national levels to improve FAFSA filing among college-intending students. For the past several years, the federal government has piloted efforts to provide student-level FAFSA completion information to educational agencies throughout the country. However, providing such information to school districts may be insufficient to meaningfully increase FAFSA completion rates. Indeed, anecdotal evidence based on conversations with personnel from districts connected to the FAFSA pilot project indicates that utilization rates of these data are low across many school districts. For at least two reasons, this is not surprising. First, a typical public school counselor in the US currently manages a caseload twice the 250:1 recommended by the American School Counseling Association (ASCA, 2012; Planty et al., 2009). Second, many counselors lack training and expertise in key college-going processes, such as applying for financial aid (Civic Enterprises, 2011). Therefore, as in other settings, it is likely necessary to go beyond making information available to proactively bringing information to those who need it in actionable ways (e. g., Kling, Mullainathan, Shafir, Vermeulen & Wrobel, 2012; Bhargava & Manoli, 2015). Further, while many states and local

communities participate in initiatives such as College Goal Sunday, through which volunteers provide families with assistance to complete the FAFSA, awareness of these efforts may be poor.

In both cases, the channels through which information about FAFSA completion is communicated may be ineffective at reaching school-based staff, students, and families. Without prompts or systems to make use of the available FAFSA data, school counselors may instead allocate their time to more pressing work commitments. Similarly, high school seniors typically are spread thin by a range of academic and social commitments and may struggle to allocate time to focus on financial aid. They and their families may also be confused or daunted by the complexity of the FAFSA, and in response to this cognitive overload may procrastinate on completing the application (Casey, Jones, & Somerville, 2011; Castleman, 2015; Ross, White, Wright & Knapp, 2013). This response is particularly likely among lower-income students and families whose attention is often occupied with pressing concerns (e. g., financial security or safety) (Mullainathan & Shafir, 2013).

The FAFSA is one of numerous barriers students encounter in the college-going pipeline (Page & Scott-Clayton, 2016). Prior experimental work demonstrates that text-based reminders for students about financial aid and other transitional tasks can improve college entry and persistence among economically-disadvantaged students (Castleman & Page, 2015; 2016a; 2016b). We build on this work by investigating the impact of a texting campaign to specifically address the informational and behavioral barriers associated with initial FAFSA filing among high school seniors. We also advance beyond prior work by designing a texting system that leveraged regularly-updated administrative data on the status of students' FAFSA submissions to provide students with personalized updates on their FAFSA completion status; encouragement to make use of community supports available for FAFSA filing; and the invitation to write back for one-on-one, text-based assistance with FAFSA.

We hypothesize that by providing students with timely, personalized reminders about the importance of the FAFSA and their individual status in the filing process, this initiative will improve

students' successful completion of the FAFSA overall and within institutional and state priority deadlines. Further, we hypothesize that early, successful completion of these processes will lead to higher and more stable levels of financial aid for students which will, in turn, improve the rates with which students matriculate to and succeed in college.

To test these hypotheses, during the 2014-15 academic year, we implemented the text-based FAFSA intervention in two distinct locations. First, we partnered with a set of eight school districts in Texas that together served over 17,000 class of 2015 high school seniors across 66 high schools. Within these districts, we experimentally selected high schools to participate in the text-based intervention. Given random assignment, we are able to estimate causal effects of the text-based intervention in a straightforward manner. Second, we partnered with the state of Delaware to offer text-based outreach focused on FAFSA filing as well as subsequent college transition tasks to all class of 2015 seniors attending public schools in the state. Given the state-wide nature of this implementation, we rely on quasi-experimental matching and difference-in-differences strategies to assess the effects of the intervention in Delaware. We discuss implementation details and analytic strategies associated with each site in greater detail below.

To preview our results, in both sites, we find that the text-based outreach has positive and economically meaningful impacts on timely FAFSA completion. In Texas, the intervention prompts only modest increases in FAFSA filing overall but more substantial improvements in the timing of FAFSA completion with treatment students more likely to complete the filing process earlier during the school year. These impacts on FAFSA filing converted to significant impacts on college enrollment in four-year institutions on the order of four percentage points. In Delaware, we observe overall impacts on FAFSA filing of approximately four percentage points, with impacts that are twice as large in the half of schools that exhibited high rates of intervention participation.<sup>3</sup> Especially given the efficiency of text-based

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<sup>3</sup> We do not yet have complete data on college enrollment to assess enrollment impacts in Delaware.

outreach and the low-cost of implementation, we conclude that this is an efficient and effective strategy to proactively support students in navigating this key step in the process of college access.

We structure the remainder of the paper as follows. In Section II, we describe the research sites and the structure of each site's specific intervention. In Section III, we present the data and research designs that we utilize to assess the impact of each intervention. In Section IV, we present results, and conclude with a discussion in Section V.

## **II. Research sites and intervention descriptions**

We first describe the participating Texas sites and the associated intervention. We then provide an analogous description for our Delaware site.

### ***A. Texas sites and intervention***

During the 2014-15 academic year, we partnered with several public school districts in the Austin and Houston areas of Texas (Table 1) to implement a text messaging intervention aimed at improving FAFSA submission and completion rates among high school seniors. Across the participating districts, our study sample includes 66 high schools serving over 17,000 high school seniors in the Class of 2015. We present descriptive statistics for participating students and schools in Table 2. These districts collectively serve a majority-minority student population that is 26 percent white, 19 percent black and over 50 percent Hispanic. 41 percent of sample students served by these districts are individually flagged as economically disadvantaged, although the rate of economic disadvantage ranged substantially across participating schools from quite low to nearly 100 percent.<sup>4</sup> The average participating student attended a high school where 44 percent of the class of 2013 graduates attended college and where nearly half of the class of 2014 completed a FAFSA by the end of 2014.

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<sup>4</sup> Economic disadvantage is indicated based on qualification for free- or reduced-price school meals. We suspect this indicator yields an underestimate of economic disadvantage particularly because older students are less likely to take up the opportunity for free school meals.

Our Texas intervention consisted of weekly personalized text messages related to FAFSA and college financial aid. To implement the project, we built on a contract that some of the districts already had with a data management and communications platform (OneLogos Education Solutions). OneLogos has the capability to communicate with students via text message and connect them, via text, to school counselors.<sup>5</sup> A unique feature of this project is that, via the Texas Higher Education Coordinating Board (THECB) and the Apply Texas Counselor Suite Portal, these districts had access to regularly updated student-level data on FAFSA filing and income verification status.<sup>6</sup> OneLogos was able to automate data pulls from this system to provide students with text message updates on the status of their FAFSA application.<sup>7</sup> Project implementation was additionally facilitated by the fact that, via access to students' Apply Texas college application information, the districts already had access to student cell phone information for their college-intending seniors as well as consent to message these students via text regarding the college-going process.

### ***Texas Intervention description***

Beginning in January 2015 and continuing through late April 2015, via the OneLogos platform high school seniors received automated, customized messages approximately weekly related to applying for college financial aid.<sup>8</sup> Some of these messages were general (i.e., the content was the same for all recipients), while in others we aimed to customize message content according to students' actual status in the FAFSA filing process. Messages also prompted students to respond via text to ask questions or seek additional help. The goals of these messages were to: (1) remind students about the importance of the FAFSA and steps / timelines / priority deadlines for applying for financial aid; (2) provide feedback on

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<sup>5</sup> For more information about OneLogos, see <http://www.onelogos.com/>.

<sup>6</sup> The ApplyTexas system is a comprehensive college application system through which Texas students are able to apply to nearly all public and some private colleges in the State of Texas. For more information about Apply Texas, see [https://www.applytexas.org/adappc/gen/c\\_start.WBX](https://www.applytexas.org/adappc/gen/c_start.WBX).

<sup>7</sup> Specifically, districts granted the technology provider permission to access and process FAFSA completion records as a third-party vendor on their behalf. The data platform has the capability to sort and target students for differential message content based on FAFSA completion status.

<sup>8</sup> The complete set of message content is available upon request.

students' progress in the aid application process; and (3) facilitate students' communication with their school counselor, via text, to ask questions and obtain additional help and guidance. These messages included links to additional resources such as short informational videos on the FAFSA process created by Federal Student Aid.<sup>9</sup> Students' assigned school counselor was the ostensible sender of all text messages, and the messages encouraged students to reply via text (or in-person with the school counseling staff) with questions or for further assistance with the college financial aid process.

As noted above, we customized some of the messages based on student-level FAFSA filing status information made available to the school districts by the Texas Higher Education Coordinating Board. Specifically, we were able to classify students into the following categories:

- ***FAFSA not yet started:*** these students received outreach with information about the importance of and appropriate timing for completing the FAFSA. Messages provided links to online information about the FAFSA; prompted students to schedule a date and time to work on the FAFSA; invited students to obtain one-on-one support with the FAFSA through a local FAFSA completion event;<sup>10</sup> and invited students to text back with any questions that they have regarding the FAFSA. School counselors responded to incoming text messages using the OneLogos web-based platform for responding to incoming text messages. Because Texas has a separate application process for undocumented students to access state-based financial aid (the Texas Application for State Financial Aid or TASFA), messages directed to those who had not yet started the FAFSA were inclusive of TASFA filing procedures as well.<sup>11</sup>
- ***FAFSA submitted, not yet complete:*** these students received outreach with a congratulatory message about submitting the FAFSA; with a reminder that their FAFSA was not yet complete; and

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<sup>9</sup> See, for example, <https://www.youtube.com/playlist?list=PL23B9A23CD8DD82DD>.

<sup>10</sup> For example, Austin-area high schools host FAFSA completion events through the months of February and March. For more information, see <http://www.austinchamber.com/education-talent/college-ready-now/financial-aid-saturdays.php>.

<sup>11</sup> There is no source of data on TASFA filing; therefore, we were not able to customize messaging to students according to their TASFA filing status.



with simplified guidance about finalizing their FAFSA. The messages also invited students to obtain one-on-one support through a local FAFSA completion event and invited students to text back with any questions that they had regarding the FAFSA.

- **FAFSA complete:** these students received a congratulatory message about completing the FAFSA. The messages provided links to videos on what to do after submitting the FAFSA. These students also received messages to remind them to review their Student Aid Report<sup>12</sup> and inform them of the possibility that they could be flagged for income verification a week or two after submitting the FAFSA. The messages invited students to text back with any questions that they had regarding the financial aid process.
- **FAFSA complete, selected for income verification:** these students received a congratulatory message about completing the FAFSA along with notification that they had been selected for income verification. They received a link to a video to learn more about the verification process. The messages invited students to obtain one-on-one support with the verification process through a local FAFSA completion event or by following up with their school counselor with questions or for additional support.

Students' FAFSA status information was updated in the districts' data systems every one to two weeks. As this information was updated, the message stream which students received also was updated automatically. We closed out the spring messaging with reminders about updating FAFSA information with 2014 taxes, if needed, and reminders about likely due dates of enrollment deposits.

During the course of the intervention in treatment schools, control schools did have access to the OneLogos platform and the texting capabilities included. As we show below, text outreach was

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<sup>12</sup> After completing the FAFSA successfully, each applicant receives a personal Student Aid Report that summarizes the information reported on the FAFSA. For more information, see <https://studentaid.ed.gov/sa/fafsa/next-steps/student-aid-report>.

utilized in the control schools but it was much less frequent, less broadly distributed, and less systematically focused on FAFSA and college financial aid.

### **B. Delaware site and intervention**

During the same academic year, we also partnered with the Delaware Department of Education (DE DOE) to implement a statewide text messaging campaign to encourage high school seniors and their families to apply for college financial aid and also to inform students about required pre-matriculation tasks in order to successfully enroll in college. Different from our experimental intervention in Texas, our goal in Delaware was to offer the text-based support to all class of 2015 seniors attending Delaware public high schools and to implement among those who opted in. This approach is complementary to our Texas intervention, as it provides the opportunity to examine impacts of offering this type of outreach and support at a statewide level. Different from the Texas context, the Delaware DOE did not have ready access to students' cell phone information. Therefore, it was necessary to implement a state-wide effort to recruit students to participate and to gather necessary contact information.

The primary means of student recruitment and cell phone number collection was through a college application week survey that the state aims to administer to all public high school seniors. During the fall of each academic year, each public high school in Delaware hosts a college application week during which school counselors, other staff, and volunteer mentors provide individual support to students to complete college applications. At the end of each school's college application week activities, students participate in a survey to report out on the activities that they found useful and their own accomplishments in terms of college applications begun and/or completed. During the 2014-15 academic year, the survey included an invitation to participate in the text-message effort and a prompt to students to provide their consent and cell phone contact information. It was through this survey that

the majority of participating students were recruited. Approximately 45 percent of Delaware's 9,196 class of 2015 high school seniors in the state enrolled in the texting campaign.<sup>13</sup>

In Table 3 we present the demographic and baseline academic characteristics of public high school seniors who signed up for the texting campaign and those who did not. Students who signed up for the campaign were somewhat less likely to be from a low-income household and more likely to be a student of color than students who did not sign up for the campaign but otherwise were similar on baseline characteristics to the statewide public high school senior population in Delaware.

### ***Delaware intervention description***

Our project implementation in Delaware was similar to Texas in both aims and content. The Delaware project began in mid-January 2015 and, different from Texas, continued through the end of August of that same year, with messages being distributed approximately once every two weeks. In Delaware we partnered with Signal Vine to both deliver messages and facilitate text-based exchanges between students and counselors.<sup>14</sup> In addition to messaging regarding financial aid and FAFSA filing, the Delaware messaging also included outreach regarding topics such as selecting a college or university and summer college-transition tasks such as immunizations, housing paperwork, placement exams, and transportation to campus. The Delaware text content similarly invited message recipients to text back with questions to be addressed by a text-based advisor.<sup>15</sup> The Delaware DOE supervised a project team made up primarily of volunteer graduate students at the University of Delaware to staff the text message portal and engage with students and families on their college-related questions and challenges. Different from the Texas intervention, the ostensible sender of the messages to Delaware students was

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<sup>13</sup> Our messaging provider, Signal Vine, also built a system for both students and parents to join the text intervention via text-in sign up. While few students joined the campaign via the text-in strategy, this was the primary means through which parents could sign up for messaging. In contrast to the fairly robust recruitment of students, only 445 parents signed up for the messaging campaign. Therefore, in our subsequent analyses we focus our attention primarily on student and not parent involvement in the outreach.

<sup>14</sup> For more information about Signal Vine, see <http://www.signalvine.com/>.

<sup>15</sup> The Delaware message content is available upon request.

a Delaware Department of Education staff member who “signed” most of the outgoing messages. We anticipated that text-based response rates among student participants would be higher in Delaware compared to in Texas, given that Delaware students could only engage with the outreach via text. In Texas, students could still follow up in person with the school counselor who was the perceived sender of the messages. Delaware students could have also followed up with their school counselor, but this person was not connected to the text outreach.

### **III. Research design, data and analysis**

While project structure and implementation differed somewhat across the two sites, in both, our primary research interest is in the impact of the outreach and text-based support on timely FAFSA filing and subsequent on-time college enrollment. In this section, we describe the research designs, data and analysis that we bring to bear to explore these impacts in each site.

#### **A. Texas school-level randomized controlled trial**

We implemented the text-based outreach in selected Texas school districts in the context of a school-level randomized controlled trial (RCT). Our sampling frame includes 66 unique high schools across eight school districts. The majority of these schools are part of the Houston Independent School District, with the remaining schools in other Houston and Austin area districts (Table 1).

We randomized schools in the participating districts to one of two experimental interventions, the second of which occurred in the subsequent academic year (here, we report only on the FAFSA-focused messaging intervention for the class of 2015).<sup>16</sup> To ensure balance on key baseline information and to improve statistical power, we matched sample schools into groups (“group”) of approximately five each, matching on 2013 school-level college enrollment data publically available through the Texas Education Agency, and then randomly selected three out of each of the five schools to be assigned to

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<sup>16</sup> In order to balance available resources across the two projects, we randomly assigned more than half of participating schools to receive the FAFSA intervention.

the FAFSA messaging intervention. For large districts (e.g., Houston ISD and Austin ISD), we prioritized matching schools within districts but in other cases, schools were paired across districts. In sum, we randomly selected 39 schools to participate in the FAFSA messaging intervention and 27 schools to serve as control.

We assess baseline equivalence at both the student and school levels. At the student-level, we regress each student-level baseline characteristic on school-level random assignment utilizing a multilevel model with random effects at both the group and high school levels. At the school-level, we again regress the school-level baseline characteristics on school-level random assignment in a two-level model that includes a random effect for group. In Table 2, we report estimates from models that weight schools equally as well as those that weight schools differentially according to enrollment. All results indicate that our sample is well balanced according to both student- and school-level characteristics.<sup>17</sup> Importantly, the schools are balanced on lagged measures of college enrollment (from the class of 2013) and FAFSA filing (from the class of 2014).

## **Data**

To assess the impact of the intervention on students' FAFSA filing and college enrollment outcomes, we draw on data from multiple sources. First, the participating districts provided student-level administrative records that allow us to observe information like student race / ethnicity, gender, and an indicator of socioeconomic disadvantage corresponding to qualification for free- or reduced-price school meals. From the Apply Texas system (via the participating school districts), we obtain information on whether students submitted and completed the FAFSA, the timing of initial submission, and an indicator for whether the student was flagged for income verification. From our technology partner, OneLogos, we obtain student-text message level records in order to capture information on text message receipt

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<sup>17</sup> A small number of participating schools were too new to have lagged college enrollment and/or FAFSA filing data available. For these schools, we imputed zero values and grouped these schools together for the sake of randomization. Therefore, within group, missingness of this school-level information is balanced.

and sending during the course of the intervention as well as the intensity of student participation. In addition to the student-level FAFSA filing information, we obtained school-level information publically available through Federal Student Aid (FSA) on week-by-week FAFSA submission and completion counts during the course of the intervention.<sup>18</sup> Compared to the student-level data, the FSA data is a better source of information for examining change over time in both submission and completion rates. In addition, as we discuss further below, anecdotal evidence from participating counselors as well as comparison between the two sources of FAFSA filing data led us to question the accuracy of the student-level filing information. Our final source of data is the National Student Clearinghouse, which provides student-level information on whether, where and the intensity (e. g., full- versus part-time) with which students enroll in college. From these data, we are able to focus on the following primary college enrollment outcomes: overall college enrollment, enrollment in a two-year institution, enrollment in a four-year institution, enrollment in college full time.

## Analysis

We utilize multi-level regression and linear probability models to assess intervention implementation, engagement and impact. To examine intervention participation and college enrollment outcomes, we fit models of the following general form on data at the student level:

$$Y_{ijk} = \beta_0 + \beta_1 \times \text{Treat}_{jk} + \mathbf{X}_{ijk}\boldsymbol{\gamma} + \mathbf{S}_{jk}\boldsymbol{\theta} + v_k + u_{jk} + \epsilon_{ijk}$$

Where for student  $i$  in school  $j$  in group  $k$ ,  $Y_{ijk}$  is the outcome of interest,  $\text{Treat}_{jk}$  is an indicator for treatment assignment at the school level; and  $\mathbf{X}_{ijk}$  and  $\mathbf{S}_{jk}$  are vectors of baseline characteristics at the student and school levels. Given the multi-level structure of the data, we allow for error terms separately at the group, school and individual level ( $v_k$ ,  $u_{jk}$ , and  $\epsilon_{ijk}$  respectively). Our parameter of primary interest is  $\beta_1$  which represents the impact of school-level random assignment to the intervention on a given student outcome.

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<sup>18</sup> <https://studentaid.ed.gov/sa/about/data-center/student/application-volume/fafsa-completion-high-school>

To examine impacts on FAFSA submission and completion, we analyze data aggregated to the school level. The associated models take a similar form with outcomes assessed at the school rather than individual level and where we include baseline covariates at the school level only. Given week-by-week FAFSA submission and completion data, we model these outcomes over time over the duration of the intervention and for several weeks after the conclusion of the active intervention period. When examining outcomes at the school level, we weight observations according to school enrollment.

### **B. Delaware quasi-experimental design**

As described above, we implemented the Delaware texting intervention statewide. Therefore, we use a combined matching and difference-in-differences (DID) design as our primary analytic strategy to investigate impact. Our “first-difference” comparison comes from comparing FAFSA filing rates between Delaware class of 2015 high school seniors, who had the opportunity to participate in the texting campaign, to those for class of 2014 seniors in the same high schools who did not have the opportunity to participate in the texting campaign. This first difference captures any increases in FAFSA filing due to the texting campaign as well as increases that result from concurrent factors changing over the same time period (e.g., enhanced federal efforts to promote FAFSA completion). To account for these temporal factors affecting FAFSA completion, our second difference is based on examining changes in FAFSA filing rates between class of 2015 and 2014 high school seniors from matched comparison schools in nearby states—Maryland, New Jersey, and Pennsylvania—which we assume capture what the change in FAFSA completion in the Delaware high schools would have been absent the texting campaign. The difference between these two differences represents the causal impact of the statewide texting campaign on FAFSA filing, separate from other factors affecting FAFSA filing over the same time period.

To identify a comparison set of schools in MD, NJ, and PA that most closely resemble the Delaware high schools, we matched each Delaware high school to one matched comparison school drawn from a neighboring state, using a Mahalanobis matching strategy, where we matched schools on

a vector of characteristics including size, racial / ethnic make-up, free / reduced price meals participation and lagged measures of FAFSA completion. In Table 4, we present descriptive statistics for the Delaware schools and their matched comparisons. These descriptive statistics and associated tests of baseline equivalence are weighted by school enrollment. The results in Table 4 illustrate that our matching strategy was effective in matching Delaware high schools to comparison high schools in other states that were similar on observable baseline characteristics. The one exception is the share of Black students in each high school, which is somewhat lower, on average in the matched comparison schools.

## Data

While we had access to student-level data for the Delaware schools, this was not the case for our matched comparison schools. To capitalize on consistent data across the schools included in our analysis, our primary data comes from two sources. First, from the National Center for Education Statistics Common Core of Data (CCD), we obtained lagged 12<sup>th</sup> grade enrollment counts for each high school in each state, as well as several school-level measures, including the percent of students qualifying for free- or reduced-price lunch and the percent of students from different racial/ethnic groups.<sup>19</sup> Second, we again utilized school-level FAFSA completion data from Federal Student Aid, which provides week-by-week counts of FAFSA submission and completion. To calculate FAFSA completion rates, we divide the school-level number of students completing FAFSA each week by the 12<sup>th</sup> grade enrollment count from CCD for the class of 2014, on the assumption that the 12<sup>th</sup> grade enrollments in schools are fairly stable over this time period.<sup>20</sup> One limitation of using the FSA publicly-available FAFSA

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<sup>19</sup> <https://nces.ed.gov/ccd/>

<sup>20</sup> While we have school-level counts of seniors for the Delaware high schools, we do not have analogous data for the high schools in neighboring states. To be consistent, we utilize CCD counts for all high schools. Our results are also robust to other strategies for calculating school-level FAFSA completion rates (for example, using the 2014 11<sup>th</sup> grade enrollment counts for the 2015 12<sup>th</sup> graders or calculating the difference between the 2013 11<sup>th</sup> graders and 2014 12<sup>th</sup> graders and applying that “dropout rate” to the 2014 11<sup>th</sup> grade figures to calculate the size of the 2015 12<sup>th</sup> grade class).



data is that it only includes school-level FAFSA filing data for 32 of the 47 high schools that had students participating in the Delaware text messaging campaign.<sup>21</sup>

## Analysis

We utilize the following model to obtain DID estimates of the impact of the text intervention on school-level FAFSA filing in Delaware:

$$Y_{cjk} = \alpha_k + \beta_1 \times DE_{jk} + \beta_2 \times I_{cjk}^{2015} + \beta_3 (DE_{jk} \times I_{cjk}^{2015}) + \mathbf{S}_{cjk}\theta + \epsilon_{cjk}$$

Where for cohort  $c$  in school  $j$  in matched pair  $k$ ,  $DE_{jk}$  is an indicator for a school being in Delaware,  $I_{cjk}^{2015}$  is an indicator for being in the 2015 high school cohort, and  $\mathbf{S}_{cjk}$  is a vector of cohort characteristics.  $\alpha_k$  is a fixed effect for each matched pair of schools so that our impact estimates rely on variation between each Delaware high school and its most comparable school in the neighboring states.  $\beta_3$  represents the DID estimator of the effect of the texting intervention on cohort-level FAFSA filing. As with school-level analysis in Texas, in our Delaware analysis, we weight observations according to school size.

## IV. Results

In this section, we first present results from the Texas experiment followed by those for the Delaware intervention. For Texas, we report on intervention participation, FAFSA-related outcomes and college-enrollment outcomes. In Delaware, we report on participation and FAFSA-related outcomes but do not

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<sup>21</sup> As an alternate strategy we aggregated up from individual-level student data to create school-level FAFSA filing rates for all 47 high schools in Delaware. However, there appears to be a data inconsistency issue with the 2014 student-level FAFSA filing data: the 2014 completion rates are very low relative to submission rates that year (about 30 percent completion and 44 percent submitted), while the 2015 submission/completion gap is much smaller (46.3 percent completion and 46.2 percent submitted). In order to generate a more conservative estimate of the impact of the statewide messaging campaign, and to ensure we are using consistent data across states, the FAFSA completion results we report rely on data from the 32 Delaware high schools with data in the publicly-available FSA dataset. 15 Delaware schools were not consistently present in the federal FSA data. These schools were largely schools that were different from standard comprehensive high schools, such as a military academy as well as schools for students with disabilities.

yet report on college-enrollment outcomes, due to discrepancies in the Delaware NSC data between the 2014 and 2015 cohorts that we are currently working to resolve.

#### **A. Texas intervention participation and impacts**

In Table 5, we present impacts of the intervention on receipt of text outreach through the texting portal utilized by the schools in our intervention. In the first column, we report impacts on whether or not students received any text outreach during the course of the intervention. Here, we observe that of students in the control group, approximately 38 percent did receive text outreach through the system. This high rate of text receipt is not surprising, given that all schools (both treatment and control) had access to the texting portal. In this sense, the Texas control condition can be thought of as business as usual when making a texting platform available but without a concerted campaign being implemented. In the control schools, while some of the text outreach was college related, other messages were for the purpose of advertising other campus events, such as job fairs. Control of these messages was at the school level, so the content is much more heterogeneous across schools, compared to the financial aid focused campaign that we implemented.

In the treatments schools, the rate of text receipt was nearly 33 percentage points higher, such that over 70 percent of students in the treatments schools received text-based outreach over the course of the intervention. In the remaining columns of Table 5, we observe various indicators of higher text-based engagement in the treatment compared to the control schools. In the control schools, approximately 6 percent of students texted into a school counselor, compared to nearly 20 percent in the treatment schools (column 2). In addition, treatment students received and sent more texts than their control group counterparts (columns 4 and 5). Treatment group students were also somewhat more likely to opt out of receiving text outreach, although we interpret an overall treatment group opt out rate of three percent as an indication that student were neutral to positive about receiving the text-

based outreach. This opt out rate is on par with what we have observed in prior text-based interventions (e. g., Castleman & Page, 2015, 2016).

Next, we turn to examine FAFSA submission and completion rates. We first examine trajectories of FAFSA submission and completion for students in the treatment and control schools (Figure 1, panels A and B). During 2015, the first week of available FAFSA completion data was for filing through the end of February 27, several weeks into our intervention. Based on these figures, we observe a meaningful difference in FAFSA filing that is largest across the first several weeks that we can examine and that narrows over time. In addition, submission and completion rates progress non-linearly in both the treatment and control schools. Given the shape of these curves, we utilize a logarithmic functional form to model trajectories of FAFSA filing. We investigate whether the treatment effect narrows significantly over time by including an interaction term between the log of time (in weeks) and treatment in our model. We present model results in Table 6.

We estimate that at the end of February, FAFSA submission and completion were 6 and 5 percentage points higher, respectively, in treatments schools compared to control schools. The significant interaction between treatment and time in Table 6 reveals that the treatment effect narrows over time such that, overall, the intervention had a modest effect on FAFSA filing and a stronger effect on the timing of FAFSA submission and completion. Those students who received the text outreach were more likely to complete the FAFSA earlier in the school year. Below, we discuss what implications FAFSA timing may have for financial aid received. Finally, with regard to successful application for college financial aid, we reason that these estimates potentially represent a lower bound on impacts, given that the text outreach was inclusive of financial aid application process for undocumented students (e. g., completing the TASFA). Because the districts do not collect data on TASFA filing activity, however, any impact of the intervention on application behavior of undocumented students is not represented in our data.

In Table 7, we report impacts on on-time college enrollment, based on data from the National Student Clearinghouse. Focusing on the models that include both student- and school-level covariates, we find that the intervention led to a significant improvement in timely college enrollment on the order of four percentage points. This enrollment effect is driven entirely by a significant increase in enrollment at four-year institutions and enrollment as a full-time college student.

### **B. Delaware participation and intervention impacts**

In Delaware, 45 percent of the state's class of 2015 high school seniors enrolled in the texting campaign, of which, 60 percent responded to at least one text (Table 8). As in Texas, the rate of participating students opting out was quite low (about 4 percent of students who signed up for the text messages). Students received an average of 28 text messages throughout the campaign, and on average the typical participant wrote in to the texting system three times. In Table 9, we present overall results on FAFSA submission and completion, by month, based on comparing participating Delaware schools to matched comparison schools in other states, using the difference-in-differences (DID) estimation strategy described above. Different from Texas, in Delaware, impacts grew over time from a non-significant 3.7 percentage point increase in submission and completion by the end of February to a significant 5 percentage point overall impact on both FAFSA outcomes by the end of June. The continued growth of the impacts through June in Delaware is sensible, given that messaging continued for the Delaware students through the summer months, whereas in Texas, the outreach concluded at the end of April.

Beyond these overall impacts, we additionally examined whether impacts varied by the extent of student participation in the texting intervention. To do so, we allowed treatment effects to vary according to whether schools' participation rates were above or below the median school-level participation rate. Across the Delaware high schools, the median campaign participation rate was 44 percent (and ranged from about 27-75 percent). For each Delaware high school, we identified whether it was an above- or below-median participation school and then applied this same classification to the

schools to which each Delaware school had been matched. That is, we assume that the take-up rate would have been the same within each Delaware school's matched comparison.

In Table 10, we present DID impacts estimates separately for schools with below-median and above-median participation. Based on these results, we find that the overall treatment impacts were driven entirely by those schools that had stronger rates of intervention participation. The effect of the campaign for the below-median schools is essentially zero, while the effect for above-median schools is roughly double those we report above. In the high-participation schools, the texting campaign increased FAFSA submission and completion by 8 and 7 percentage points, respectively, by the end of June.

### **C. Exploring potential mechanisms**

Of course, higher rates of FAFSA completion, as we observed in Delaware, are alone likely to equate to higher rates of college enrollment, consistent with earlier research (e. g., Bettinger et al, 2012). Given that in the Texas intervention, the intervention appeared to have a differentially meaningful impact on FAFSA timing, we consider two additional channels through which earlier FAFSA submission may relate to higher rates of college access.

First, it may be that, all else equal, students who file the FAFSA earlier are able to access more generous financial aid. This may be particularly so in Texas, where many of the colleges and universities common among the students in our sample have early priority filing deadlines. The Texas messages both encouraged early FAFSA filing in general and linked students directly to easy-to-digest information about institution-specific priority filing deadlines. If early filers are awarded more financial aid, on average, then it would stand to reason that early filing is a mechanism for improved college access (via improved college funding).

To explore this relationship, we utilize data from 2011-12 National Postsecondary Student Aid Survey (NPSAS:12) to examine average Pell grant and institutional aid award receipt for students, grouped by EFC, who filed the FAFSA at various points throughout the spring of their senior year in high

school.<sup>22</sup> We restrict our sample to dependent students whose high school state of residence was Texas and who had filed the FAFSA. We then divided the sample into groups of students within a \$500 EFC range (e.g., an EFC of \$0-499, \$500-999, etc.) and averaged Pell grant and institutional aid awards for students who filed the FAFSA prior to February 1st. We then calculated the difference in aid receipt for students within the same EFC bin who filed their FAFSA between February 2nd and March 1st, between March 2nd and April 1st, between April 2nd and May 1st, and after May 1st.

As we show in Table 11, across most EFC categories, students who file after February 1st receive smaller Pell grants, on average, than early filers. For example, among the lowest income students (EFC less than \$500), those who file after April 1<sup>st</sup> receive over \$600 less than those who file by February 1<sup>st</sup>. We observe similar trends between FAFSA filing date and institutional aid received (Table 12). In Table 13, we further disaggregate these patterns in institutional aid by two- and four-year institutions.<sup>23</sup> These figures reveal that the differentials in institutional aid are primarily driven by variation in awards within the four-year sector. Although there are almost no differences in institutional aid receipt at two-year colleges, among students enrolled at four-year institutions, there are substantial differences in average institutional awards by filing date. Across all income levels, these data suggest that students may miss out on thousands of dollars by filing their FAFSA later on in the spring, with the largest differences for students with the lowest family EFCs.<sup>24</sup> Specifically, we estimate that the lowest income students who file the FAFSA early receive institutional aid of over \$3000, on average. In contrast, socioeconomically similar students who file in the summer receive almost no institutional aid.

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<sup>22</sup> A limitation of these data is that the sample only includes college aspiring students who successfully matriculated to college and does not include students who, for example, may have failed to matriculate due to FAFSA or financial-aid related issues.

<sup>23</sup> Here, we group students into \$1000 EFC bins to alleviate issues of small cell size.

<sup>24</sup> These descriptive analyses do not control for institution. Therefore, it may be possible that these differences are driven by variation in FAFSA filing deadlines across institutions that are differentially generous in terms of financial aid awards.

A second possibility is that by filing the FAFSA earlier, students have more time to successfully navigate the income verification process, if they are flagged to do so. Indeed, in our Texas sample, of those students we observe to have submitted a FAFSA, nearly 30 percent are additionally flagged for income verification. If they file later, they may have less time to successfully navigate the verification process in advance of institutional priority deadlines. To our knowledge, the impact of the verification process on college access has not been explored.

In our data, we are not able to observe whether a student successfully navigates verification, only whether a student is selected for verification. Nevertheless, if the text messaging helped students to navigate the verification process earlier and more successfully, we hypothesize that the intervention would have helped to mitigate to some extent any negative impact that verification may have on college access. Indeed, this is what we observe.

In Table 14, we begin (column 1) by examining the overall relationship between being selected for income verification and timely enrollment among those students who are indicated in our data to have filed the FAFSA. Here, we observe that among FAFSA filers in both treatment and control schools, nearly three-quarters of filers not selected for verification enroll on time but that on-time enrollment is five percentage points lower among those flagged for verification. This same pattern holds after controlling for baseline covariates (column 2).

In columns 3 and 4, we present results from analogous models that this time include an interaction between verification and attending a treatment school. If students were more successful with the verification process in the treatment schools, we should see a positive coefficient on this interaction term. We observe suggestive evidence that this is the case. Both with and without covariate controls, the point estimates on the interaction term parameter indicates that the negative effect of verification selection is somewhat smaller within the treatment schools. These estimates are noisy and

not precise enough to be statistically significant. Nevertheless, they are suggestive of potential benefit, in that in the treatment schools, the negative effect of verification is reduced by 25 to 30 percent.

## **V. Discussion**

Across both the Texas and Delaware sites, we observe a sizeable and significant impact of the text-based outreach on FAFSA submission and completion. In Texas, we additionally observe downstream impacts on timely four-year college enrollment. At a low-cost, we were able to reach a large number of students. For example, in Texas, our financial aid intervention reached approximately 7,500 high school seniors at a service provider contract cost of \$60,000, leading to a direct technology cost of approximately \$8 / student reached. We can also frame costs in terms of expenditure per student enrolled in college. The treatment schools collectively served approximately 10,000 students. Among students served by these schools, we estimate that the intervention increased timely college enrollment by approximately 4 percentage points, or 400 students. Scaling our provider costs by this denominator equates to a cost of approximately \$150 per impacted college enrollee. Framed either way, the low cost and sizeable impacts together underscore the benefit of text-based outreach as a readily scalable strategy for improving student completion of important college-going milestones, such as timely FAFSA filing. The system that we devised also represents an efficient strategy for schools to make better (and automated) use of the student-level FAFSA status data that they are able to receive. A qualification to this point, however, is that we did observe substantial discrepancy between students' reported FAFSA filing activity and indicators represented in the data. For example, in Texas, counselors frequently received text- or in-person communication from students indicating that they had completed their FAFSA after having received a text message indicating that that counselor's records suggested otherwise. Data accuracy is no doubt a fundamental prerequisite to the long-run success of a system such as this.



That we observe positive impacts of the text intervention in both Texas and Delaware points to the versatility of the general strategy despite some key implementation differences. For example, in the Texas implementation, the ostensible sender of the text-based communication was each student's school counselor – a school staff member known well to each student. In Delaware, the ostensible sender was a state department of education staff member who, in reality, was being represented by a core of volunteers staffing message follow up. This structure allowed for more efficient staffing but meant that students were receiving messages from and had the opportunity to follow up with individuals less well known to them personally.

A second difference is that in Texas, because students' school counselors were engaged, students had the opportunity to follow up with their counselor either via text, in person during the school day, or via other modes of communication that they typically used to connect with their counselor. If a student needed to seek in-person support as a follow up to the text outreach, this was readily possible in Texas, as students and counselors were in the same building each school day. In Delaware, in contrast, text messaging represented the only means of communication between students and supporting staff. In this sense, when a student needed in-person support, the best the text-based advisor was able to do was recommend follow up with a school counselor or other local resource.

A final critical difference between the two sites is the process of engaging students in messaging. In Texas, nearly three quarters of targeted students received outreach, as students who had a valid cell phone number in their Apply Texas profile were initially opted in. In contrast, in Delaware, students were asked via a survey to indicate their interest and provide their cell phone number in order to opt in. In Delaware, the take-up rate was a far lower 45 percent. Therefore, just as default procedures and enrollment burden matter in school communication with parents (Rogers & Bergman, 2016) and other settings, such as retirement plan participation (Beshears, Choi, Laibson & Madrian, 2009), they

played a role in the comparative robustness of target student participation across our two intervention sites.

In both interventions, we regard students receiving the text-based outreach as college intending. In Texas, this is indicated through students' establishment of an Apply Texas profile and account which they use to apply to colleges and universities within the state. In Delaware, this is indicated through students' participation in the intervention itself. In previous work, we find that even among college-intending high school graduates who are accepted to a college or university and intend to enroll, many fail to actually matriculate (Castleman & Page, 2014a, 2014b). Further, we find that low-cost interventions to provide outreach and support to students in the summer months can help to mitigate this "summer melt" (Castleman & Page, 2015). Yet, advising staff who participated in these summer interventions often cautioned that the "summer melt" we observed actually began in the winter, when students and families should be navigating the FAFSA. The impacts that we observe of this intervention on college enrollment (at least in Texas) are similar in magnitude to those for analogous low-cost efforts to mitigate summer melt. Thus, these results lend credence to the notion that, under traditional FAFSA filing timeframes, more proactive college transition support ought to focus on FAFSA filing, and there is a benefit to maintaining this focus on supporting students to complete the FAFSA prior to the end of the school year. By supporting students with this key milestone, and shepherding them through the process earlier, rates of college access can be improved among college-intending high school graduates. In the Texas data, among students indicated as FAFSA filers, nearly 30 percent were flagged for income verification, with these rates higher for students indicated as low income. Given that a substantial share of students need to navigate this verification process, moving up their FAFSA filing timeline and allowing them more time during the school year to navigate verification (while also prompting the need for them to do it) may be a particularly important benefit of the federal

government's shift to earlier FAFSA filing based on prior-prior-year tax data for the first time for the graduating class of 2017.

Finally, this work points to the importance of going beyond seeking to improve educational systems just with the provision of data. Rather, educational systems need to have efficient procedures in place to make use of that information. We provide evidence in support of using data to inform students about and support them through one such process. The positive impacts that we observe here inspire thinking about other data-informed nudges to encourage and support students along their educational trajectories.

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## Tables & Figures

**Table 1. Districts and number of schools participating in Texas experiment**

<b>District</b>	<b>Number of schools</b>	<b>Number of students</b>
Austin Independent School District	13	4,552
Bastrop Independent School District	2	486
Hays Consolidated Independent School District	3	903
Houston Independent School District	41	9,267
Hutto Independent School District	1	335
Lockhart Independent School District	1	308
Manor Independent School District	2	425
Spring Branch Independent School District	3	1,455
<b>Total</b>	<b>66</b>	<b>17,731</b>

**Table 2. Descriptive statistics and assessment of balance between treatment and control groups in Texas experiment (n = 17,731)**

Variable	Mean	Proportion missing	Student-level		School-level	
			treatment	control	treatment	control
			differential	differential	differential	differential
White	0.26	0.002	0.005 (0.033)	0.005 (0.033)	0.006 (0.032)	-0.002 (0.045)
Black	0.19	0.002	-0.025 (0.045)	-0.025 (0.045)	-0.025 (0.044)	-0.002 (0.048)
Hispanic	0.58	0.002	0.035 (0.070)	0.036 (0.070)	0.032 (0.070)	0.034 (0.094)
Other race / ethnicity	0.07	0.002	0.008 (0.019)	0.008 (0.019)	0.007 (0.019)	0.003 (0.017)
Female	0.50	0.010	0.002 (0.013)	0.003 (0.013)	0.014 (0.015)	-0.002 (0.011)
Economically disadvantaged	0.41	0.042	0.005 (0.046)	-0.005 (0.045)	-0.001 (0.044)	-0.049 (0.065)
GPA	2.80 (0.814)	0.125	0.062 (0.120)	0.066 (0.126)	0.07 (0.130)	-0.013 (0.080)
SAT (math + verbal)	881.26 (227.261)	0.471	16.123 (41.213)	9.41 (43.646)	14.543 (45.788)	-15.438 (31.243)
College enrollment rate (lagged 2013)	0.443 (0.148)	--	--	--	0.004 (0.017)	0.009 (0.021)
2-year college enrollment rate (lagged 2013)	0.172 (0.068)	--	--	--	0.002 (0.022)	-0.002 (0.017)
4-year college enrollment rate (lagged 2013)	0.270 (0.128)	--	--	--	0.003 (0.031)	0.011 (0.026)
FAFSA filing rate (lagged 2014)	0.483 (0.143)	--	--	--	0.035 (0.031)	0.022 (0.025)
Missing values imputed to zero				x		
Weighted by school enrollment						x

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: administrative records from partnering school districts

Notes: Student-level balance covariates are derived from multi-level regression models where we regress each student-level covariate on an indicator for treatment assignment and include random effects at the group and high school level to handle the structure of the randomization. Group-level balance covariates are derived from analogous models where observations are at the school level. In checking school-level balance, we present results that are unweighted and weighted by school enrollment. Robust standard errors are in parentheses.

**Table 3. Descriptive statistics for text intervention participants and non-participants among class of 2015 high school seniors in Delaware**

	Participants Mean	Non-participants differential
White	0.581 (0.008)	0.050*** (0.010)
Black	0.348 (0.007)	-0.039*** (0.010)
Hispanic	0.112 (0.005)	-0.000 (0.007)
Other race / ethnicity	0.070 (0.004)	-0.012* (0.005)
Low Income	0.215 (0.006)	0.027** (0.009)
Female	0.502 (0.008)	-0.000 (0.011)
SAT Score (Math +Verbal)	891.966 (3.386)	-1.818 (4.558)
Missing SAT score	0.203 (0.006)	-0.012 (0.008)
Observations	4095	5074

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: Delaware Department of Education

Notes: Compares participating and non-participating students on race, gender, income, and SAT score. Robust standard errors are in parentheses.



**Table 4. Baseline equivalency of Delaware and matched comparison high schools**

	Delaware Mean	Match School Differential
12th Grade Enrollment	277. 831 (16. 391)	-0. 056 (24. 549)
% White	0. 535 (0. 029)	0. 067 (0. 053)
% Black	0. 311 (0. 026)	-0. 113** (0. 039)
% Hispanic	0. 109 (0. 013)	0. 024 (0. 028)
% FRPL	0. 298 (0. 021)	0. 022 (0. 039)
% schools w/FRPL <20%	0. 224 (0. 080)	-0. 043 (0. 115)
% schools w/FRPL >=40%	0. 204 (0. 072)	0. 034 (0. 109)
2014 March FAFSA Submission	0. 422 (0. 019)	0. 009 (0. 029)
2014 April FAFSA Submission	0. 506 (0. 019)	-0. 022 (0. 028)
2014 June FAFSA Submission	0. 563 (0. 018)	0. 002 (0. 026)
Weighted	X	X
Number of matches	1	1
N of schools	32	32

~ p<0. 10, \* p<0. 05, \*\* p<0. 01, \*\*\* p<0. 001

Source: Common Core of Data, Delaware Department of Education and Federal Student Aid.

Notes: Robust standard errors are in parentheses.

**Table 5. Take-up and participation rates in Texas experiment**

	Received text outreach	Responded to text outreach	Request texts stop	N texts received by student	N texts sent by student
Treatment	0.326*** (0.078)	0.131*** (0.023)	0.024*** (0.006)	5.920*** (1.126)	0.236*** (0.054)
Control group mean	0.379*** (0.057)	0.056*** (0.014)	0.006* (0.002)	2.690*** (0.623)	0.101*** (0.029)
N	17,731	17,731	17,731	17,731	17,731

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: administrative records from partnering school districts and project technology partner.

Notes: Results are obtained from multi-level regression models where we regress each outcome covariate on an indicator for treatment assignment and include random effects at the group and high school level to handle the structure of the randomization. Robust standard errors in parentheses.

**Table 6. Impacts on FAFSA submission and completion over time in Texas experiment**

	Submit FAFSA		Complete FAFSA	
Treatment	0.058~ (0.032)	0.050~ (0.028)	0.051~ (0.029)	0.034 (0.024)
Log(week)	0.088*** (0.005)	0.087*** (0.006)	0.081*** (0.005)	0.078*** (0.005)
Treat x log(week)	-0.017** (0.006)	-0.012~ (0.007)	-0.014* (0.006)	-0.005 (0.007)
Fitted control group mean	0.205		0.184	
N schools	66	66	66	66
Covariates	x	x	x	x
Weighted by school enrollment	x		x	

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: administrative records from partnering school districts and Federal Student Aid.

Notes: Results are obtained from multi-level regression models where we regress school-level FAFSA outcomes on an indicator for treatment assignment and include random effects at the group level to handle the structure of the randomization. Robust standard errors in parentheses. We present results from these school-level regressions unweighted and weighted by school enrollment. Models include school-level covariates reported in Table 2.

**Table 7. Impacts on college enrollment outcomes in Texas experiment**

	Overall college enrollment		Two-year college enrollment		Four-year college enrollment		Full-time college enrollment	
Treatment	0.041~ (0.025)	0.035** (0.014)	-0.019 (0.015)	-0.016 (0.014)	0.058* (0.028)	0.047** (0.018)	0.044~ (0.025)	0.030* (0.015)
Fitted control group mean	0.475		0.223		0.250		0.277	
Student-level covariates	X	X	X	X	X	X	X	X
School-level covariates		X		X		X		X
N	17,731	17,731	17,731	17,731	17,731	17,731	17,731	17,731

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: administrative records from partnering school districts and National Student Clearinghouse.

Notes: Results are obtained from multi-level regression models where we regress each outcome covariate on an indicator for treatment assignment and include random effects at the group and high school level to handle the structure of the randomization. Robust standard errors in parentheses. We present results from student-level regressions with student-level covariates reported in Table 2 and with and without school-level covariates reported in Table 2.

**Table 8. Take-up and participation rates in Delaware text campaign**

	Received text outreach	Text engagement among students receiving messages			
		Responded to text outreach	Requested texts stop	N texts received by student	N texts sent by student
Delaware class of 2015 students	0.45	0.59	0.04	28	3
N	9,169	4,095	4,095	4,095	4,095

Source: administrative records from Delaware Department of Education and project technology partner.

**Table 9. Impacts on FAFSA submission and completion in Delaware intervention, by month**

	FAFSA submission				FAFSA completion			
	February	March	April	June	February	March	April	June
Delaware x 2015	0.037 (0.025)	0.031 (0.027)	0.043 (0.027)	0.053~ (0.028)	0.038 (0.024)	0.031 (0.026)	0.042 (0.027)	0.051~ (0.028)
Delaware	-0.030 (0.020)	-0.019 (0.021)	0.012 (0.021)	-0.014 (0.022)	-0.032~ (0.018)	-0.023 (0.020)	0.002 (0.021)	-0.020 (0.022)
2015 school year	0.001 (0.018)	-0.009 (0.019)	-0.020 (0.020)	-0.029 (0.021)	-0.003 (0.017)	-0.011 (0.019)	-0.023 (0.019)	-0.034~ (0.020)
Average 2014 rate in matched comparison schools	0.322	0.431	0.484	0.564	0.306	0.410	0.463	0.538
N schools	64	64	64	64	64	64	64	64
R <sup>2</sup>	0.617	0.611	0.615	0.564	0.639	0.635	0.640	0.602

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: Common Core of Data and Federal Student Aid.

Notes: Robust standard errors in parentheses. All models include school-level covariates, including 12th grade enrollment, and 12th grade % Asian, % Black, % White, and % Free/Reduced Price Lunch eligible in 2013-14, using Common Core of Data information. Outcome of interest is FAFSA submission as of March 27th, April 17th, June 1st, and December 31st using data from FSA. All observations weighted for 12th grade enrollment.

**Table 10. Impacts on FAFSA submission and completion in Delaware intervention, by month and school participation rate**

	FAFSA submission				FAFSA completion			
	February	March	April	June	February	March	April	June
Impact in schools with below- median participation	0.018 (0.034)	0.002 (0.036)	0.009 (0.037)	0.024 (0.038)	0.023 (0.032)	0.007 (0.035)	0.015 (0.036)	0.031 (0.038)
Impact in schools with above- median participation	0.056 (0.036)	0.060 (0.038)	0.078* (0.039)	0.082* (0.041)	0.053 (0.034)	0.054 (0.037)	0.069~ (0.038)	0.070~ (0.040)
N of schools	64	64	64	64	64	64	64	64
R <sup>2</sup>	0.646	0.639	0.646	0.595	0.660	0.660	0.663	0.628

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: Common Core of Data, Federal Student Aid and administrative records from Delaware Department of Education.

Notes: Robust standard errors in parentheses. All models include school-level covariates, including 12th grade enrollment, and 12th grade % Asian, % Black, % White, and % Free/Reduced Price Lunch eligible in 2013-14, using Common Core of Data information. Outcome of interest is FAFSA submission as of March 27th, April 17th, June 1st, and December 31<sup>st</sup> using data from FSA. All observations weighted for 12th grade enrollment.

**Table 11: Pell Grant Received By FAFSA Filing Date**

EFC	Filing Dates				
	By Feb. 1st	Feb. 2-March 1	March 2-April 1	April 2-May 1	After May 1
\$0-500	\$4,691	\$ (97)	\$ (172)	\$ (660)	\$ (1,026)
<i>N filers</i>	110	230	160	100	310
\$500-999	--	\$ (868)	\$ 134	\$ (1,495)	\$ (1,412)
<i>N filers</i>	--	10	10	10	20
\$1000-1499	\$3,863	\$ (63)	\$ (327)	\$ 109	\$ (768)
<i>N filers</i>	10	20	10	10	20
\$1500-1999	\$2,960	\$413	\$ (64)	\$ (549)	\$ (421)
<i>N filers</i>	10	20	10	10	10
\$2000-2499	\$2,250	\$633	\$ 212	\$ (17)	\$ (89)
<i>N filers</i>	10	20	20	<10	10
\$2500-2999	\$2,278	\$ (209)	\$ 79	\$ (942)	\$ (630)
<i>N filers</i>	10	10	10	10	10
\$3000-3499	\$2,265	\$ (351)	\$ (559)	\$ (895)	\$ (899)
<i>N filers</i>	10	10	10	10	10
\$3500-3999	--	\$1,112	\$ 1,044	\$ 932	\$ 557
<i>N filers</i>	--	20	10	<10	20
\$4000-4499	\$1,215	\$46	\$ (372)	\$ (148)	\$ (451)
<i>N filers</i>	10	10	10	<10	10
\$4500-4999	\$833	\$ (218)	\$ (89)	\$ (257)	\$ (331)
<i>N filers</i>	<10	10	10	10	10
\$5000-5499	\$624	\$42	\$ (438)	\$ (415)	\$ (470)
<i>N filers</i>	10	10	10	<10	10
\$5500 +	\$12	\$ (12)	\$ (4)	\$ (12)	\$ (12)
<i>N filers</i>	130	190	160	100	300

Source: Data from the 2011-12 National Postsecondary Student Air Study (NPSAS:12) restricted-use data files.

Notes: Sample sizes rounded to the nearest 10 according to IES-NCES reporting requirements. Instances of 0 represent cells with no observations; instances of "--" indicate that there are insufficient observations and the cell size and outcomes are suppressed; instances of "<10" indicate the sample size rounds to 0. The first column reports the average institutional aid award students from each EFC bin received if they filed by February 1st. Each subsequent column reports the difference between the average institutional award received if filing during that period relative to students who filed the FAFSA by February 1<sup>st</sup>. Values in parentheses indicate negative numbers. Sample limited to dependents whose high school state of residence was Texas.



**Table 12: Institutional Aid Received By FAFSA Filing Date**

EFC	Filing Dates				
	By Feb. 1st	Feb. 2-March 1	March 2-April 1	April 2-May 1	After May 1
\$0-500	\$2,662	\$ (828)	\$ (1,776)	\$ (1,494)	\$ (2,451)
<i>N filers</i>	110	230	160	100	310
\$500-999	--	\$ 2,471	\$ 3,755	\$ 472	\$ 141
<i>N filers</i>	--	10	10	10	20
\$1000-1499	\$8,111	\$ (7,224)	\$ (7,801)	\$ (7,261)	\$ (8,063)
<i>N filers</i>	10	20	10	10	20
\$1500-1999	\$1,300	\$ 2,578	\$ 222	\$ 534	\$ 1,224
<i>N filers</i>	10	20	10	10	10
\$2000-2499	\$1,850	\$ (543)	\$ (474)	\$ (1,517)	\$ (1,788)
<i>N filers</i>	10	20	20	<10	10
\$2500-2999	\$1,453	\$ (850)	\$ 3,207	\$ (835)	\$ (1,419)
<i>N filers</i>	10	10	10	10	10
\$3000-3499	\$ -	\$ 1,536	\$ 3,827	\$ -	\$ 375
<i>N filers</i>	10	10	10	10	10
\$3500-3999	--	\$ (48)	\$ 1,465	\$ 7,620	\$ (1,196)
<i>N filers</i>	--	20	10	<10	20
\$4000-4499	\$ 1,600	\$ 2,598	\$ (523)	\$ (1,067)	\$ (1,291)
<i>N filers</i>	10	10	10	<10	10
\$4500-4999	\$ 9,377	\$ (8,362)	\$ (6,765)	\$ (9,377)	\$ (6,142)
<i>N filers</i>	<10	10	10	10	10
\$5000-5499	\$3,541	\$ (2,612)	\$ (2,975)	\$ (3,470)	\$ (3,532)
<i>N filers</i>	10	10	10	<10	10
\$5500 +	\$5,348	\$ (1,719)	\$ (3,210)	\$ (3,227)	\$ (4,456)
<i>N filers</i>	130	190	160	100	300

Source: Data from the 2011-12 National Postsecondary Student Air Study (NPSAS:12) restricted-use data files. Notes: Sample sizes rounded to the nearest 10 according to IES-NCES reporting requirements. Instances of 0 represent cells with no observations; instances of "--" indicate that there are insufficient observations and the cell size and outcomes are suppressed; instances of "<10" indicate the sample size rounds to 0. The first column reports the average institutional aid award students from each EFC bin received if they filed by February 1st. Each subsequent column reports the difference between the average institutional award received if filing during that period relative to students who filed the FAFSA by February 1st. Values in parentheses indicate negative numbers. Sample limited to dependents whose high school state of residence was Texas.

**Table 13: Institutional Aid Received By FAFSA Filing Date, Two-Year Colleges**

EFC	Filing Dates				
	By Feb. 1st	Feb. 2-March 1 differential	March 2-April 1 differential	April 2-May 1 differential	After May 1 differential
<b>Two-year institutions</b>					
\$0-999	\$ 35	\$ 40	\$ 3	\$ 45	\$ 54
<i>N filers</i>	40	80	70	50	200
\$1000-1999	--	\$ 72	\$ 205	\$ 13	\$ -
<i>N filers</i>	--	10	10	10	20
\$2000-2999	\$ -	\$ -	\$ 129	\$ 50	\$ -
<i>N filers</i>	10	10	10	10	10
\$3000-3999	\$ -	\$ 86	\$ 1,126	\$ -	\$ 24
<i>N filers</i>	<10	10	10	<10	20
\$4000-4999	--	\$ 263	\$ -	\$ -	\$ 376
<i>N filers</i>	--	<10	10	10	20
\$5000+	\$ 223	\$ 100	\$ 225	\$ (211)	\$ 1
<i>N filers</i>	20	40	40	20	100
<b>Four-year institutions</b>					
\$0-999	\$ 4,495	\$ (1,077)	\$ (2,493)	\$ (996)	\$ (3,766)
<i>N filers</i>	60	110	70	30	60
\$1000-1999	\$ 6,490	\$ (2,489)	\$ (4,425)	\$ (2,909)	\$ (6,431)
<i>N filers</i>	10	20	10	10	10
\$2000-2999	\$ 3,179	\$ (954)	\$ 1,683	\$ (1,691)	\$ (3,179)
<i>N filers</i>	10	10	10	<10	10
\$3000-3999	--	\$ 2,556	\$ 5,179	--	\$ 561
<i>N filers</i>	--	10	10	--	10
\$4000-4999	\$ 8,033	\$ (4,830)	\$ (6,165)	--	\$ (1,569)
<i>N filers</i>	<10	20	10	--	10
\$5000+	\$ 6,716	\$ (1,149)	\$ (3,565)	\$ (3,040)	\$ (4,919)
<i>N filers</i>	90	110	80	50	110

Source: Data from the 2011-12 National Postsecondary Student Air Study (NPSAS:12) restricted-use data files.

Notes: Sample sizes rounded to the nearest 10 according to IES-NCES reporting requirements. Instances of 0 represent cells with no observations; instances of "--" indicate that there are insufficient observations and the cell size and outcomes are suppressed; instances of "<10" indicate the sample size rounds to 0. The first column reports the average institutional aid award students from each EFC bin received if they filed by February 1st. Each subsequent column reports the difference between the average institutional award received if filing during that period relative to students who filed the FAFSA by February 1st. Values in parentheses indicate negative numbers. Sample limited to dependents whose high school state of residence was Texas who enrolled in a two-year college.

**Table 14. Relationship between on-time college enrollment and selection for FAFSA verification overall and by school-level treatment status**

	M1	M2	M3	M4
FAFSA verification	-0.052*** (0.012)	-0.049*** (0.011)	-0.062** (0.019)	-0.060** (0.019)
Treatment x FAFSA verification			0.016 (0.024)	0.018 (0.023)
Intercept	0.744*** (0.006)		0.744*** (0.006)	
Covariate controls		X		X
N	8400	8400	8400	8400
R <sup>2</sup>	0.094	0.167	0.094	0.167

~ p<0.10, \* p<0.05, \*\* p<0.01, \*\*\* p<0.001

Source: administrative records from partnering school districts and National Student Clearinghouse.

Notes: Results from regression models including fixed effects at the school level. Models include school-level covariates reported in Table 2. Robust standard errors in parentheses.

Figure 1: FAFSA submission and completion rates by week in Texas experiment

