APPENDIX A

In this appendix, we present the content and timing of the messages sent to treatment group students in the DIMES – national sample. In Table A-1, we provide an overview of the message timing and topics. In Table A-2, we provide the specific message content. Each planned outgoing message was distributed to treatment group students over a several day period, as described in Appendix D.

Over the course of the intervention, our approach to the message content evolved. Whereas the first several messages were designed to deliver uniform content and information to all students, over time, the research and implementation teams shifted the style of the messaging to be shorter and more conversational in nature. Early in the intervention, the uAspire advising team observed great variation in students' needs and understanding as well as the progress that they had made in their own college-going process. In addition, low take-up of multi-part messages led the team to question whether multi-part messages that students needed to trigger with keywords were the best approach to providing college-going information via text. Given these observations, we sought instead to craft outreach messages that would prompt students on topics in a more open-ended way, inviting them to engage with advisors on those topics.

For example, the initial version of message 4 below included a link to a Federal Student aid video on types of financial aid and a prompt to reply to the text with the keyword "AID". This keyword triggered an autoreply from the Signal Vine system that would link students to tools like college net price calculators and the federal EFC estimator. After a few days of this message sequence, the advisors observed that students were responding to the outreach with widely varying levels of understanding about financial aid and judged that these videos and tools were not the right entry point. After advisors were able to engage with students on the topic of financial aid, they were then able to provide links to the videos and other resources. The early lesson in this experience of advisors was that they should not assume a common base of understanding among all of the treatment group students. For this reason, the outreach messages were shifted to be more open-ended in nature so that advisors could work to conducting advising conversations that were relevant and personalized to each student's needs.

Because the advisors sought to engage students in text-based conversations as much as possible, in message 12, we explicitly experimented with whether adding a simple "Yes or No" prompt at the end of a message would increase student responsiveness. The explicit yes/no prompts indeed led to higher engagement rates with the program message, and thus this became a standard convention in writing program messages for the duration of the project.

Appendix A: DIMES National treatment group message content

Table A-1. Topic and timeframe for treatment group messages

Message	Topic	Begin date	End date
1	Introduction	April 9	April 22
2	SAT (spring) – registration and prep	April 23	May 31
3	I am a human	May 12	May 31
4	College Search	June 1	June 29
5	College affordability	June 30	August 3
6	Fall SAT - registration	August 4	August 26
7	Applications and fee waivers	August 27	September 20
8	Deadlines and college lists	September 21	October 13
9	Application assistance	October 14	November 4
10	Paying for college	November 5	November 30
11	FASFA/Financial aid prep	Dec 2	Jan 6 (no messaging over winter break)
12	FASFA, federal and state aid	Jan 7	Feb 1
13	Financial aid deadlines	Feb 2	Feb 29
14	Finishing aid applications	March 1	March 28
15	Financial award letters	March 29	April 25
16	Enrollment decisions and tasks	April 26	May 23
17	College accounts and summer tasks	May 24	June 20
18	College bills	June 21	July 18
19	Conclusion and survey	July 19	Sept 2*

Appendix A: DIMES National treatment group message content

Table A-2. Message content for treatment group messages

Message	Content
1	(1/2) Hi [first_name] this is [advisor] from College Board. At the PSAT/NMSQT you signed up for texts about college & financial aid. I'll send 1 - 2 txts/month (2/2) You can text me back for help. To learn about the program: http://www.collegeboard.org About me: reply [advisor]. Txt STOP to quit. Msg&DataRatesMayApply **RESPONSE TO [advisor]:** I'm [advisor], a uAspire advisor working on behalf of College Board. I'm here to answer your college questions. Details: https://www.uaspire.org/textadvising
2	**Note: This message is differentiated according to each student's status with regard to the SAT. Specifically, we divided students into groups according to whether they (1) had previously taken the SAT; (2) were registered for the spring SAT; or (3) had neither taken nor registered for the SAT.** **GROUP 1: Taken the SAT** Hi, it's [advisor] again. You've taken the SAT, so we want to help you with what's next. Have you had a chance to start your college search yet? Reply YES or NO. **IF YES:** **Part 1:** (1/2) Great! To see your SAT scores and look for more schools/careers that are right for you check out Big Future: http://bit.ly/mybigfuture. **Part 2:** (2/2) If college matches aren't schools you're excited about, retaking the SAT might be a good choice. You may be able to retake for free. Text back for advice. **IF NO:** **Part1:** (1/2) No problem! Get started by using Big Future to see your SAT scores and find schools/careers that are right for you: http://bit.ly/mybigfuture **Part 2:** (2/2)If college matches aren't schools you're excited about, retaking the SAT might be a good choice. You may be able to retake for free. Text back for advice. **Group 2: Registered for SAT** Hi [first_name], it's [advisor]. Congrats on registering for the SAT! Have you had a chance to explore the free SAT test prep resources? Reply YES or NO. **IF YES:** Great job! A little practice can go a long way towards increasing your score. Text me if I can help you with prep, or reply PREP for ideas on how to get ready.

Message	Content
	IF NO: No problem, you have some time! A little practice can go a long way. Text me if I can help you with prep or reply PREP for ideas on how to get ready. **Group 3: No info on registered or taken** Hi, it's [advisor]. Many colleges require the SAT as part of their application. Have you already registered for the SAT? Reply YES or NO. **IF YES:** Great job! A little practice can go a long way towards increasing your score. Text me if I can help you or reply PREP for ideas on how to practice. **IF NO:** **PART 1:** (1/2) That's OK, if you want to take the SAT, you have until Friday, May 8 to sign up. Ask your counselor if you qualify for a fee waiver to take SAT for free. **PART 2:** (2/2) You can sign up at http://bit.ly/satsignup. Text back for help registering or thinking about whether to take SAT. Or reply PREP for ideas for practice. **RESPONSE TO PREP:** #1 We'll send you a few automated suggestions about preparing for the SAT. Text NEXT to see the next tip or write back w/ questions and I'll respond. **RESPONSE TO NEXT:** #2 College Board is partnering with Khan Academy to offer free SAT prep video tutorials. You can find the videos here: http://www.bit.ly/satexamprep Text NEXT. **RESPONSE TO NEXT:** #3 Also at http://www.bit.ly/satexamprep, you can find free practice tests. These will give you a sense of what to expect when you take the SAT. Text NEXT. **RESPONSE TO NEXT:** #4 On the same site, you can sign up to get the Official SAT Question of the Day. Practicing each day can help you prep for the exam. Text me w/ any questions
Extra message	**Note: Based on initial student inquiries to the first two messages, the research and implementation teams judged that this message was needed in order to make clear to students that they were receiving outreach from human counselors and not a chatbot.** (1/2) Hi [first_name], it's [advisor]. I've gotten asked if I'm a human or a computer. I'm a real person! :) Read my bio here: https://www.uaspire.org/textadvising (2/2) I'm a uAspire advisor working on behalf of College Board. If you text me any questions you have about college. I'll text back as soon as I can.
3	Hi, it's [ADVISOR] again. I hope things are going well. Have you made progress on your college search? YES or NO

Message	Content
	RESPONSE TO YES: That's great, really excited to hear that! Which colleges interest you most right now? **RESPONSE TO NO:** That's OK! Reply TIPS for ideas on finding colleges or text back if I can help you. If you've already started searching, which colleges interest you right now? **RESPONSE TO TIPS:** #1 Use GPA & test scores to sort colleges into: safeties (where you're confident you'll get in), good fits, & reaches (challenging to get into). Text NEXT **RESPONSE TO NEXT:** #2 Don't rule out schools just b/c they seem expensive. There's often financial aid available. Visit http://bit.ly/collegeaffordability to learn more. Text NEXT **RESPONSE TO NEXT:** #3 Brainstorm the majors you might like based on your interests and strengths. Then look for schools that offer those majors. TEXT NEXT **RESPONSE TO NEXT:** #4 To learn more about what each college has to offer, visit the Big Future site: http://bit.ly/mybigfuture. Text me back with questions!
4	**Part 1:** (1/2) Hi, its [advisor]. Have you ever wondered how financial aid works? Summer before senior year is a really good time to think about financial aid. **Part 2:** (2/2) Let's look at how much fin aid you might get from colleges. Which college do you want to start with?
5	**Note: This message is differentiated according to each student's status with regard to the SAT. Specifically, we divided students into groups according to whether they (1) had previously taken the SAT; (2) were registered for the fall SAT; or (3) had neither taken nor registered for the SAT.** **GROUP 1: TOOK SAT IN SPRING** Hi, it's [Advisor]. Many students who took the SAT junior year retake it senior year for a chance to improve their scores. Did you register to retake it? Yes or No **RESPONSE TO YES:** That's great. The key now is prep! Have you tried the free SAT prep resources from College Board and Khan Academy? http://bit.ly/mysatkhan **RESPONSE TO NO:** If you plan to retake it, the next SAT is on Oct 3 and the deadline to register is Sept 3. Register using your CB account. Do you have any SAT questions? **GROUP 2: NO RECORD OF SPRING SAT** Hi, it's [Advisor]. Registration for the fall SAT is here and many four-year colleges require an entrance exam like the SAT. Do you plan to take it? Yes or No **RESPONSE TO YES:**

Message	Content
	Part 1: (1/2) That's great. The next SAT is on 10/3 and the deadline to register is 9/3. Registration is online http://bit.ly/satsignup. Need any help registering? **Part 2:** (2/2) Also, a great way to get ready for the SAT is to try the free SAT prep resources from College Board and Khan Academy: http://bit.ly/mysatkhan
6	**Note: This message is differentiated according to each student's status with regard prior use of an SAT fee waiver.** **GROUP 1: USED AN SAT FEE WAIVER** **Part 1:** Hi again! Now's a great time to pick at least four colleges that you want to apply to. For tips on applying to college: http://bit.ly/mycolleges **Part 2:** The good news is that because you used an SAT fee waiver, you qualify for 4 college application fee waivers. Do you know how the college app fee waivers work? **GROUP 2: NO INDICATION OF FEE WAIVER USE** **Part 1:** Hi again! Now's a great time to pick at least four colleges that you want to apply to. For tips on applying to college: http://bit.ly/mycolleges **Part 2:** Some students qualify for college application fee waivers, which makes it free to apply. Have you talked to your counselor to see if you qualify?
7	Hi [first_name]. Do you know the application deadlines for each of the colleges you want to apply to? Reply Yes or No **RESPONSE TO YES:** Great! When is the first application due? **RESPONSE TO NO:** That's okay. I can help you look that up. Which college is your first choice?
8	Hi, I wanted to see how your college applications are going. Have you started working on them? Reply Yes or No **RESPONSE TO YES:** That's awesome. What questions can I answer about the application process? **RESPONSE TO NO:** That's ok, this is a good time to start working on them. Do you know which college application you want to start with?
9	**Part 1:** Hi, it's [advisor]. I know it's a busy time with school, life and thinking about college. I just want to say that I know you're working hard :)

Message	Content
	Part 2: Almost all students have questions and concerns about paying for college. Has this been on your mind too?
10	**Part 1:** Hi! Whether you've applied to college yet or not, it's almost time to apply for financial aid through the FAFSA. You can fill out the FAFSA starting January 1. **Part 2:** Applying for aid doesn't commit you to college but is required to receive grants & other $$. What questions can I answer about the FAFSA?
11	**Note: this message was differentiated according to each student's state, because the states have varying systems and opportunities with regarding to state-level financial aid.** **[AZ, NC, SC, VA] -- states without an additional or separate aid application** **Part 1:** Hi, I hope had a great winter break! You can now start the federal financial aid application (FAFSA). It will require your family's info & other financial documents. **Part 2:** For info on what you need for the FAFSA: [URL]. What questions do you have about how you and your family should apply for financial aid? **[TX, CA, WA] -- states with two separate aid applications depending on students' citizenship status** **Part 1:** Hi, I hope had a great winter break! You can now start your financial aid applications. In [TX / CA / WA], students complete the FAFSA or [TAFSA / Dream Act App / WASFA]. **Part 2:** For info on FAFSA or [TAFSA / Dream Act App/WASFA] check out: [URL]. What questions do you have about how you and your family should apply for aid? **[FL, NY, GA, IN, MD, NJ, OR, PA] - states where students have to complete FAFSA and an additional application** **Part 1:** Hi, I hope you had a great winter break! You can now start the federal financial aid application (FAFSA). It will require your family's info & other documents. **Part 2:** If you are applying to college in [FL, NY, GA, IN, MD, NJ, OR, PA]? You'll also apply for [FL aid / TAP / GA HOPE / IN Aid / MD Aid / TAG / OR Aid / PA Aid]: [URL]. What questions do you have about how you and your family should apply for aid?
12	**Note: In this message, we experimented with the impact of including the "Yes or No" prompt at the end of the message to examine whether it influenced student responsiveness.** **GROUP 1 (Batches 1,2,5,7):**

Message	Content
	Hi! Even if your parent(s) haven't filed taxes yet, submit FAFSA now to meet deadlines. Do you know your state & colleges' financial aid deadlines? Yes or No **GROUP 2 (Batches 3,4,6,8):** Hi! Even if your parent(s) haven't filed taxes yet, submit FAFSA now to meet deadlines. Do you know your state & colleges' financial aid deadlines?
13	Hi, have you had the chance to submit your FAFSA yet? Yes/No
14	Hi [first_name]! If you applied for aid, you will receive a Financial Aid Award Offer from the colleges where you get accepted. Did you get these? YES or NO
15	**Note: This message was differentiated according to whether students had engaged with the text outreach at all up to this point in the intervention.** **GROUP 1: PRIOR ENGAGED WITH ADVISORS** Hi! I'm checking back in to see how your college decision is going. Do you know where you plan to attend? YES or NO **Group 2: NO PRIOR ENGAGEMENT** Hi [first_name]! I've been texting you on behalf of the College Board for about a year & haven't heard back. Are you planning to attend college? YES or NO
16	If you're starting college this fall, you need to set up your online college account and college email as soon as possible. Do you know how? YES/NO
17	Hi, you'll most likely need to pay your first college bill before fall classes start. Have you received your bill? YES/NO/HELP
18	**Note that students were randomly assigned to receive one of the part 2 messages.** **Part 1:** Hi (first_name). This texting program ends Sept 2. Please text me your college and financial aid questions while I'm still around! **Part 2a:** I do have one quick question for you. Did you read the text messages i've been sending you this past year about college? Reply YES or NO **Part 2b:** I do have one quick question for you. Can you share why you didn't respond to any of the messages we sent? Thanks! **Part 2c:** I do have one quick question for you. What is your Fall plan? Text back all the numbers that apply: 1-College 2-Job 3-Military 4-Other 5-Not Sure

Appendix A: DIMES National treatment group message content

Message	Content
	Part 2d: I do have one quick question for you. How helpful was this texting program? Text back a number rating the program from 1 (not helpful) to 5 (very helpful). **Part 2e:** I do have one quick question for you. Can you please describe something you learned as a result of me texting you about college? **Part 2f:** I do have one quick question for you. Can you please describe something you did related to college planning as a result of me texting you? **Part 2g:** I do have one quick question for you: In what way were my texts helpful for college planning?" **Part 2h:** I do have one quick question for you. Besides my texts, who else was helping you with college planning and financial aid? **Part 2i:** I do have one quick question for you. Would you recommend this texting program to the new Class of 2017 seniors? YES/NO **Part 2j:** I do have one quick question for you. How can we improve this texting program for students in the future?

APPENDIX B

In this appendix, we detail the staffing model, hiring, training, and supervision of the uAspire advising team throughout implementation of the national DIMES study.

Recruitment & Hiring Process

The advisor role for the project was structured as a fellowship, the term of which was February 2015 - September 2016. Recruitment of the first cohort of virtual advising fellows began in November 2014 and was conducted by the uAspire director of virtual student support, who had been hired in October 2014 to recruit, train, and supervise the virtual advising team. There were two subsequent hiring cycles, in the summer of 2015 and winter 2016 to add two additional advisors to the project. Candidates were recruited via online job boards, as well through uAspire's network of former advisees. In order to recruit candidates who would be interested in counseling students via virtual means, the role was positioned as an opportunity to engage in an ambitious and innovative large-scale project by working directly with students via SMS text message, at the intersection of research and practice.

Applicants for the virtual advising fellowship completed uAspire's three-stage interview process, which included: (1) a phone screen to gauge interest in, and understanding of, the position and project; (2) a situational interview to understand how well the candidate's previous work and life experiences might prepare them to excel in advising in this different, fast-paced, high volume context; and, (3) a behavioral interview where candidates complete role play exercises to test for their incoming ability to communicate with students over text message.

Training Activities

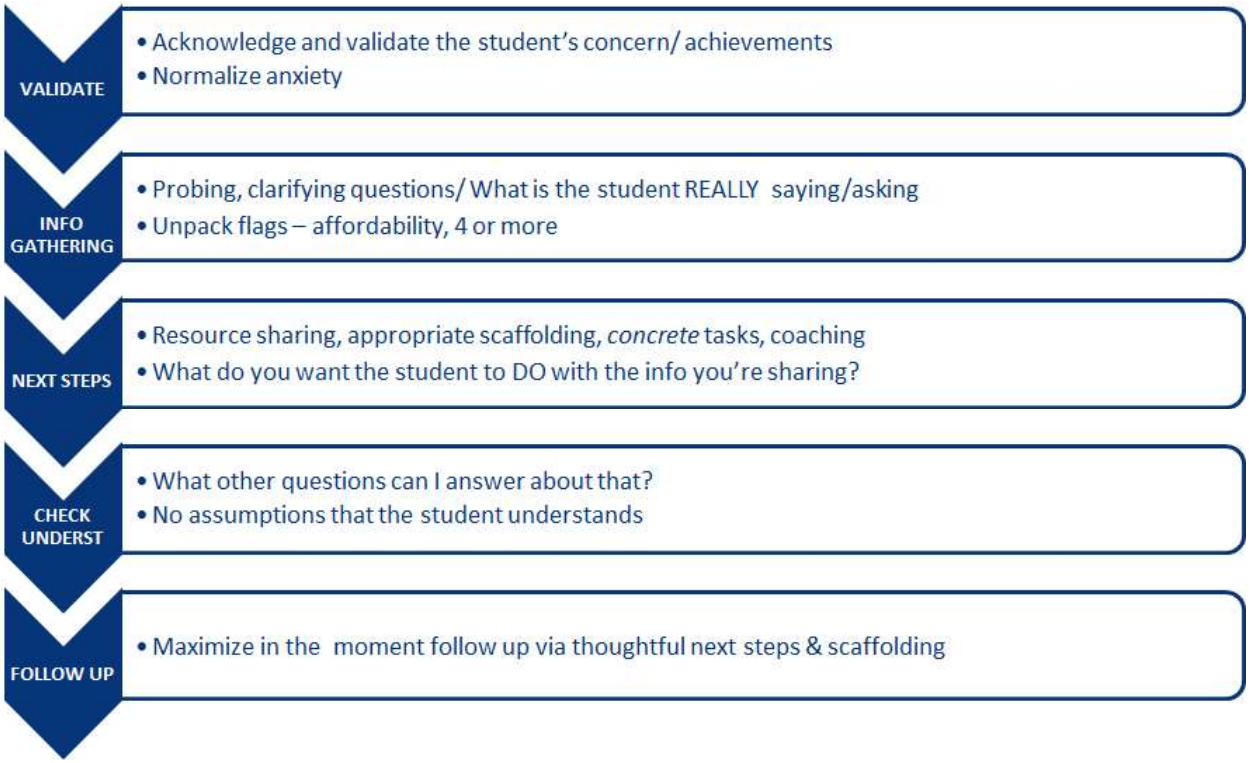
Virtual advisors participated in training and skill development activities throughout the project to ensure content mastery of relevant college access and affordability information and to enhance their ability to coach and counsel students via text message. This included an intensive onboarding period, with additional training prior to each program message, and significant independent research.

Upon being hired, advisors received rigorous and robust onboarding training to prepare them for the scale and scope of the advising task. These training modules included:

- Orientation to the DIMES study, with a focus on their population of treatment students in the national sample, and the context under which they would be working: volume, scale, allowable time frames for texting, caseload structure, and message schedule.
- uAspire's core college affordability training content, given to all advising staff.
    - Topics included college affordability national landscape, key financial aid forms (e.g., the FAFSA and CSS Profile), legal and citizenship policies that affect college access and financial aid, understanding federal taxes and how they impact financial aid, award letter advising, FAFSA verification, interpreting the student aid report (SAR), summer melt, and covering the college bill.
- Academic fit and match
- College entrance exams
- College counseling from a developmental perspective -- a presentation and discussion led by Dr. Mandy Savitz-Romer
- Big Future and the SAT -- robust overviews, given by representatives from the College Board
- The Signal Vine platform -- an overview and demonstration, given by Signal Vine

Advisors also completed conceptual and practical training exercises on how to deliver college access and affordability advising over text message. They received an overview of the elements of high quality, student-centered advising, as defined by uAspire and informed by virtual advising programs to decrease summer melt. These guidelines (see Figure 1 below) included: validating the student's reply, even if it was off topic; gathering information about their individual needs; offering clear next steps; checking for understanding; and following up, as needed and as feasible, given the large volume of students. To prepare themselves to advise across multiple states, advisors completed independent research throughout the project on the states included in their caseloads. This research allowed advisors to become familiar with relevant university systems (and their respective admissions and financial aid deadlines and practices), promise programs, policies for undocumented and DACA students, and state grants. In addition to startup training activities, advisors received an orientation to each treatment message, prior to its release to students. This regular practice grounded advisors in the message content, the advising goal for each message, and included supplemental training on college and affordability counseling topics relevant to the program message. Advisors then completed additional research into the relevant state-level policies or nuances that might impact the way they advised students on particular topics.

Figure D-1. uAspire guidelines and process for student-centered advising



A central theme of the training activities was the uAspire concept of 'student centeredness.' Student centered is one of uAspire's five core organizational values and permeates the nature of work of every uAspire employee. uAspire defines student centered as a "…focus above all else on the needs of our students. Our work with students requires flexibility so that we can effectively respond to our students'

changing needs. We respect each student's unique situation and do our best to make their college aspirations affordable." As such, throughout the training and supervision of the advisors, applying this standard for interaction with students was essential. For instance, when resolving a complex financial aid question, advisors were expected to consider not just the most accurate response, but also what the most student-centered way to deliver that information and coach the student through next steps might be. In essence, this was an exercise in applying emotional intelligence and empathy at scale. Thus, it is important to identify that while the nature of virtual advising might be rooted in short form communication, there were no shortcuts taken to offer students access to an advisor who would offer the depth of emotion and humanity as they might if they were sitting across a desk from one another. Advisors could not rely on simply superficial exchanges of information (an answer for each question, a reply for each text). Instead, their mandate was to offer highly detailed and accurate advising with a focus on student centeredness. This is an important factor to consider when reading the following section on supervision: the reader will not find an absolute formula for standardization that governed advising throughout the project because there is no way to fully standardize advising while honoring the uAspire commitment to student centeredness.

Staffing and Caseloads

The treatment group in the national sample included 31,549 students, from 15 states, across four US time zones. In the next several sections, we discuss the staffing plan and implementation logistics that made advising feasible at this scale.

At program launch, four uAspire full-time equivalent (FTE) staff members served as advisors. Because the level of student engagement with the program messages was higher than anticipated -- resulting in a very challenging workload for the advisors at the beginning of project implementation -- three additional FTEs were added to the advising team by January 2016. The additional advising capacity allowed for each advisor's caseload of students and number of states within their caseload to decrease, making their advising tasks more manageable. All of the advisors were based in uAspire's primary office in Boston, MA. Because we sought to prioritize hours for messaging outside of the typical school day and because students were spread across several US time zones, including Pacific Standard Time, the advisors' workday was a 12pm-8pm EST shift.

At the beginning of the project, treatment group students were divided into four caseloads, each assigned to an advisor for the duration of the project. Caseloads ranged in size from 7,624 - 8,180 with four FTEs, and then 3,986 - 4,756 with 7 FTEs. Treatment students were sorted by state, and then allocated to advisors in groups by state, to minimize the number of states and time zones in each advisor's individual caseload. Though advisor caseloads had relatively consistent total numbers of students, the number of states in each caseload varied between one and six, and contained one to two primary time zones. This was because the number of students from each of the 15 states varied significantly: Texas had the highest number of students in the treatment group at 11,856, South Carolina the smallest at 292.

Batching and Message Schedule

To make advising manageable at this scale, the distribution of program messages had to be scheduled at a pace that would make it feasible for advisors to engage in a timely manner with each student who replied. Messages also needed to be scheduled in accordance with school day texting restrictions named by participating schools. To achieve this, we divided students into subgroups within their caseloads (called "daily batches") of approximately equal size. Each advisor's caseload was divided into eight such batches. The batches contained, on average, 988 students at the start of the intervention, and 562 once the advising team was at its largest (seven advisors, January 2016). Program messages were thus scheduled

by batch group, such that each message was delivered to the full treatment group over the course of eight texting days. To allow advisors to respond to each student reply and do so in a manner that was consistent with uAspire's advising standards for student centeredness, the days on which program messages were scheduled to their respective batch groups were interspersed with days during which no program message was scheduled ("pause days"). On these pause days, advisors were able to catch up on replying to students, follow up on complex student questions, and do additional research, as needed. There were also 2-3 days between program message cycles to allow for orientation and training for the next message. In sum, the resulting pace of the messages overall was: 3 texting days per week, 2-3 weeks to cycle through a message, 2-3 days to debrief and prepare for the next. This pacing meant that treatment group students received approximately one program message per month.

Batches were created by ordering schools by time zone, state, and school ID such that students at the same school would receive their program message on the same day. Schools were then assigned time slots within their batch group during which they would receive each program message that met the allowable texting time frame criteria, as indicated by participating schools via a survey administered by the College Board. No program messages were to go to any school earlier than 1pm local time. Additionally, a total of 33 schools opted out of texting students in the 1 – 2 PM local time hour; 31 schools similarly opted out of messaging from 2 – 3 PM local time; and one school requested that messaging not start prior to 4:30 PM EST

Thus, the allowable time frame for sending program messages were (in EST, given that this the advisors were all based in Boston at uAspire's Central Office):

- Eastern Standard Time: 1pm-5pm EST
- Central Standard Time: 2pm - 5pm EST
- Mountain Time: 3pm - 5pm EST
- Pacific Standard Time & Arizona: 4pm - 6pm EST

It is important to note is that advisors had to remain attentive to which batch group they were working with on a given texting day, to ensure their advising was accurate, according to state-level factors, and in compliance with school day texting restriction rules. This meant that each time an advisor replied to a student text, they needed to be cognizant of what state and time zone that student was in, and whether they attended a school that had opted into a more stringent school day texting restriction.

Use of Local Phone Numbers in Sending Program Messages

The Signal Vine platform has the capability to send program messages from a 10-digit phone number, with a local area code, rather than a short code or another numeric convention that might be unfamiliar to the student recipients. Further, per the batch group structure, our goal was for students from the same school to receive messages from the same phone numbers on the same day. Each individual student received their program messages from a single, consistent phone number for the duration of the project. The intention in doing so was to reinforce for students that their uAspire virtual advisor was consistently available during the course of the intervention.

The platform had limits on how many messages could be sent from a single phone number per hour (n=120). Where school groups had more than 120 students in the program, additional sender phone numbers were assigned to those groups. Thus, students from schools with a smaller number of participants in the program received all program texts within the same hour from the same local phone number, while students who attended schools with over 120 participants received program messages from as many phone numbers as they had multiples of 120 student participants.

Relationship with the College Board -- as it relates to the advising work

The agreement that guided collaboration and information sharing throughout the project was articulated after a series of conversations between the respective legal counsels for uAspire, the College Board and Harvard University. A critical topic was how to present the uAspire advisors to the students who had opted into the program in such a way that preserved the College Board's relationship with their members and offered clear parameters on how and when the advisors might say who they were and what organization they represented. Given that uAspire advisors were texting with students who opted into the program at the time that they took the PSAT – and effectively to receive a College Board service –the advisors were introduced to the students in the first program message as [Advisor name] "from College Board." The message also gave students the option to receive additional information about their advisor. Specifically, students were prompted to access this additional information by replying to a text with their advisor's name. This reply would prompt an additional text that explained that their advisor was "a uAspire advisor working on behalf of the College Board", and a link to a video in which each advisor introduced themselves. Thereafter, if students texted additional clarifying questions about their advisor, the advisor would re-introduce themselves and reiterate that they were a uAspire advisor, texting on behalf of the College Board.

Furthermore, the College Board's legal counsel reviewed "FAQ" documents (discussed further below) used by the advising team as response banks for aiding them in replying to student questions that were expected to be frequent, given the message topics. The goal of these documents was to ensure alignment in messaging between uAspire advisors and the College Board, and set protocols for how the advising team might handle critical situations, for instance, if a student made comments that suggested they might be a danger to themselves or others.

Supervision

Advisors were supervised and coached in individual and group settings by two managers: the director of virtual student support and the manager of virtual advising. Individual supervision consisted of regular monitoring of their advising activities in Signal Vine by their manager, as well as occasional observations conducted by the College Board and other uAspire staff who were affiliated with the project (e.g., the president of uAspire and the vice president of research and evaluation). Advisors were given individual feedback and coaching based on their advising performance during bi-weekly individual meetings with their supervisor. Over the course of the project, the advising team and managers met weekly as a group to discuss their collective advising progress, identify any challenges that emerged from advising conversations, workshop difficult scenarios, and capture qualitative trends as they emerged.[22] These individual and group supervision activities informed ongoing training and research efforts, to ensure that advisor skill and knowledge was continuously responsive to the needs of their students.

Supervision activities were especially crucial to aid advisors in successfully and thoughtfully advising students who faced a challenge for which there was no single, clear path forward. Much in the way a team of counselors or teachers might meet in a professional learning community to support one another in their work with students at school, the uAspire virtual advisors were able to work together regularly to discuss the details of a given student's case, including the federal, state, and/or institutional factors at play, and to distill a plan of action to then be communicated back to the student in a way that

[22] These trends, reflections, and observations were compiled and shared each month with the research team throughout the project via written memo and discussed in team calls. They also informed the creation of keyword lists that were shared with the research team members conducting qualitative analysis.

corresponded to their individual characteristics and prior engagement with their advisor. Scenarios that warranted this collaborative approach included:

- Addressing challenges that arose in financial aid applications, such as a mismatch in either the student or parent's FSA ID and their information on file with the Social Security Administration.
- Coaching students who were behind on their college application and/or financial aid steps or who had missed a critical deadline.
- Nudging students who might only have one or two schools on their college list and who might have been resistant to adding others.
- Addressing verification processes: how to coach students through identifying what they needed to submit, deadlines, process, and locating or requesting tax forms on the IRS website.
- Teaching students to seek help and support from postsecondary institutions when they needed to advocate for themselves directly with the college, for instance, to confirm that financial aid information was correct and complete.
- Re-engaging students who had received disappointing information regarding their admissions status, their financial aid, or their college bill; identifying the best next steps the student could take to build up momentum and sense of options and choice.

Standardization of Advising

Though advisors had response banks to aid them in fielding student replies to program messages, more granular standardization of advising was a particular challenge in the project, because the nature of the treatment was to provide students access to two-way texting with an advisor. Further, uAspire's own deliberate choice to have advisors answer nearly all of the incoming messages, rather than take advantage of Signal Vine's automation features, was made with the intention of creating more genuine, responsive advising conversations. As discussed in the previous section, advisors were trained to be responsive to whatever each student might present with in their reply to each program message, rather than reflexively redirect them to the message topic. This was a key factor in building rapport and trust over text message. At times, students expressed skepticism regarding whether they were interacting with a real person, and so being responsive, *especially to their off topic replies,* was critical for proving to the students that the uAspire advisors were real people and that they were indeed getting individual attention from a trained practitioner when they were texting back and forth. It was often during these moments that students would express that until then, they had assumed that the messages were entirely automated. Further, this approach reflects the process through counselors and practitioners build relationships with students in person. Counselors validate and connect with their clients and students on their terms in order to build trust. Thus, by being responsive to the issues students raised (be they on-topic or not), the advising team aimed to capture a key element of in-person advising and manifesting it over the texting platform.

The aforementioned response bank that advisors used (called "FAQs" throughout the project) did contain clear objectives for each message so that, when the student was replying about the topic (often by answering the yes or no question that was in the program message), there was a clear direction to guide where the advisor should be driving the conversation. Additionally, advisors relied on research they did for their individual states and popular institutions therein, to anticipate some of the specific state- and college-level questions they would have to answer repeatedly.

Each primary outgoing message was distributed to batches of treatment group students over an eight-day cycle. Over the course of each message's cycle, advisors felt that they were able to hone their response bank language, and improve in their ability to anticipate students' confusion and questions. In effect, the advisors were gaining content mastery and fluency over the course of each message cycle.

In addition to the message response banks and rapid learning over the course of each message cycle, there were also standards in place for advisors regarding inbox management and communication with students and within the team. With respect to inbox management, advisors were trained to reply to all students within 48 business hours, if not sooner, but to do so in a way that prioritized urgent or time sensitive student questions. This meant that rather than replying to students in the order in which each incoming student message was received, advisors scanned their inboxes regularly for urgent situations that required more immediate response. These often were student questions about next steps they were completing under the pressure of a looming deadline (as is the case at various stages of the admissions and financial aid application and follow up processes), a student with whom the advisor was having an intense, quick back and forth exchange regarding immediate next steps, or an especially personal or sensitive conversation (e.g., about citizenship status, a student's doubts about his own college readiness, how a student's family could cover the fall term bill, a student's frustration with the many hurdles she was having to clear in order to complete any one phase of the process, etc.).

Advisors were also expected to send student reminders and nudges regarding the follow up steps that arose in their advising conversations, utilizing the message scheduling feature in the Signal Vine messaging platform. The standard operating procedure was for the advisor to name the next step for the student, ask them when they anticipated completing the step, which was often in the evening after they were home from either school or work, and then asking the student if they would like to receive a reminder text at that time to help them remember. As a rule, advisors also used "sign offs" to pause conversations when the office was closing for the day. Advisors were of course not expected to stay past their 8pm EST shift to answer every last question in their inbox, and so in order to signal to the student that they were going home for the day, they would send them a text that informed them that the office was closing and so they had to sign off, but that they would pick the conversation back up the following day. In addition to these individual signoffs, the advising team also made use of Signal Vine's Autoresponder feature as an out of office notification students received when they texted a question when the office was closed. Similar to the sign off messages, these included a greeting, information about the duration of the office closure, and reassurance that the advisor would reply when they were back at the office. These were critical practices in building rapport with students and ensuring that social rules about 'ghosting' did not apply to the advisors, who were of course not ignoring a student on purpose but were not available all the time. This represents a key tradeoff in using human advisors rather than automated messaging.

The "I'm not a robot" Program Message

In May 2015, after nearly 30% of treatment students had replied to either the introductory message or the SAT registration nudge message, an additional message was added to the program and was sent to students who had not yet engaged with a program text. The message read:

(1/2)Hi [first_name], it's [advisor]. I've gotten asked if I'm a human or a computer. I'm a real person! :) Read my bio here: https://www.uaspire.org/textadvising

(2/2) I'm a uAspire advisor working on behalf of College Board. If you text me any questions you have about college, I'll text back as soon as I can.

The intention in doing so was to distinguish these text messages from push notifications and other mass texting programs or services the student might have subscribed to. The engagement with this message was modest: 637 students who had not previously responded replied to the message. Student responses to this message reflected their general surprise that the advisor was a human, although there was some continued skepticism throughout the project, due perhaps to the fact that the primary program messages were scheduled and sent en masse.

Iterations & Troubleshooting During Implementation

Given the project's reliance on text messaging as the sole means of communication, access to a reliable messaging system and high-quality internet were critical for successful implementation. In addition, successful implementation relies on phone carriers (outside of the control of our project team) to provide reliable service. During the active intervention period, the advising team did experience a few instances of messaging platform outage, instances of phone carriers distributing two-part messages out of order, and internet outages. When these issues occurred, the advising team worked closely with Signal Vine to diagnose the source of and solve the problem. When such problems hindered the ability to advise, the team would document the duration of the advising interruption. Typically, advisors were interrupted for less than one hour, and when this was not the case, primary outreach messages were rescheduled for a later date, to allow time for the issue to be resolved without interfering with a program message.

Though the system worked well for nearly the entirety of the project, one significant messaging error occurred at the very end of the project, on August 30, 2016. On this day, due to a mishap in migrating a Signal Vine server, all students received a repeat message from earlier in the program (originally sent in November, 2015). The topic of the message was student concerns about paying for college. All of the students in the treatment group received the message on the same day, inclusive those who had opted out since November. This is because the system error redistributed the same message to the roster of students who were actively participating in the treatment when the message was originally sent.

In addition to the primary program message, any adhoc scheduled messages the advisor had in queue at the time of the November message were also sent out to their intended recipients. Naturally, this created some confusion since the previous message had been intended to close the program and offer students a survey on their experience with the texts. Although unintended, it is worth noting that many of the students who replied were prompted to seek last-minute advice on covering their college bill. An apology was sent to students who received the errant message despite having opted out of the program since November. Overall, these students reiterated their desire to no longer receive messages. In order to give advisors time to address the inbox traffic this generated, the duration of the program was extended to September 16, 2016, adding an additional 2 weeks from the original end date of September 2, 2016.

APPENDIX C

In this appendix, we present the content and timing of the messages sent to control group students in the DIMES – national sample. In Table C-1, we provide an overview of the message timing and topics. In Table C-2, we provide the specific message content.

Table C-1. Topic and timeframe for control group messages

Message	Topic	Begin date	End date
1	Introduction	April 9	April 21
2	College search	May 14	May 22
3	College affordability	July 9	July 21
4	Fall SAT – registration and preparation	August 10	August 19
5	Fine tuning college list	October 6	October 19
6	College application process	November 9	November 20
7	FAFSA	January 14	January 26
8	What to do after submitting applications	March 10	March 24
9	What to do after selecting college	April 26	May 10
10	Summer transition tasks	June 9	June 23
11	Final reminders	July 19	August 2
12	Survey and conclusion	August 15	August 30

Appendix C: DIMES National control group message content

Table C-2. Message content for control group messages

Message	Content
1	Hi it's Shawn from College Board. You signed up at the PSAT/NMSQT to get helpful college tips from us. Text GO to start (Txt STOP to quit/Msg&DataRatesMayApply) **Response to GO:** Please tell me the letter of the topic you think you need the most help with (A) financial aid, (B) building a college list, (C) preparing for SATs or (D) All **Response to A, B, C, D:** Great. I'll send you texts every other month about that and other aspects of college planning! In the meantime, check out bigfuture.org for more free resources **Response to STOP:** This message confirms that we will no longer send text messages about college & financial aid. If you wish to restart the messages you can respond START. **Response to START:** COLLEGE BOARD: Your text messages have been reactivated. Reply STOP to opt out. Reply HELP for help. Msg&Data rates may apply. **Response to HELP:** These are college planning alerts from College Board. Program questions? Visit http://www.collegeboard.org Txt STOP to quit. Msg&Data Rates May Apply
2	**Part 1:** (1/2) Hey, it's Shawn from College Board. Building your college list can be a challenge. Here are a few steps to make the process clearer! **Part 2:** (2/2) Text YES to get started. (Txt STOP to quit / Msg&DataRatesMayApply) **Response to YES:** (1/7) First, think about if you want a 2 yr v. a 4 yr school, how far from home you're willing to go, & setting (size, city, campus, etc.). Txt "2" for more **Response to 2:** (2/7) Don't rule out schools just b/c they're expensive – there's often financial aid available. Check out the school's net price calculator to see! Txt "3" **Response to 3:** (3/7) Look into each college's graduation rate. You want to pick schools with high grad rates so you can feel supported and be successful at college. Txt "4" **Response to 4:** (4/7) Use GPA & test scores to sort colleges into: safeties (where you're confident you'll get in), good fits, & reaches (challenging to get into). Txt "5" **Response to 5**: (5/7) Now choose: 1-2 safeties, 2-4 good fits, and 1-2 reaches. Plan to apply to at least 4 schools b/c it will improve your odds of getting in. Txt "6" **Response to 6:** (6/7) Use your support network. Guardians, counselors & teachers can help you think about your decisions and choose which schools are best for you. Txt "7" **Response to 7:** (7/7) Good luck building your list! Check out http://bit.ly/mycollegefit for more info on this!

Appendix C: DIMES National control group message content

Message	Content
3	It is Shawn from the College Board. Wondering how you'll be able to pay for college? To learn about how affordable college can be for you, text 1 **Response to 1: (**1/6) Almost 70% of full-time college students receive some type of financial aid, so you have a great chance of receiving aid. Txt 2 **Response to 2:** (2/6) Scholarships are typically merit-based (e.g. based on specific skills or talents) but most federal and grant aid is given based on financial need. Txt 3 **Response to 3:** (3/6) Aid from colleges can include grants, scholarships and loans. Txt 4 **Response to 4:** (4/6) When awarding aid, college financial aid officers will look at many factors such as family income, family medical expenses, and more. Txt 5 **Response to 5:** (5/6) Visit this website to get a personalized estimate of financial aid options at the colleges you're interested in http://bit.ly/myfinancialaid . Txt 6 **Response to 6:** (6/6) For more information on financial aid and how you can afford to go to college, check out: https://bigfuture.collegeboard.org/pay-for-college/financial-aid
4	Hi, it's Shawn from College Board. Have you registered for the SAT? (A) Yes (B) No (C) I already took it **Response to A:** That's awesome. Taking an exam early will give you more time afterward to visit schools & build your college list. Txt 1 for tips on how to prep for the exam **Response to B:** No prob. Register by 9/3 for the next SAT (sat.org/register). Talk to your school counselor to see if you're eligible for an SAT fee waiver. Txt 1 for prep tips **Response to C:** That's awesome! Many people decide to take SAT twice to improve their scores. Register here if so (sat.org/register). Txt 1 for prep tips **Response to 1:** (1/4) We get that prepping can be stressful. Be sure to check out these free SAT resources we made in partnership with Khan Academy (bit.ly/mysatkhan). Txt 2 **Response to 2:** (2/4) Try free practice tests on College Board's website! They can help you discover your weaknesses and learn to manage your time during the test. Txt 3 **Response to 3:** (3/4) Keep these last-minute tips in mind: Get a good night's rest before the exam, know where your test center is located, and bring snacks for breaks! Txt 4 **Response to 4:** (4/4) Remember the best way to prep is to study hard and do well in your classes. SAT practice is important but make sure to keep up with your course work!

Message	Content
5	Figuring out which colleges to apply to? We've got seven easy steps to help you fine tune your college list. Text GO now **Response to GO:** Keep an open mind and consider all options. Talk to people who know you, and challenge yourself to think about schools you wouldn't typically think about. Text 1 **Response to 1:** Look for colleges that are a good academic fit for you — whether they seem to be a safe bet or a little out of reach. Text 2 **Response to 2:** Browse colleges' graduation rates. You want to pick schools with high grad rates so you have a greater chance of being successful. Text 3 **Response to 3:** Don't rule out schools just b/c they seem expensive-there's often financial aid available. Visit a college's net price calculator for the best cost estimate. Text 4 **Response to 4:** Think about location and size. Do you want to be close to home? Would you rather go to a larger school or a smaller school? Text 5 **Response to 5:** Brainstorm careers and majors you think you might be interested in. Then make sure you're looking at schools that offer those types of programs. Text 6 **Response to 6:** And remember there will be more than one school that's a great fit for you. Right now just consider all your options and figure out what matters to you! Text 7 **Response to 7:** Check out bit.ly/mycollegesearch for more info on building and refining your college list!
6	Starting to get ready for your college apps? Text GO to get a quick overview of common components of applications **Response to GO:** As you finalize your college list, remember to consider the academics, size, location, and net price of the colleges on your list. Text 1 **Response to 1:** Once you have finalized your list, start putting together the application pieces. Not every college requires the same things. Text 2 **Response to 2:** Most colleges require your high school to submit your official transcript. Be sure to request it from your counselor well before the application deadline. Text 3 **Response to 3:** Standardized applications, like Common App or Universal College App, let you apply to several participating colleges at once. Text 4 **Response to 4:** But note that many of these colleges also may require a supplement in addition to the standardized application. Text 5

Message	Content
	Response to 5: College application deadlines can vary. Check the colleges website and the Common App or Universal College App websites for due dates. Text 6 **Response to 6:** It's important to start your application essay as well as who'd you like to ask for letter of recommendations. Text 7 **Response to 7:** Remember to send test scores to the colleges that you're applying to that require them. Text 8 **Response to 8:** Finally, remember that the FAFSA opens in Jan. 2016. Also, check to see if your colleges require the CSS/Financial Aid PROFILE bit.ly/mycssprofile. Text 9 **Response to 9:** Get more info on what you need for your college applications here: bit.ly/mycollegeapps
7	You've made it so far! You just have one more step to take. Complete the FAFSA and get free money for college! Want more info? Text GO **Response to GO:** The FAFSA is used to determine students' eligibility for aid. Completing it is the single most important thing you can do to get help paying for college! Text 2 **Response to 2:** Before you start the process, collect all the documents you'll need to complete the FAFSA. Check the list here: http://bit.ly/fafsaid. Text 3 **Response to 3:** When you start your FAFSA at fafsa.gov, you'll create an FSA ID & password. These will become your online IDs for all federal student aid programs. Text 4 **Response to 4:** Funds are limited--do the FAFSA as close to Jan 1st as you can to increase odds of receiving aid. Pay attention to your colleges & state grant deadlines! Txt 5 **Response to 5:** Note that some state agencies & colleges require other financial aid docs & tax forms besides the FAFSA. Visit your college's aid website for more info. Text 6 **Response to 6:** For more information on the FAFSA and to start your application, head to fafsa.gov
8	Hi. You'll probably start hearing back from schools soon! Wondering what to be doing in the meantime? Text GO for some helpful tips. **Response to GO:** Most students receive decisions from colleges btw mid-March & April 1. After that, most colleges give you until May 1 or even later to decide where to go. Txt 1 **Response to 1:** Use this time to learn about each college! Start making a pro/con list and a list of questions for each school in case you get accepted to multiple ones. Txt 2

Message	Content
	Response to 2: If you have new grades or test scores you'd like to add to your application, make sure your guidance counselor will send those to colleges for you. Txt 3 **Response to 3:** Visiting schools to meet faculty or sit in on a class can help you decide and shows the admissions office that you really want to go there. Txt 4 **Response to 4:** You'll have to send a final transcript to the college you plan to attend, so you can always use this time to focus on keeping your grades up. Txt 5 **Response to 5:** Lastly, think more about the type of college experience you want! Hear from real students about how they choose schools and majors. http://bit.ly/1YrXmnu
9	You might be in the process of picking your college. But keep looking ahead! There are important things to do after choosing your school. Txt GO for info **Response to GO:** Most important thing is that once you choose a college to attend, be sure to read and respond to all the info and forms you receive from them. Txt 1 **Response to 1:** Some schools want you to send in a tuition deposit to save your place. Contact the admissions office if the deadline isn't clearly listed. Txt 2 **Response to 2:** You'll also need to set up orientation activities, financial aid, housing, meal plans and more -- carefully check deadlines for all those. Txt 3 **Response to 3:** Heads up: your financial aid offer is separate from your acceptance offer! Be aware that you'll need to accept the aid offer separately. Txt 4 **Response to 4:** Remember that you don't have to accept the entire financial aid package. Decide what to accept & then complete/return the form by the deadline. Txt 5 **Response to 5:** Are you accepting a loan as part of your fin aid package? You'll have to complete entrance loan counseling and sign your loan before the semester starts. Txt 6 **Response to 6:** For more info on what to do after you get accepted to school, check this article out: http://bit.ly/prepforcollege
10	If you're headed to college in just a few short months, there are some important last steps you'll need to take to prep. Text GO for details **Response to GO:** Check your email and your college's web portal regularly for communications. They might have forms or tasks that you'll need to complete. Txt 1 **Response to 1:** Work with your school's admissions office to finalize your fin aid/loan decisions. Be on the lookout for the tuition bill your school will send you. Txt 2.

Message	Content
	Response to 2: If you're going to live in a dorm, you will receive housing info and a contract that you'll need to return -- keep an eye out for that. Txt 3 **Response to 3:** More interested in off-campus housing than a dorm? Contact your college's housing office for help setting that up! Txt 4 **Response to 4:** Select a meal plan if you're living on campus. Depending on the school, enrolling in one could be mandatory for on-campus students. Txt 5 **Response to 5:** Confirm that your school counselor has mailed your final transcript to your college's admission office. Txt 6 **Response to 6:** Find out if you have to take placement exams. Ask admissions officer what you can do to get ready, or check the college website for test info. Txt 7 **Response to 7:** Go to the doctor! Most incoming students have to submit results of a recent physical exam & vaccination history before registering for classes. Txt 8 **Response to 8:** Find out if the school offers pre-orientation programs--these let freshman meet each other early & can be a great way to ease into campus life. Txt 9 **Response to 9:** Lastly, don't forget to thank your supporters (counselors, teachers, family), and let them know how much you appreciate all their help all the way!
11	Hey, it's Shawn from College Board. This will be my last set of texts to you. Before we say bye, text GO for some final reminders. **Response to GO:** You've worked hard to get into college. You belong on your campus-- it may just take some time for you to feel comfortable. Txt 1 **Response to 1:** It's ok to be nervous but know that you're not alone! Your peers probably feel the same way. It might help to talk with them about it or a trusted mentor. Txt 2 **Response to 2:** Check out how other students navigated various issues, like handling culture shock and more, here: bit.ly/lifeoncampus. Txt 3 **Response to 3:** Ask for help. There are campus services to support you whenever you need it. Reach out to an advisor/dean and they'll point you in the right direction. Txt 4 **Response to 4:** Most importantly, remember to breathe and enjoy yourself! It's been awesome texting you and I wish you the best in college!

Appendix C: DIMES National control group message content

Message	Content
12	**Part 1:** Hi, it's Shawn. The College Board texting program will be ending in August. I hope you've found these messages to be helpful. **NOTE THAT STUDENTS WERE RANDOMLY ASSIGNED TO RECEIVE ONE OF THE PART 2 MESSAGES.** **Part 2a:** Before that, I have one question for you. Did you read the text messages I've been sending you this past year about college? Reply YES or NO **Part 2b:** Before that, I have one question for you. What is your Fall plan? Text back all the numbers that apply: 1-College 2-Job 3-Military 4-Other 5-Not sure **Part 2c:** Before that, I have one question for you. How helpful was this texting program? Text back a number rating the program from 1 (not helpful) to 5 (very helpful). **Part 2d:** Before that, I have one question for you. Can you please describe something you learned as a result of me texting you about college? **Part 2e:** Before that, I have one question for you. Can you please describe something you did related to college planning as a result of me texting you? **Part 2f:** Before that, I have one question for you. In what way were my texts helpful for college planning? **Part 2g:** Before that, I have one question for you. Besides my texts, who else was helping you with college planning and financial aid? **Part 2h:** Before that, I have one question for you. Would you recommend this texting program to the new Class of 2017 seniors? YES/NO **Part 2i:** Before that, I have one question for you. How can we improve this texting program for students in the future? **Response to inbound message:** Thanks for your feedback! CollegeBoard.org is a good resource if you still have questions.

APPENDIX D

In this appendix, we present the content and timing of the messages sent to treatment group students in the DIMES – Texas sample. In Table D-1, we provide an overview of the message timing and topics. In Table D-2, we provide the specific message content. This message content should be regarded as prototypical, as districts had the ability to adjust the content so that it aligned with other college going efforts within the schools and district. In addition, districts had discretion over the day of the week and the time of day that messages were distributed.

Table D-1. Topic and timeframe for treatment group messages

Message	Topic	Date (or Week of:)
1	Introductory message	April 13
2	SAT score sending	April 20
3	SAT Follow Up	April 27
4	College affordability	May 4
5	College affordability	May 11
6	College visits	May 18
7	Sign off for summer	May 26
8	Fall welcome back	September 14
9	Selecting colleges	September 21
10	SAT score sending	September 28
11	College affordability	October 5
12	College search	October 12
13	College applications	October 19
14	Campus visits	October 26
15	College applications	November 2
16	College applications	November 9
17	Priority application deadlines	November 16
18	Priority application deadlines	November 23
19	College applications	November 30
	Message sent at counselor discretion	December 7
20	FAFSA / TASFA	December 14
21	FAFSA / TASFA	January 12
22	FAFSA / TASFA	January 19
23	FAFSA / TASFA	February 2
24	FAFSA / TASFA	February 9
25	FAFSA / TASFA	February 23

Appendix D: DIMES Texas treatment group message content

Message	Topic	Date (or Week of:)
26	FAFSA / TASFA	March 1
27	FAFSA / TASFA	March 8
28	FAFSA / TASFA	March 22
29	FAFSA / TASFA	Mar 29
30	FAFSA / TASFA	April 5
31	FAFSA / TASFA	April 12
32	Enrollment deposit	April 19
33	Updating FAFSA with 2015 taxes	April 26
34	Transition to summer messaging	May 3
	Message(s) sent at counselor discretion	May 10 – June 14
35	Summer messaging kick-off	June 21
36	Housing	June 23
37	Web portal	June 28
38	Orientation	June 30
39	Tuition bill/Payment Plan	July 12
40	Meningitis shot	July 14
41	Work study	July 19
42	Tuition bill / payment plan	July 21
43	Plans for getting to campus	July 26
44	Summer conclusion	July 28

Appendix D: DIMES Texas treatment group message content

Table D-2. Prototypical message content for Texas treatment group messages

Message	Content
1	Juniors-Senior year is almost here! [HS ABBR] advising will be texting with info about college planning. Text with questions (Stop to opt out/Start to rejoin)
2	By Thursday, 4/23: log into your College Board account to pick 4 schools to receive your SAT scores for FREE https://sat.collegeboard.org/home. Any questions?
3	This week: update your CollegeBoard profile & get college matches. Go to My Organizer->MySAT @ [URL shortener] to sign up for Student Search Service. Questions?
4	College may be more affordable than you think thanks to financial aid. Learn how to pay for college & estimate your financial aid @ [URL shortener]. Questions?
5	Juniors-Watch this 1 minute video to learn about grants & scholarships to pay for college [URL shortener]. Text any time with questions about college planning.
6	Juniors! Summer is a great time to visit colleges & see what college will be like. This week, make plans to visit 2+ area schools: [URL shortener]. Need help? URL: This will link to a document that provides campus specific information on how to participate in a campus tour.
7	Have a great summer juniors! This is my last text until next fall. Can't wait to help you with college apps when you are back as seniors!
8	Tuesday: [STUDENT NAME]-Welcome back! It's [HS ABBREV] Counseling! This year, we'll be texting with info about college/career planning. Text anytime with questions Thursday: [STUDENT NAME] - Have you created your ApplyTexas.org account to start applying to colleges? If not, get started this week. Need help?
9	Tuesday: Hi [STUDENT NAME]-Now's the time to map out a timeline for 4+ colleges you want to apply to. Need help with picking colleges? Check out [short URL]. Thursday: Taking SAT on 10/3 or ACT on 10/24? Extra prep can help you maximize your score. See free SAT prep: [short URL] & free ACT prep: [short URL]. Any questions?
10	Taking SAT this weekend? Good luck! Be ready to pick 4 colleges to send your scores & check out the test day checklist: [short URL]
11	Don't rule out any colleges because of cost. Financial aid can help. This week use [short URL] to estimate your financial aid. How can I help?
12	How's your college search coming? Be sure to apply to a range of schools. Have you picked a reach, 2 good fits, and a safety school? How can I help?

Appendix D: DIMES Texas treatment group message content

Message	Content
13	How are your college apps coming? Some early decision deadlines are less than 2 weeks away! See [short URL] for more deadline info. Need any help?
14	Have you visited any colleges or met with a college recruiter? Check out [HS ABBREV]'s college calendar for available opportunities. How can I help?
15	Checking in on college apps. Have you requested letters of recommendation & started essays? Here are tips for essays [SHORT URL] & recs [SHORT URL]
16	**Note: this message is differentiated according to whether the ApplyTX system indicates that students have already applied to at least one school.** **Submitted an application:** Hi [STUDENT NAME]. I see you've already submitted apps through ApplyTX. Great! Any others you plan to submit? I recommend 4+ schools. Can I help? **Have not submitted anything:** Hi [STUDENT NAME]. How are things going with college apps? I notice that you haven't submitted any in ApplyTX yet. I recommend 4+ schools. Can I help? **Started an application but have not submitted:** Hi [STUDENT NAME]. How are things going with college apps? I notice that you haven't submitted any in ApplyTX yet. I recommend 4+ schools. Can I help?
17	Priority application deadlines for some colleges are coming up on Tuesday, 12/1. Check out [short URL] for info on schools' deadlines. Need help with anything?
18	Don't forget, many college priority application deadlines are Dec. 1. Use the break to hit these deadlines. For more info on deadlines see [SHORT URL]
19	**Note: this message is differentiated according to whether the ApplyTX system indicates that students have already applied to at least one school.** **Submitted an application:** Hi [STUDENT NAME]. Congrats on submitting your apps through ApplyTX! Are there any others you're still working on? How can I help? **Have not submitted anything: Hi** [STUDENT NAME]-My ApplyTX records show you haven't submitted any college apps yet. Are you planning to apply? How can I help? **Started an application but have not submitted:** Hi [STUDENT NAME]-My ApplyTX records show you haven't submitted any college apps yet. Are you planning to apply? How can I help?
20	Over break finish up college apps & get organized for financial aid. Check out these videos about FAFSA [FAFSA URL] & TASFA [TASFA URL]. Happy holidays!

Appendix D: DIMES Texas treatment group message content

Message	Content
21	Welcome back! Whether you've applied to college yet or not, it's time to apply for financial aid through FAFSA/TASFA. Know which one? <<LINK TO WEBSITE ON FILING FAFSA OR TASFA>>.
22	Part 1: Plan to file a FAFSA? Start @ www.fafsa.gov even if you & your parents haven't filed 2015 taxes yet. Watch to learn how: <<LINK TO FAFSA VIDEO>>. Questions? Part 2: Plan to file a TASFA? Learn how @ <LINK TO SITE WITH TASFA DOCUMENTS> Text w/ questions if you need help.
23	File FAFSA/TASFA by March 1 to help get more money for college. Know which one? <<LINK TO WEBSITE ON FILING FAFSA OR TASFA>>. Text me with questions
24	How are things going w/ FAFSA/TASFA? Get help @ <<URL for local help resources>> or text me for help
25	Part 1: File FAFSA? You should get your Student Aid Report (SAR) after filing. Check your email. If you completed FAFSA but don't have your SAR, let me know <Link> Part 2: File TASFA? All TASFA apps will be verified by your colleges. Be prepared to provide your and your parents' tax documents to your colleges. Questions? <link>
26	**Note: this message is differentiated according to each student's FAFSA filing status.** **FAFSA / TASFA not yet started:** How are things going w/ FAFSA/TASFA? Make sure to meet your schools' deadlines: [URL WEBSITE WITH DEADLINES]. Text for help. **FAFSA submitted, not complete:** Almost there but my records as of X/XX show your FAFSA is INCOMPLETE. Finish this week to increase your aid. For info watch <<LINK TO FAFSA VIDEO>> **FAFSA complete:** Congrats on completing your FAFSA! You're on track to meet school deadlines. Want to know what happens next? Watch <<LINK TO VIDEO ON WHAT HAPPENS NEXT>> **FAFSA complete, selected for income verification:** My records as of X/XX show you need to verify your FAFSA. Do this with your parents before upcoming deadlines: [URL WEBSITE WITH DEADLINES]. Text for help
27	**Note: this message is differentiated according to each student's FAFSA filing status.** **FAFSA / TASFA not yet started:** [STUDENT NAME]-Many college financial aid priority deadlines are now: See [URL WEBSITE WITH DEADLINES] for details. Meet your deadlines to increase aid

Appendix D: DIMES Texas treatment group message content

Message	Content
	FAFSA submitted, not complete: [STUDENT NAME]-my records as of X/XX show your FAFSA is INCOMPLETE. Go to fafsa.gov & finish ASAP. Many deadlines are soon: [URL WEBSITE WITH DEADLINES] **FAFSA complete:** [STUDENT NAME]-Congrats on completing your FAFSA. Check email for your Student Aid Report. Know what happens next? Watch <<LINK TO VIDEO ON WHAT HAPPENS NEXT>> **FAFSA complete, selected for income verification:** [STUDENT NAME]-My records as of X/XX show you need to verify your FAFSA. Work with your parents to do this. See <<LINK TO VERIFICATION VIDEO>> or text for help
28	**Note: this message is differentiated according to each student's FAFSA filing status.** **FAFSA / TASFA not yet started:** [STUDENT NAME] - Still planning to do FAFSA/TASFA? Let me know how I can help **FAFSA submitted, not complete:** [STUDENT NAME] - Almost there but my records as of X/XX show your FAFSA is INCOMPLETE. See <<LINK TO FAFSA VIDEO>> to learn about completing FAFSA. Text me for help **FAFSA complete:** [STUDENT NAME] - Congrats on completing your FAFSA! Know what happens next? Watch this quick video: <<LINK TO VIDEO ON WHAT HAPPENS NEXT>> **FAFSA complete, selected for income verification:** [STUDENT NAME] - My records as of X/XX show you need to verify your FAFSA. For info: <<LINK TO VERIFICATION VIDEO>>. Call your schools or text me for help
29	[STUDENT NAME]-Filed FAFSA/TASFA? If FAFSA, check email for your Student Aid Report. If TASFA, call your colleges to make sure they have everything. Questions?
30	[STUDENT NAME] - Applied to new schools since completing FAFSA/TASFA? If FAFSA, add new schools @ www.fafsa.gov. If TASFA, send app to new schools. Need help?
31	**Note: this message is differentiated according to each student's FAFSA filing status.** **FAFSA / TASFA not yet started:** [STUDENT NAME] - Still planning to do FAFSA/TASFA? Let me know how I can help **FAFSA submitted, not complete:** [STUDENT NAME] - Almost there but my records as of X/XX show your FAFSA is INCOMPLETE. See <<LINK TO FAFSA VIDEO>> to learn about completing FAFSA. Text me for help **FAFSA complete:** [STUDENT NAME] - Filed 2016 FAFSA with 2014 taxes? Update with 2015 taxes this week. Here's how: <<URL for info on how to update FAFSA info with 2015 taxes>>. Text with questions

Appendix D: DIMES Texas treatment group message content

Message	Content
	FAFSA complete, selected for income verification: [STUDENT NAME] - My records as of X/XX show you need to verify your FAFSA. For info: <<LINK TO VERIFICATION VIDEO>>. Call your schools or text me back for help
32	[STUDENT NAME] - Some colleges require enrollment deposits by May 1. All set with choosing your college & paying your deposit? Any questions about your financial aid?
33	[STUDENT NAME] - -Filed FAFSA with 2014 taxes? If so, update your FAFSA with 2015 taxes this week. Here is how: <<SHORTENED URL>>. Any questions?
34	[STUDENT NAME]-Looking forward to college this fall? Hope so! We'll keep texting this summer to help with transition. Text any time-HISD staff are here to help
35	Hi [STUDENT NAME]-[CAMPUS ABBREV] will offer help all summer with financial aid/college-related issues. It's not too late to enroll. Text back for help.
36	[STUDENT NAME]-Living on campus this fall? Get housing paperwork in on time. If you don't have money for a deposit, you may be able to get it waived. Need help?
37	Hi [STUDENT NAME], have you logged onto your college's web portal for info on financial aid, tuition, orientation, housing and placement tests? Need help?
38	Hi [STUDENT NAME]-Some colleges require TSI tests if you aren't exempt. Be sure to meet test requirements to avoid delays in registration. Any questions? Yes/No
39	Hi [STUDENT NAME], college tuition is due before you start classes. Are you set with grants & financial aid? Need a payment plan? Any questions?
40	Hi [STUDENT NAME]. Your college will require proof that you are vaccinated against meningitis before you can enroll. Any questions? Yes/No
41	Hi [STUDENT NAME]-Is there work-study in your fin aid award package? If so, you have to apply for a work-study job to access that money. Any questions? Yes/No
42	Hi [STUDENT NAME] – Almost time for college. We are proud of you! Checking in: tuition covered? Call your financial aid office or text me with questions
43	[STUDENT NAME]-College will be starting soon. All set for getting to campus? Need help with travel plans or anything else? Yes/No
44	Hi [STUDENT NAME]-This is the end of summer texting from [DISTRICT]. We are proud of you and hope you have a great year!

APPENDIX E

Table E-1. Descriptive statistics and assessment of balance in school-level measures between treatment and control groups in the national study

Lagged school-level measures	Mean	Treatment-control differential
Lagged college enrollment	0.557	0.005
		(0.004)
Lagged four-year college enrollment	0.305	-0.001
		(0.001)
Percent FRL	0.611	0.009
		(0.009)
Lagged PSAT/NMSQT critical reading	42.929	-0.029
		(0.159)
Lagged PSAT/NMSQT math	43.354	0.061
		(0.174)
Lagged PSAT/NMSQT writing	41.846	-0.010
		(0.161)
Lagged N PSAT takers	140.048	-0.617
		(5.568)
Aggregated student measures		
White	0.346	-0.013
		(0.012)
Black	0.203	-0.000
		(0.009)
Hispanic	0.291	0.013
		(0.010)
Asian	0.067	-0.001
		(0.004)
American Indian	0.011	-0.001
		(0.001)
Other ethnicity	0.035	0.000
		(0.002)
Male	0.432	0.001
		(0.006)
GPA	3.056	-0.012
		(0.019)
PSAT/NMSQT critical reading	42.908	-0.249
		(0.186)
PSAT/NMSQT math	43.960	-0.122
		(0.185)
PSAT/NMSQT writing	40.892	-0.229
		(0.190)
F-statistic assessing joint significance		0.69
(p-value)		(0.8285)

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

Notes: Treatment-control differentials derived from regression models that regress each school-level covariate on a school-level indicator for treatment and fixed effects for groups within which we randomized schools. Robust standard errors (in parentheses) clustered at the school level. All analyses weighted by inverse of probability of assignment to experimental condition to handle variation in assignment probability across groups. N = 745.

Appendix E: Additional tables

Table E-2. Take-up and participation rates in national study, by message

Topic	Date range	# students receiving message	% of treatment students receiving message	# students opting out	% of students opt out by msg	# students engaged	% of students engaged by msg
Introduction	April 9 – 22, 2015	31,486	86.2%	1,400	3.8%	3,502	11.1%
Spring SAT registration and preparation	April 23 – May 31, 2015	30,074	82.3%	189	0.5%	10,415	34.6%
Extra message ("I am a human")	May 12 – 31, 2015	19,140	52.4%	143	0.4%	635	3.3%
College search	June 1 – 29, 2015	29,720	81.4%	208	0.6%	7,308	24.6%
College affordability	June 30 – August 3, 2015	29,510	80.8%	149	0.4%	5,404	18.3%
Fall SAT registration and preparation	August 4 – 26, 2015	29,356	80.4%	92	0.3%	7,205	24.5%
College applications and fee waivers	August 27 – Sept. 20, 2015	29,257	80.1%	106	0.3%	2,464	8.4%
Deadlines and college lists	September 21 – Oct. 13, 2015	29,117	79.7%	140	0.4%	9,188	31.6%
Application assistance	October 14 – Nov. 4, 2015	28,967	79.3%	93	0.3%	7,658	26.4%
Paying for college	November 5 – 30, 2015	28,872	79.1%	83	0.2%	4,022	13.9%
FASFA/Financial aid prep	Dec. 2, 2017 – January 6, 2016	28,788	78.8%	36	0.1%	1,773	6.2%
FAFSA Aid and state aid assistance	January 7 – February 1, 2016	28,751	78.7%	63	0.2%	4,509	15.7%
Financial Aid deadlines	February 2 – 29, 2016	28,688	78.6%	65	0.2%	3,511	12.2%
Finishing aid applications	March 1 – 28, 2016	28,618	78.4%	103	0.3%	6,930	24.2%
Financial award letters	March 29 – April 15, 2016	28,512	78.1%	152	0.4%	4,944	17.3%
Enrollment decisions and tasks	April 26 – May 23, 2016	28,350	77.6%	196	0.5%	7,267	25.6%
College accounts and summer tasks	May 24 – June 20, 2016	28,141	77.1%	123	0.3%	3,740	13.3%
College bills	June 21 – July 18, 2016	28,014	76.7%	109	0.3%	4,320	15.4%
Conclusion and Survey	July 19 – Sept 2, 2016	27,904	76.4%	173	0.5%	4,029	14.4%
	Total across all messages			3,623	9.9%	23,895	65.4%

Notes: Distribution of the extra “I am a human” message began on May 12. This message was sent to the subset of treatment group students who had not yet received the second message regarding spring SAT registration and preparation. Over time, the number of students receiving a given message can decline more than the number of students opting out, because some students do not opt out but their cell phone numbers become inactive.

Appendix E: Additional tables

Table E-3. Take-up and participation rates in Texas schools study

	Received text outreach	Responded to text outreach	Request texts stop	N texts received by student	N texts sent by student
Treatment	0.683***	0.333***	0.027***	45.372***	1.150***
	(0.057)	(0.029)	(0.004)	(2.906)	(0.201)
Control mean	0.179	0.076	0.008	1.942	0.636
R-squared	0.584	0.195	0.023	0.598	0.048

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

Notes: Treatment effects on take-up and participation derived from regression models that regress each outcome on an indicator for treatment assignment at the school level and fixed effects for groups within which we randomized schools. Standard errors (in parentheses) clustered at the school level. All analyses weighted by inverse of probability of assignment to experimental condition to handle variation in assignment probability across groups. N = 21,001.

APPENDIX F

Introduction

To understand how students engaged with the DIMES outreach, we sought to characterize each treatment group student's level of engagement during the full course of the intervention, rather than simply considering whether a student responded within the timeframe of each message flow. In this appendix, we report on the engagement behavior for students assigned to the DIMES - National treatment arm. Students received a total of 19 automated outreach messages during their participation in the project. We defined engaging in a message flow if a student sent at least one text message to an advisor within a given message flow. To proxy for message "quality" or "depth of engagement" in a specific message flow, we counted the number of characters across all messages that a student sent, by message flow. We assume that longer messages indicate higher quality of interaction and/or deeper student engagement in the intervention.

Here, we address the following research questions related to students' engagement behavior:

1. What number and share of students engaged within each message flow and overall?
2. For those students who engaged, what was the length of their responses within each flow and overall?
3. Are there prototypical patterns of student engagement throughout the intervention?
4. If so, what is the relationship between prototypical types of engagement and individual- or school-level characteristics?

Analysis & Results

To answer these research questions, we utilized a data file containing all text messages to and from students and advisors during the full course of the intervention. We first generated a count variable for the number of times that a student responded with a text message during each message flow. Similarly, we generated a count variable that counted the number of characters in each student response and then summed these counts within each message flow. We then generated summary statistics for the number of times a student responded and message length, both for individual message flows and averaged across all message flows. The final average measures were **avg_respond,** which is the average number of messages sent by the student across all message flows, and **avg_string,** which is the average number of characters each student sent within each message flow. Note that for these aggregate measures, only message flows in which a student engaged were used to calculate each students' average score. To account for students' non-response in specific message flows, we created a separate variable that counted the number of message flows in which a student engaged, to provide a pseudo-weight for each student in the subsequent analysis.

(1) What number and share of students engaged within each message flow and overall?

Overall, a total of 65.41% of treatment group students engaged in text communication over the course of the intervention,[23] but never opted out of the intervention (Table 4 in main body of paper). Rates of engagement varied across the message flows. Considering both whether students responded and the

[23] Engaged defined as a student responding with one of more messages to any given message flow.

intensity of their responses, student engagement was highest regarding topics of where to apply to college and which college to select. Messages related to financial aid generated the second highest level of student engagement. Across message flows, the average student who engaged sent 2.66 messages. This means that students who responded, on average, sent 2 to 3 text messages within a given message flow.

In Table E-1, we present summary engagement statistics by message. Not accounting for the number of students who engaged, but instead just examining intensity among those who did engage, we observe the highest intensity of student engagement on topics related to college financing including: (1) college bills, (2) applications and fee waivers, (3) financial award letters, (4) financial aid deadlines, and (5) FAFSA preparation. This may indicate that while not all students in the sample required financial aid support, it was a topic of high need / engagement for a subset of the sample.

Among those who do engage within the message flows, we observe variation in the intensity of that engagement. At the most extreme, for example, one student sent 181 messages during the course of the message flow related to managing the college bill. Thus, while overall rates of engagement may be modest, we observe examples of high need among some students in the sample.

(2) For those students who engaged, what was the length of their responses within each flow and overall?

The average number of characters sent by students, across all the DIMES message flows was 67.13. That is, on average, students' messages totaled 67.13 characters in length per message flow, among those who engaged. In Table E-2, we present string length statistics by message flow.

On average, student engagement (as measured by character count among engagers) was most intense in response to message 11, focused on preparing to complete the FAFSA (average length = 187.29), while the briefest average message occurred in message 2, focused on SAT preparation and registration (average length = 27.02). As with the message counts, there is substantial variation in the intensity of student engagement as measured by character count. For example, during message flow 18 (focused on college bills) the most engaged student sent messages totaling 18,808 characters. We examined all outliers and found that they were, in fact, valid student conversations with an advisor, rather than, for example, a result of a coding error or misclassification of student messages within message flows.

To illustrate patterns of engagement overall, Figures E-1 and E-2 show the frequency distribution for both aggregate measures described above, which average student engagement across message flows. Both show strong positive skew, indicating that most students were low on both measures of engagement. To examine the correlation between these two measures of engagement, we plot their bivariate relationship together with a lowess curve (Figure 3). We observe a strong linear relation between the two measures ($r = 0.71$).

(3) Are there prototypical patterns of student engagement throughout the intervention?

Here, we used cluster analysis to examine whether students could be clustered into distinct groups based on the extent of their engagement with the DIMES text messaging. To do so, we employed K-means clustering.[24] K-means is an unsupervised learning algorithm that clusters data based on inputs provided,

[24] This clustering algorithm works by clustering data according to a user-defined number of clusters, k. We utilize random seeding to begin the algorithm to ensure that the ordering of the data had no influence on the clustered produced. Once the initial seeds are set, a student is assigned to the cluster with the nearest seed, based on a

in our case avg_respond, avg_string, and a count for the number of message flows in which a student engaged. The data structure that we used for the cluster analysis was at the student level. Only students who had responded at least once during the intervention were included in the cluster analysis, and we subsequently classify non-responders accordingly.

Using k-means clustering, we produced three distinct groups corresponding to students who were low-level, moderate or high engagers.[25] In Table E-3, we present the frequency of students belonging to each of these three clusters, together with the share of students who never engaged in the intervention.

Among all students who engaged in text communication, most are clustered in the low engagement group (45%). This cluster includes students who sent only a few messages per message flow in which they engaged, 1.8 on average, and messages that were relatively short in length, 31.0 characters, on average. On average, low engagers responded to 2.3 of the message flows.

Approximately 18 percent of students engaged at a moderate level. These students sent an average of 3.6 messages and 97.3 characters, on average, within an average of 8.4 message flows. As suggested above, a very small share, nearly 3 percent, of students engaged in the DIMES advising at a very high level. These students sent an average of nearly 10 messages and 475 characters, within the nearly seven message flows in which they engaged. Table E-4 provides summary statistics for the cluster solutions.

Figures E-4 and E-5 present box plots showing the cluster groupings against the avg_respond and avg_string measures. These plots illustrate clear distinctions among the clusters, with some overlap. Overall, these three groups exhibit different levels of engagement. Among the high engagement students, some students were extremely engaged, to the point of averaging 30+ messages per message flow, with 1,000+ characters.

(4) What is the relationship between prototypical types of engagement and individual- or school-level characteristics?

To answer the final research question, we ran a series of mixed effect models/multiple linear regressions to examine the relationship between cluster membership and student- and school-level characteristics. In these models, we treat the cluster membership variables as predictors and the student- and school-level characteristics as outcomes. We include random effects to handle the nesting of students within schools. We present results in Table E-5.

Student-Level Covariates

Gender & Race / Ethnicity: We observe a significant relationship between student gender and engagement. Approximately 60 percent of high engagement students were female. Moderate engagers had a modestly higher proportion of female students, whereas low engagers and students who did not

distance measure. We used Euclidian distances on standardized variables. The cluster centroids are continually updated as the algorithm iterates through the data, and the algorithm is completed once all the observations have been assigned and re-assignment of cluster has ceased and stabilized.

[25] We explored the use of both K-mean and K-medians using both standardized and un-standardized versions of the input variables. The k-means standardized solution was chosen as the final solution based on creating clean distinct factors, although differences among the approaches were modest.

engage were significantly less likely to be female. Low engagers were 4 percentage points less likely to be female and those who did not engage were 10 percentage points less likely to be female.

We also observe a significant relationship with student race / ethnicity, such that the high engagement students have lower shares of white students compared to groups that exhibit lower levels of engagement. High engagement students also had higher shares of Asian students compared to groups that exhibit lower levels of engagement.

PSAT & GPA: We also observe a significant relationship between student engagement and measures of academic achievement. Medium and high engagers have modestly higher PSAT sub scores (Verbal, Math, and Writing) and modestly lower GPAs compared to those students with low or no engagement.

School-Level Covariates

We utilized the same modeling approach to evaluate the school-level covariates.

School–level characteristics: Regarding school context, we examined school type (private or public), school size (measured as number of 11th graders in the school), school-level college going rate, and school-level percent FRL and the relationship between these characteristics and the student engagement cluster measure. Of all of these potential predictors, only school type was related to student engagement. Students with low engagement were somewhat less likely to be from a public school. For example, 94.5% of the high-engaging students attended public schools, compared to 91.5% of the low engaging students. We found no significant effect of either four-year college going rate, school size, or percent FRL.

Conclusion

We observe substantial variation in whether and how students engaged with the DIMES messaging. The majority of students did respond to the messaging at least once during the course of the intervention, but among responders, most students exhibited a low level of engagement, overall, with smaller shares of students engaging at moderate or high levels.

Limitations

A limitation to this study relates to the process of analysis. We assumed that if a student responded to a message their response was relevant to the message flow topic. Because of the volume of messages sent through the program, we did not examine the content of each message sent and refer to the qualitative analyses of the message content for further insights.

Appendix F: Text message engagement analysis

Table E-1. Engagement by message flow summary statistics

Message	Topic	N	Mean	Std. Dev.	Min	Max
1	Introduction	3,502	1.73	1.94	1	37
2	SAT (spring) - registration and prep	10,415	2.19	2.29	1	78
3	Extra Msg - I am a human	635	2.37	2.92	1	52
4	College Search	7,308	3.79	3.36	1	54
5	College affordability	5,404	2.99	3.46	1	66
6	Fall SAT - registration	7,205	2.82	3.95	1	71
7	Applications and fee waivers	2,464	5.06	6.25	1	73
8	Deadlines and college lists	9,188	3.17	3.06	1	97
9	Application assistance	7,658	3.25	3.54	1	111
10	Paying for college	4,022	3.41	3.53	1	66
11	FASFA/Financial aid prep	1,773	4.18	5.67	1	97
12	FASFA, federal and state aid	4,509	3.45	4.52	1	99
13	Financial aid deadlines	3,511	4.76	6.39	1	147
14	Finishing aid applications	6,930	3.29	5.02	1	114
15	Financial award letters	4,944	4.86	6.44	1	116
16	Enrollment decisions and tasks	7,267	4.00	4.53	1	88
17	College accounts and summer tasks	3,740	4.00	5.82	1	103
18	College bills	4,320	5.28	7.83	1	181
19	Conclusion and Survey	4,029	3.39	4.91	1	74
20	Glitch	1,693	1.18	0.58	1	8
	Average	24,219	2.66	2.14	1	45

Table E-2. Character count by message flow summary statistics

Message	Topic	N	Mean	Std. Dev.	Min	Max
1	Introduction	3,502	44.90	125.89	1	2793
2	SAT (spring) - registration and prep	10,415	27.02	91.53	1	3291
3	Extra Msg - I am a human	635	104.59	155.99	1	1792
4	College Search	7,308	122.96	227.91	1	4493
5	College affordability	5,404	88.75	219.48	1	5721
6	Fall SAT - registration	7,205	77.58	220.70	1	5204
7	Applications and fee waivers	2,464	181.30	351.82	1	6783
8	Deadlines and college lists	9,188	69.85	191.12	1	5675
9	Application assistance	7,658	89.85	217.02	1	8864
10	Paying for college	4,022	117.61	221.35	1	4662
11	FASFA/Financial aid prep	1,773	187.30	349.47	1	5953
12	FAFSA Aid and state aid assistance	4,509	90.46	260.75	1	5302
13	Financial Aid deadlines	3,511	153.78	346.94	1	10376
14	Finishing aid applications	6,930	77.66	266.82	1	8320
15	Financial award letters	4,944	140.36	310.35	1	6345
16	Enrollment decisions and tasks	7,267	105.54	229.83	1	4083
17	College accounts and summer tasks	3,740	109.20	306.24	1	7435
18	College bills	4,320	160.01	469.84	1	18808
19	Conclusion and Survey	4,029	159.10	318.43	1	7469
20	Glitch	1,693	43.18	68.04	1	796
	Average	24,219	67.13	120.67	1	3999

Appendix F: Text message engagement analysis

Table E-3. Frequency counts for k-means cluster solution

Cluster	N	Percent
High Engagers	1,006	2.75
Med Engagers	6,549	17.93
Low Engagers	16,340	44.73
Never Responded	12,626	34.59
Total	36,521	100

Appendix F: Text message engagement analysis

Table E-4. Summary for k-means cluster solution

Cluster	High	Medium	Low
avg_repond	9.56	3.63	1.88
avg_string	474.62	97.35	31.04
# msg students engaged in	6.83	8.38	2.34

Appendix F: Text message engagement analysis

Table E-5. Regression results examining relationship between level of messaging engagement and student characteristics

	Female	American Indian	Asian	Black	Hispanic	White	PSAT verbal	PSAT math	PSAT writing	GPA	Public school
	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se	b/se
High (Reference)	0.605***	0.008**	0.113***	0.189***	0.316***	0.289***	43.738***	44.859***	41.662***	3.197***	0.945***
	(0.02)	(0.00)	(0.01)	(0.02)	(0.02)	(0.02)	(0.41)	(0.4)	(0.42)	(0.04)	(0.01)
Medium Differential	0.027~	0.002	-0.040***	0.040***	0.002	0.005	-0.237	-0.252	0.277	-0.03	-0.013
	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.33)	(0.32)	(0.33)	(0.03)	(0.01)
Low Differential	-0.045**	0.001	-0.052***	0.011	-0.009	0.050***	-1.214***	-0.992**	-1.036**	-0.155***	-0.029**
	(0.02)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.34)	(0.33)	(0.32)	(0.03)	(0.01)
Never Responded Differential	-0.094***	0.001	-0.045***	0.006	0.003	0.030*	-2.014***	-1.809***	-2.031***	-0.252***	-0.034***
	(0.02)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.35)	(0.33)	(0.34)	(0.03)	(0.01)
Observations	36521	36521	36521	36521	36521	36521	36521	36521	36521	36521	36521

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

Appendix F: Text message engagement analysis

Figure E-1. Frequency distribution of average character count per message flow

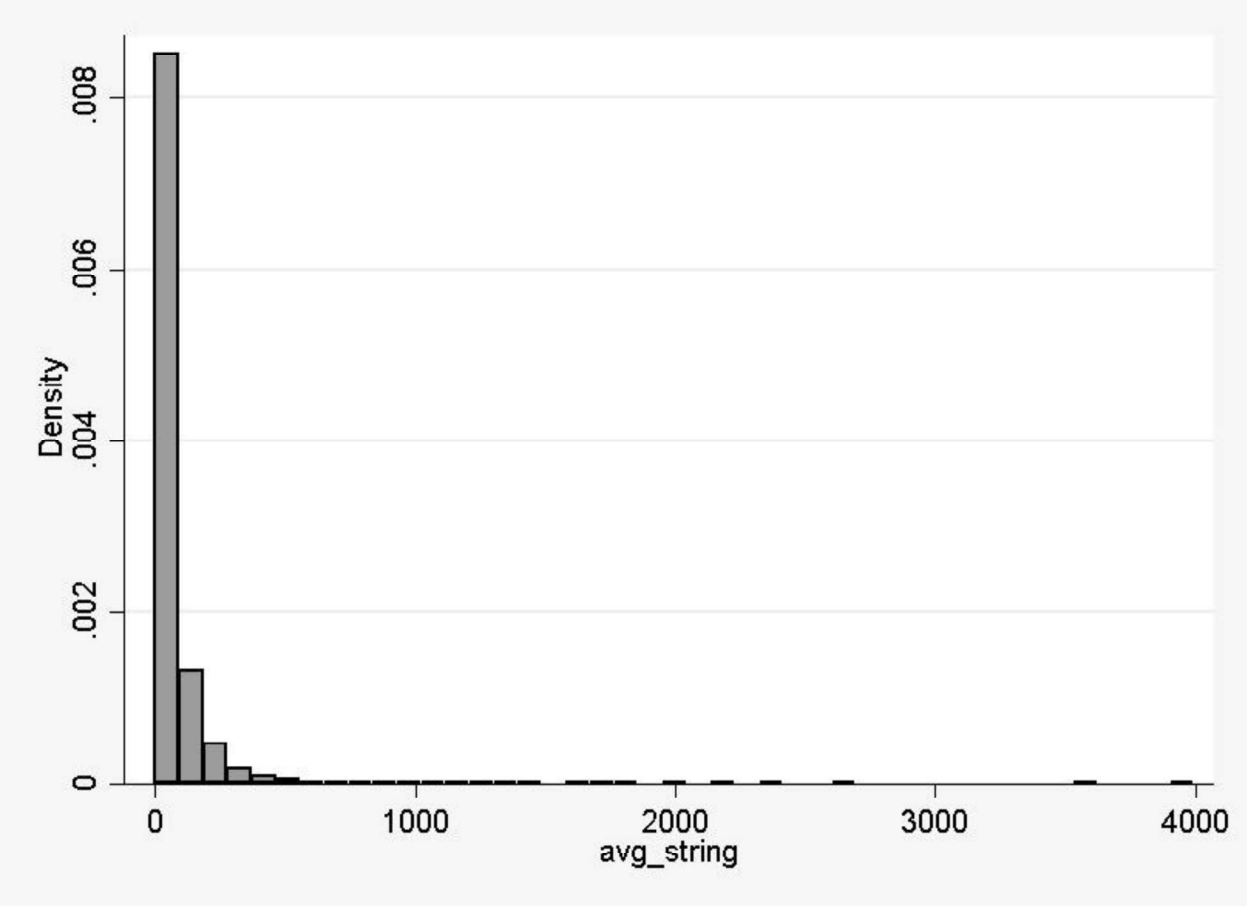


Figure E-2. Frequency distribution of average number of messages sent per message flow

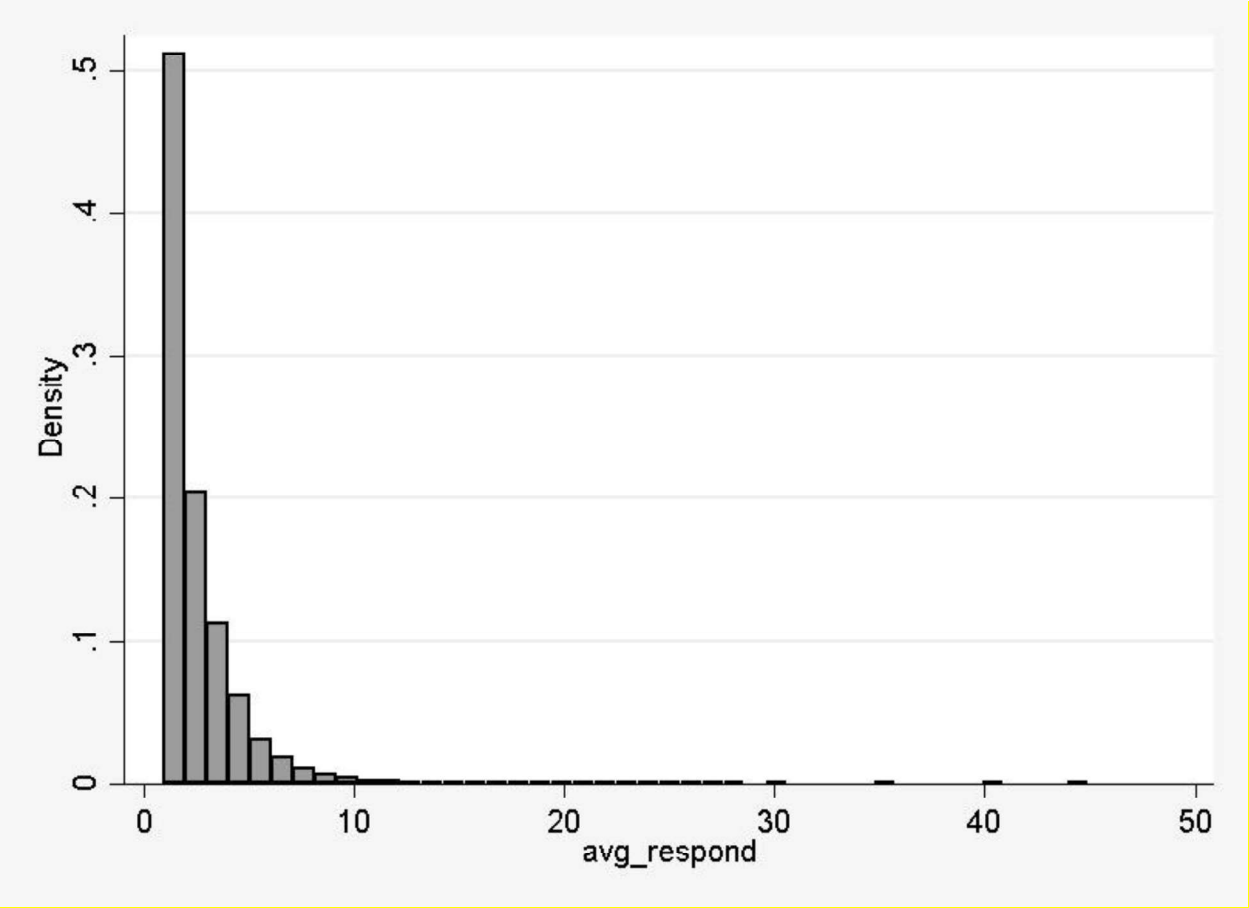


Figure E-3. Scatterplot of average character count by average number of messages sent with lowess curve

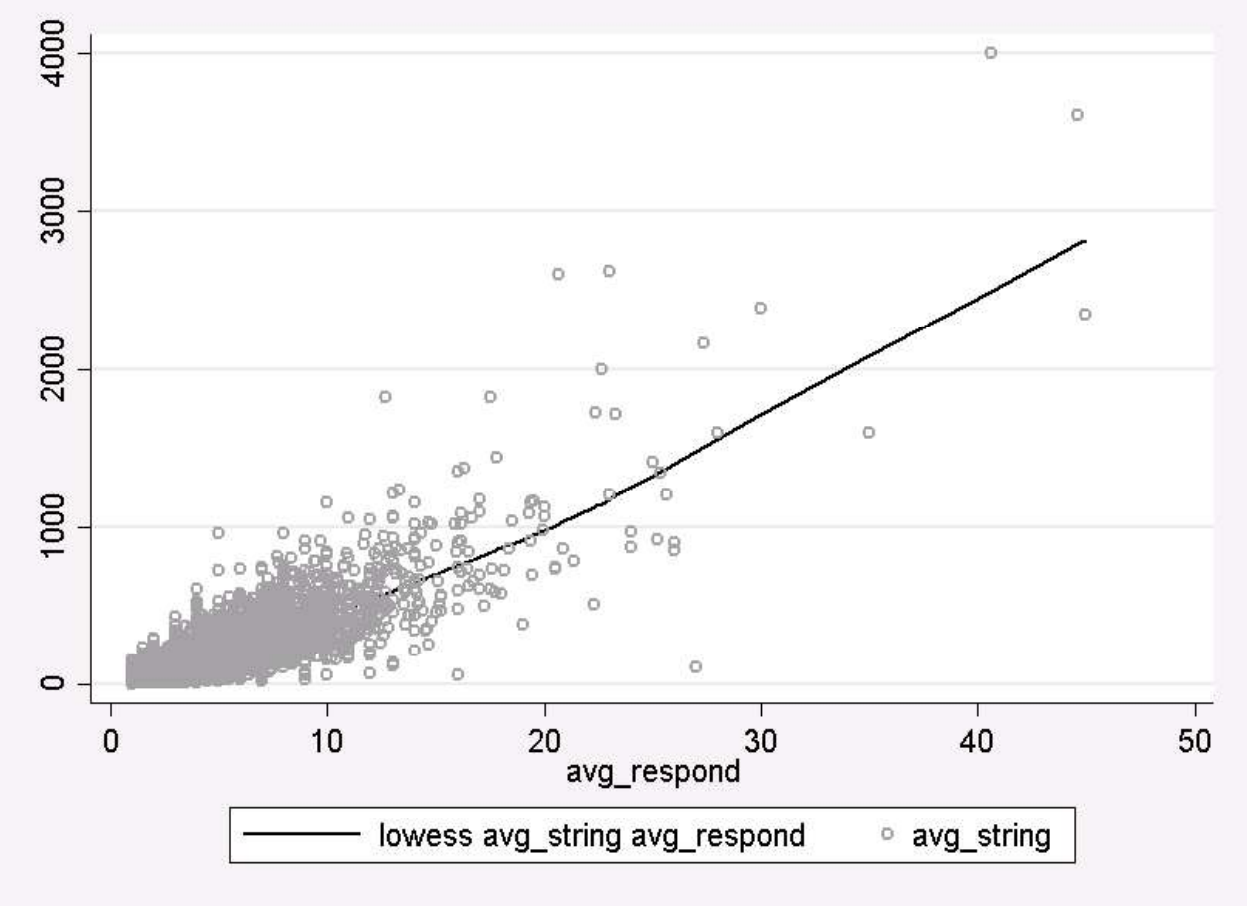


Figure E-4. Average number of messages sent by engagement level

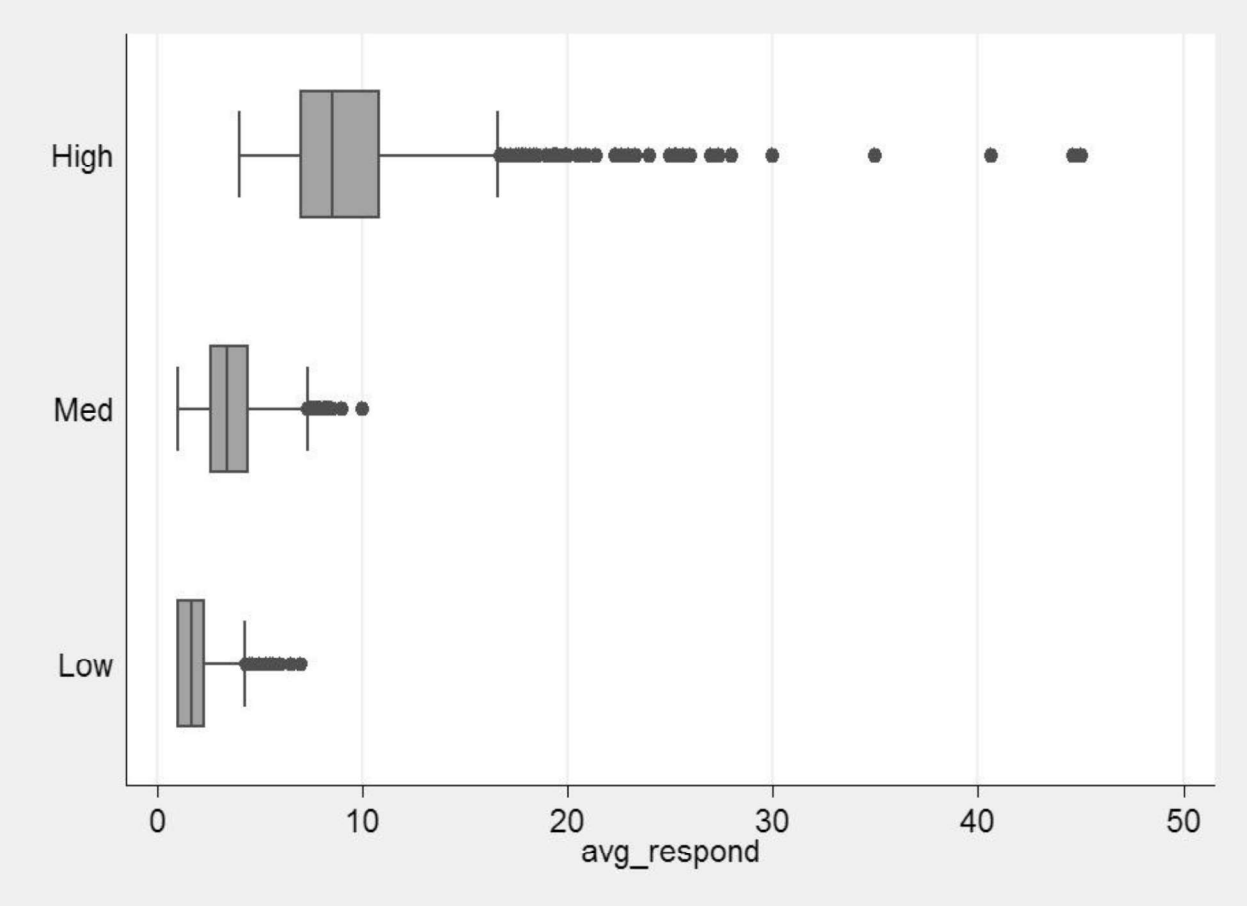


Figure E-5. Average character count by engagement level