Appendix

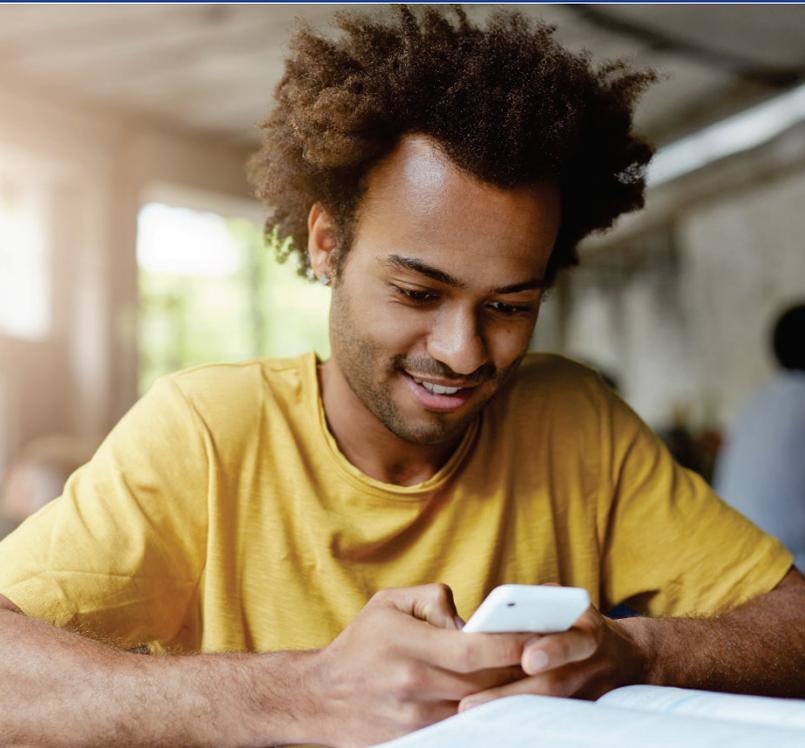# Possible Ways of Increasing College Access Among Adults from Underserved Backgrounds: A Study of College Transition Text-Based Messaging

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Possible Ways of Increasing College Access Among Adults from Underserved Backgrounds: A Study of College Transition Text-Based Messaging

May 2023

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CONTENTS

LIST OF EXHIBITS

INTRODUCTION

This appendix is a supplement to the report: *Possible Ways of Increasing College Access Among Adults from Underserved Backgrounds: A Study of College Transition Text-Based Messaging.* It provides additional information about the study of Text Ed—the messaging strategy evaluated for its ability to increase college enrollment and Free Application for Federal Student Aid completion rates among clients of Education Opportunity Centers. This includes details about the Text Ed messages, how the study was designed and conducted, detailed impact and implementation analyses, and exploratory analyses to further elucidate the findings and suggest avenues for future study. The content of the appendix is referenced as applicable within the main report.

SECTION A. ADDITIONAL DETAILS ON TEXT ED

The Text Ed study examined a text messaging strategy designed to help Educational Opportunity Centers (EOCs) increase the number of their clients who enroll in college and complete a Free Application for Federal Student Aid (FAFSA). Text Ed consisted of a series of preprogrammed text messages that included timely, personalized information concerning college enrollment activities and deadlines, tips for completing forms and other procedures, and the opportunity to contact EOC staff members for further assistance.

This section provides additional information about Text Ed. It includes a summary of the research on which Text Ed is based as well as information on the content of the messages and how they were designed to be delivered. It also includes information on the training about Text Ed provided to EOC staff members.

A.1. Research Supporting Text Ed as a Promising Strategy for Improving College Enrollment and FAFSA Completion

Text Ed was built on prior research illustrating the potential for text message strategies to increase rates of enrollment in college and FAFSA completion among high school seniors and traditionally aged college freshmen.[1] Yet little research exists on the potential of text messaging to promote college enrollment and FAFSA completion for non-traditionally aged college-seeking adults. This group represents a significant portion of EOC clients. Many adults with low incomes face unique barriers that may be less prevalent among younger, traditionally aged college-goers: adults may be constrained by the need to support children or work full time, for example, or they may have less information about college than their younger counterparts and have fewer available resources.[2] Adults who have low incomes or are first-generation students have also been found to lack confidence because of longer absences from school and may be nervous about fitting in at college.[3]

Nevertheless, a growing body of research outside of education shows that well-crafted behavioral messaging strategies can improve outcomes for adults with low incomes. For example, behavioral interventions have been shown to increase on-time childcare subsidy renewal,[4] produce greater engagement in welfare-to-work programs,[5] increase child support payment rates,[6] spur greater participation in anti-poverty programs,[7] increase take-up of the Earned Income Tax Credit,[8] influence parents' choice of K-12 schools for their children,[9] and increase parental engagement with children.[10]

Together, these two areas of research suggest that text messaging that incorporates behavioral science principles is a promising strategy for increasing FAFSA completion and postsecondary enrollment among adults. The following section describes the Text Ed messaging strategy and the content of the text messages in greater detail.

A.2 Details About Text Ed Messaging

The Text Ed messaging strategy contained several modules addressing a variety of needs common to EOC clients, was customized to different college enrollment timelines through four program versions, allowed for preprogrammed and non-preprogrammed messaging between EOC clients and staff members, and used behavioral science strategies in message design.

A.2.1 Text Ed Messaging Modules

Text Ed is comprised of seven different messaging modules, all of which are described in greater detail in Exhibit A.1. An introductory text message sequence established a texting relationship, explained that participants could text back, and provided an opt-out option. Following that introduction, the preprogrammed messages were organized into six primary modules: college search and applications, FAFSA completion, childcare support (or, for those without childcare needs, a general check-in), college and financial aid acceptance, transportation and work/school balance and, finally, college transition.

Exhibit A.1 Text Ed Modules

Section	Purpose	Differentiation	Differentiated Message Groups
Introduction	Oriented participants to Text Ed and provided an opt out option	Differentiated according to delayed start status or missing information on expected enrollment date	**Group 1** - For participants with no delayed start who indicated their expected enrollment date at intake: Received a message to orient the participant and provide an opt out option.
			Group 2 - For participants who did not indicate their expected enrollment date at intake: Received a message to orient the participant, provide an opt out option, and inquire about intended enrollment date.
			Group 3 - For participants with a delayed start: Received a message to orient the participant, provide an opt out option, and remind them of the Educational Opportunity Center (EOC) meeting date.
Module 1: College search and application	Prompted participants to select colleges to apply to, complete their applications, and monitor their email for acceptance letters	Differentiated according to participant application and college selection status, based on intake data	**Group 1** - For participants who did not know where they wanted to apply at time of study enrollment: Received messages to provide support with choosing programs and encouraged contact with EOC if needed.
			Group 2 - For participants who knew which college(s)/program(s) they were going to apply to, but had not yet applied, at the time of study enrollment: Received messages to provide support for completing applications.
			Group 3 - For participants who had applied to their college(s)/program(s), but had not yet heard about acceptance, at the time of study enrollment: Received message prompts to keep an eye out for and follow-up on acceptances.
			Group 4 - For participants who had applied to their college(s)/program(s), were accepted, and decided which school they were going to enroll in, at the time of study enrollment: Received a message confirming college plans.

(continued)

Exhibit A.1 (continued)

Section	Purpose	Differentiation	Differentiated Message Groups
Module 2: Free Application for Federal Student Aid (FAFSA)	Prompted participants to complete their FAFSA and review their Student Aid Report (SAR)	Differentiated according to FAFSA completion status, based on intake data	Group 1 - For participants who had not filed their FAFSA at the time of study enrollment: Received messages to provide support for completing their FAFSA.
			Group 2 - For participants who had filed FAFSA but had not gotten their SAR at the time of study enrollment: Received message prompts to check for SAR and check for income verification.
			Group 3 - For participants who had filed their FAFSA and received their SAR at the time of study enrollment: Received message prompts to review the SAR and check for income verification.
			Group 4 - For participants who reported they will not file the FAFSA: Received message reminder about available aid.
Module 3: Life circumstances part 1: childcare or general check-in	Provided information about childcare; checked in with participants	Differentiated according to childcare needs, based on intake data	Group 1 - For participants who indicated childcare needs: Received messages about childcare resources.
			Group 2 - For participants who indicated no childcare needs: Received a general check-in message.
Module 4: College and financial aid acceptance	Prompted participants to follow up to ensure they had been accepted to their program and had received a financial aid package	None	Not applicable.

Exhibit A.1 (continued)

Section	Purpose	Differentiation	Differentiated Message Groups
Module 5: Life circumstances, part 2: transportation and work-school balance	Provided information related to planning for reliable transportation or internet access; provided tips for balancing work and school	Messages in the second half of the module were differentiated according to intent to work while in school, based on intake data	Group 1 - For participants who planned to work while in school: Received messages related to transportation and balancing work and school. Group 2 - For participants who did not plan to work while in school: Received messages related to transportation and a general check-in message.
Module 6: College transition	Prompted participants to complete required pre-enrollment tasks for their intended institution	Differentiated based on available information about transition requirements for participant's intended institution, based on intake data or participant replies to messages inquiring about college selection	Group 1 - For participants where information about their intended institution's transition requirements was available: Received messages with specific information about college transition requirements, such as whether the institution required a placement exam. Group 2 - For participants where information about their intended institution's transition requirements was not available: Received messages with general transition information about steps they may need to take.
Post-enrollment date messages	Supported with the college transition or proposed next steps for participants who did not enroll; closed out the program	Differentiated according to enrollment status, based on confirmation of enrollment at the end of module 6	Group 1 - For participants who confirmed successfully enrolling in college: Received messages supporting the college transition.

Within each of the six modules, general outreach messages served as check-in opportunities to establish the EOC as a place of support for participants.

Following their intended enrollment date, study participants received post-enrollment date messages to support the college transition or propose next steps for participants who did not enroll. The content of these post-enrollment messages differed based on each participant's enrollment status, which was determined by clients' responses to a question at the end of the sixth module asking them to confirm if they had successfully enrolled and were ready to start classes. For each module, built in logic pathways automatically adjusted messages to participants' responses such that participants were able to receive customized, relevant support.

Within each module, the messages drew on research on behavioral strategies detailed in Exhibit A.5. For example, some preprogrammed messages were personalized. Many messages addressed participants by name and were "signed" by the sending EOC or a specific EOC staff member. Additionally, when information about a participant's intended college was available, messages were customized to provide details about tasks and deadlines specific to that college. When no information on a participant's intended college was available, messages were more generic and directed participants to online repositories of information relevant to individuals served by their EOC.

Prior to the study launch, the study team conducted focus groups with staff members and clients at several EOCs to gather their feedback on draft versions of the text messages. The full set of text messages were shared with all EOCs, and feedback was solicited, which influenced the final content of the messages.

A.2.2 Text Ed Versions

A unique feature of Text Ed is that it was customized to match the timeframe to college enrollment for each participant. At the point of study enrollment, study participants were asked about their intended date of college enrollment. Participants were assigned to one of four Text Ed version groups depending on the length of time between enrollment in the study and anticipated enrollment in college: "long," "medium," "short," and "very short." See Exhibit A.2. In assigning participants to a version, Text Ed was designed to balance the need to send messages with important content to each participant with the aim of not inundating them with messages. The goal was for participants to receive preprogrammed messages at most every other day.

Exhibit A.2. Text Ed Versions and Intended Messages

Text Ed Version	Time Before Classes Start[a]	Message Frequency	Total Number of Messages Intended
Long	36 days to 9 months[b]	One message every 4+ days	15-23
Medium	26-35 days	One message every 4-5 days	13-18
Short	20-25 days	One message every 3-5 days	13-15
Very short	19 days or less	One message every 2-5 days	9-11

NOTES: [a]The duration for each version is calculated based on the number of days from when a participant enrolled in the study and when they planned to start classes. The planned text messages extend 10-60 days after participants' intended college start date, depending on participants' engagement with post-enrollment outreach. This means, for example, that participants in the long version of Text Ed received messages starting no earlier than 9 months prior to their intended college start date and ending no later than two months after their intended college start date.

[b]Participants who enrolled in the study more than nine months before they planned to enroll in college were automatically flagged for a "delayed start." Participants with a "delayed start" automatically received their first text message nine months before they planned to start college.

The number of text messages participants were scheduled to receive depended on their Text Ed version, their status on key college-going tasks, and the support needed, based on information collected at enrollment. For example, participants who indicated that they had childcare needs received additional messaging about childcare supports. As shown in Exhibit A.2, clients in the long version should have received a message once every four or more days, for a total of 15 to 23 messages.

Exhibit A.3 presents intended messages by module. Note that due to character limitations on text messages, some messages were distributed across more than one distinct text. Nevertheless, these sets of texts count as a single message for the purpose of analysis. Additionally, some texts solicited participant responses, and the system followed up on these responses with a second, related, automated text. In these cases, the follow-up text and original text are counted as a single message.

Exhibit A.3. Number of Messages Intended per Module, by Text Ed Version

Section	Text Ed Version			
	Long	Medium	Short	Very Short
Introduction	1	1	1	1
Module 1: College search and application	1–3	1–2	1	0
Module 2: Free Application for Federal Student Aid	2–4	2–3	2	1
Module 3: Life circumstances part 1: childcare or general check-in	1–2	1	1	1
Module 4: College and financial aid acceptance	1–2	1–2	1	0
Module 5: Life circumstances, part 2: transportation and work-school balance	2	2	2	2
Module 6: College transition	4	2	2	1
Post-enrollment date messages	3–5	3–5	3–5	3–5
Total messages	15–23	13–18	13–15	9–11

Messages in the long, medium, and short versions covered a range of college-going tasks; life circumstances that can affect college enrollment (for example, childcare, transportation, and work-school balance); and general check-ins. The very short version focused primarily on life circumstances and comparatively less on specific steps related to applying for college and financial aid.

A.2.3 Timing of Text Ed Messaging Start

Messages began within a few days of study enrollment, unless study participants were more than nine months out from their anticipated date of college enrollment.[11] Those who intended to enroll after nine months received their first text message nine months before their intended college enrollment date. Participants were also scheduled to continue receiving messages for up to two months following their intended enrollment date to either support the transition to college (for successful enrollees) or prompt the participant to select a new target enrollment date.

A.2.4 Message Type and Response Request

Most of the Text Ed messages consisted of preprogrammed questions to solicit a reply from the participant and keep EOC staff members updated on client status through college-going tasks and modules. Most of the messages asked participants to reply with "YES/NO," and based on the participant's reply, the messaging system used branch logic to send an appropriate follow-up message. Exhibit A.4 shows an example of one such message sequence. To allow for some flexibility in participants' responses, the messaging system was designed to interpret a variety of relevant responses as "YES/NO" (for example, "Y," "yes I did," and "yeah!" were all coded as "YES"). The system was also able to recognize complex answers outside of this structure (for example, if a participant responded "I actually start next week" instead of simply "Yes" to the text message "Just wanted to confirm that you are set to start classes this semester. Can you let me know? Please reply YES or NO,"), and would flag the response for an EOC staff member to interpret, categorize, and respond appropriately with a non-preprogrammed reply.

There were two types of preprogrammed "housekeeping" messages built into the introductory message sequence. The first was a message that participants received if they texted "STOP" to

terminate their receipt of the Text Ed messages. The second was a message that participants received if they texted "START" to rejoin Text Ed and start receiving messages again after opting out.

Some of the messages soliciting a participant response were not paired with preprogrammed follow-up messages and gave participants a chance to ask questions and engage with their EOC. For example, one general check-in message without a preprogrammed response read "It can be helpful to talk with supportive friends and family about your plans & I'm here to help you as well. Any questions right now? –[EOC STAFF NAME/YOUR EOC TEAM]."

Non-preprogrammed communication between EOC staff members and clients could be initiated if a participant sent an unsolicited text to an EOC staff member to share or request information, or if an EOC staff member sent an unsolicited text to the participant to share or request information.

A.2.5 EOC Staff Training on Text Ed

The Text Ed messages were sent via Signal Vine, a messaging platform designed for use in higher education settings. EOC staff members were trained on how to use Signal Vine to reply to participant messages and initiate text message conversations with participants. The 2-hour virtual training session included an overview of the Text Ed intervention design; demonstrations of how to view and respond to messages, update participant profiles, send batch messages, and monitor text engagement metrics on the platform; and best practices for engaging with EOC clients through texting. EOC staff members were given a Text Messaging Guide, a full copy of the Text Ed messages, and a glossary of terms used in the participant profiles on Signal Vine. EOC staff members were offered new and refresher training sessions as needed, throughout the project period.

Exhibit A.4. Sample Message Sequence with Branch Logic

Hi [PARTICIPANT NAME] - how are things going with your college applications? Done & submitted? Please reply YES or NO.

Yes

Great! And one other question: have you heard back about your acceptance? Please reply YES or NO.

Yes

Terrific! I'll follow up soon for next steps related to financial aid. For now, please text back and tell me which school you plan to attend.

No

No problem. Take time now to check the email you used in your application(s). A message may be waiting for you in a spam folder!

Sometimes, our [STUDENTS/CLIENTS/PARTICIPANTS] are unsure about next steps after applying. If you would like to figure it out together, just let me know.

No

No problem - You still have time. Set a goal now for when you will do your applications and stick to it. Can I help? Please let me know.

No response [wait 1 day]

If you haven't yet, you can still apply to college. Set a goal now for when you will do your applications and stick to it. Can I help? Please let me know.

Exhibit A.5. Behavioral Science Principles Used in Text Ed Messages

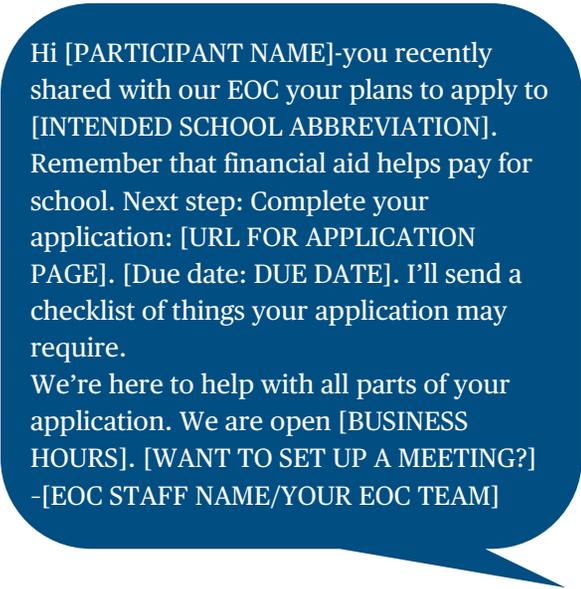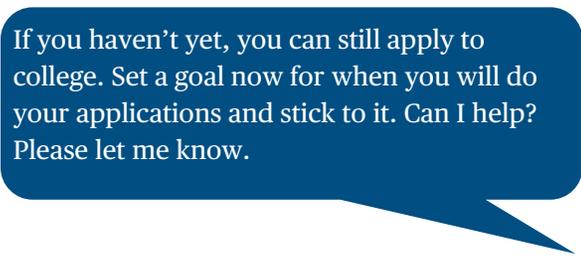| Behavioral Science Principle	Description	Use in the Study	Evidence from Other Studies	Example
Personalization	Personalization of messages aims to increase their saliency and reinforce the recipient's goals.	Messages were personalized with the participant's name, information they shared at intake, and their status in the college-going process. The personalized messages made the information more relevant and salient. They also reinforced that the Educational Opportunity Center (EOC) was paying attention to the participant's progress, making the participant feel that someone else was invested in the participant's success.	Garner (2005) found that adding a handwritten message on a sticky note to encourage faculty members to complete a survey increased the number who obliged.	Hi [PARTICIPANT NAME]-you recently shared with our EOC your plans to apply to [INTENDED SCHOOL ABBREVIATION]. Remember that financial aid helps pay for school. Next step: Complete your application: [URL FOR APPLICATION PAGE]. [Due date: DUE DATE]. I'll send a checklist of things your application may require. We're here to help with all parts of your application. We are open [BUSINESS HOURS]. [WANT TO SET UP A MEETING?] -[EOC STAFF NAME/YOUR EOC TEAM]
Plan-making	Plan-making devices motivate people to action by encouraging them to map out the precise steps they will take to complete a task.	Messages prompted participants to set a goal for when they would compete certain tasks. Discrete, actionable plans may have made it more likely that participants followed through with their objectives.	Milkman et al. (2011) found that employees who received a specific prompt to write down both a date and a time when they planned to get the flu vaccine were more likely to obtain the vaccination.	If you haven't yet, you can still apply to college. Set a goal now for when you will do your applications and stick to it. Can I help? Please let me know.

(continued)

Exhibit A.5 (continued)

Behavioral Science Principle	Description	Use in the Study	Evidence from Other Studies	Example
Loss aversion	Individuals are more likely to act to avoid losses than to acquire gains.	Messages framed outcomes as a loss to motivate participants to act to avoid that loss.	Farrell, Smith, Reardon, and Obara (2016) found that Temporary Assistance for Needy Families participants who received an additional appointment reminder focused on the losses they might experience if they missed the appointment were more likely to attend than were participants who received a reminder focused on what they could gain by attending, or no additional reminder.	[PARTICIPANT NAME]-Financial aid is available to help you pay for school. You may qualify for tuition assistance & CASH in grant aid - money you don't pay back. Applying for aid can take time. The more you get organized now, the easier it will be. Don't leave $$ on the table! I'll send a checklist of what you'll need. We are here to help! Pull together your checklist items & we can do your FAFSA together. We are here [BUSINESS HOURS]. [WANT TO SET UP A MEETING?] –[EOC STAFF NAME/YOUR EOC TEAM]
Simplification	Simplification can help bridge the gap between intention and action by breaking complex processes down into manageable subtasks.	The structure of Text Ed prompted participants to complete one step in the college-going process at a time. Walking participants through the process in this way could have increased their likelihood of completing each step.	Headlam, Anzelone, and Weiss (2018) found that sending communications to students that mapped out the steps a student needed to take to enroll in summer courses and a commitment device to encourage them to follow through increased enrollment in summer courses.	The modular format of the messaging prompted participants to tackle one step at a time, starting with applying to school, then completing the Free Application for Federal Student Aid (FAFSA), followed by planning for childcare, etc.

Exhibit A.5 (continued)

Behavioral Science Principle	Description	Use in the Study	Evidence from Other Studies	Example
Social influence	Social influence provides signals about appropriate behavior within a group and uses how people perceive themselves in relation to others to encourage action.	Messages drew connections between participants and other college applicants. These messages may have made participants feel they were not alone in any concerns they faced about the application process since others who had faced similar challenges had succeeded.	Headlam, Anzelone, and Weiss (2018) used testimonials from students who took summer courses to challenge norms about the types of students who attend summer courses as part of a messaging campaign that contributed to an increase in enrollment in summer courses by 5.5 percentage points.	Also, check with your financial aid office(s) to see if you are selected for income verification. If you are, don't worry. Many people have to do verification.
Reciprocity	Reciprocity is a social norm that involves in-kind exchanges between people by responding to another's action with another equivalent action. It is usually positive (for example, "returning a favor").	Messages highlighted that EOC staff members are helping participants with their college applications. Participants may have been more likely to follow through with their plans because they felt a sense of reciprocity with EOC staff members.	Sanders and Kirkman (2014) found that when job advisors told job seekers that they had done something specifically for the job seeker (in this case, booking them an appointment), wished them luck, and included the job advisor's name, it increased the number of job seekers who attended a recruitment event.	Hi [PARTICIPANT NAME] - all set to begin school? We created a guide for you to make sure you are ready to go: [LINK TO ONE-PAGER]
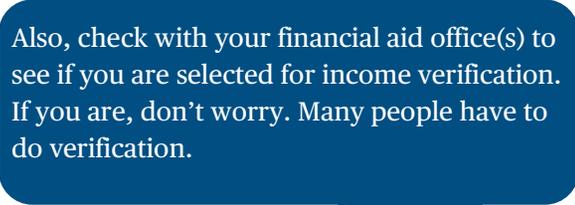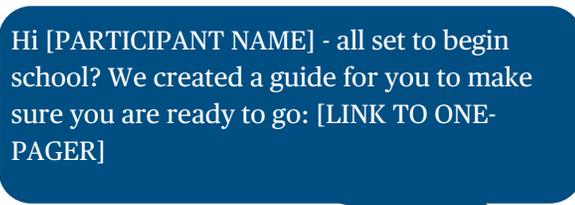
SECTION B: ADDITIONAL INFORMATION ABOUT HOW THE STUDY WAS DESIGNED AND IMPLEMENTED

This section describes how the study was designed and executed to answer the key research questions. This includes information about the study sample, data sources and measures, analytic methods, and the power of the study to detect effects on key outcomes.

The study aimed to answer the following questions:

1. Does Text Ed messaging, when added to the typical services provided by EOCs, increase client FAFSA completion and college enrollment rates?

2. Is Text Ed messaging effective for specific subgroups of clients?

3. Does Text Ed messaging affect other college going outcomes, such as FAFSA rejection rates?

4. What do typical EOC services include? What are EOCs' and clients' experiences with the text messaging strategy? Was Text Ed implemented with fidelity?

B.1 Study Design

The study team recruited EOCs nationwide for the study and randomly assigned clients of the participating EOCs to a group that would receive Text Ed messages in addition to existing EOC services or to a group that would receive existing EOC services only.

B.1.1 Participating EOCs

The study team worked to recruit a sample of EOCs that were not only interested in participating in the study but were also similar to the national population of EOCs, with a primary focus on two characteristics: host institution type (two-year, four-year, or other); and region of the country. The purpose of this recruitment strategy was to allow outcomes of the Text Ed study to inform the larger nationwide community of EOCs.

Exhibit B.1 presents the distribution of EOCs across these two dimensions, for the entire population of EOCs at the time of study recruitment, or in 2015–2016, and for the study sample. For both groups, 56 percent of EOCs are in the South, and 83 percent of EOCs are located in two-year or four-year institutions (17 percent at "other"). However, the population and the study sample differ slightly with regard to other factors. For example, in the national population, there are more EOCs at four-year than two-year institutions, while in the study sample, the reverse is true. In addition, fewer of the study EOCs are in the West, relative to the full population, and more are in the Midwest.

Exhibit B.2 presents data from the EOCs' Annual Performance Report (APR) for Fiscal Year 2017 comparing selected characteristics of clients served by EOCs nationwide (inclusive of EOCs participating in Text Ed) with characteristics of clients served by EOCs that are participating in the study. The exhibit shows that the characteristics of clients served were generally similar for the two groups. For example, 36 percent of clients served nationwide were between the ages of 19 and 27, compared with 38 percent of the clients of participating EOCs. There were some differences by race and ethnicity, with fewer Hispanic/Latino and more White clients at the study EOCs, relative to EOCs nationwide.

Exhibit B.1. Percentage of Educational Opportunity Centers (EOCs) by Census Region and Host Institution Type, for EOCs Nationwide and in the Study

126 EOC Grantees in 2015-2016	Northeast Region	Midwest Region	South Region	West Region	Total
Host institution type (%)					
2-year institution	2.6	8.6	20.5	6.0	37.7
4-year institution	2.0	6.6	27.8	8.6	45.0
Other	5.3	2.6	7.3	2.0	17.2
Total	9.9	17.9	55.6	16.6	100.0
18 Study EOCs	Northeast Region	Midwest Region	South Region	West Region	Total
Host institution type (%)					
2-year institution	5.6	5.6	33.3	5.6	50.0
4-year institution	0.0	11.1	16.7	5.6	33.3
Other	5.6	5.6	5.6	0.0	16.7
Total	11.1	22.2	55.6	11.1	100.0

SOURCE: Fiscal Year 2015 and 2016 grantees from
http://www2.ed.gov/programs/trioeoc/awards.html

NOTE: Collapsed census regions are used, in which West and Pacific are grouped in a single collapsed region, and Puerto Rico is included in the South.

Exhibit B.2. Percentage of Clients by Age and Race/Ethnicity Among Educational Opportunity Centers (EOCs) Nationwide and in the Study

Client Characteristic (%)	EOCs Nationwide	Study EOCs
Age		
18 or younger	27	24
19 to 27	36	38
28 or older	35	38
Age unknown	2	0
Race/ethnicity		
Black	33	36
Hispanic or Latino	23	11
White	34	43
Other	11	9
Sample size	142	18

SOURCE: Annual Performance Report data from Fiscal Year 2016.

B.1.2 Random Assignment and Study Participant Characteristics

The purpose of random assignment is to create two groups that are equivalent on average on observable and unobservable characteristics at baseline, such that any differences between the two groups after study entry can be interpreted as the effects of Text Ed.

A total of 3,535 clients were recruited to participate in the study. Clients were eligible for the study if they met the following eligibility criteria:

- 18 years old or older

- Completed the EOC's intake process during the study's enrollment period

- Held a high school diploma or equivalent at the time of study intake

- Not enrolled in college at the time of study intake

- Intending to enroll in college by fall 2020

- Willing and able to communicate with their EOC via text message

- Able to read text messages sent in English

The Text Ed study employed a 50:50 random assignment ratio at all participating EOC sites. Within each EOC, study participants were randomly assigned to receive either the EOC's typical services (non-message group) or the EOC's typical services plus the Text Ed messages (Text Ed group). The study assignments were generated via computer after study enrollment.

Neither participants nor EOC staff members were told of a given participant's assignment at the time of study enrollment. EOC staff members found out about each participant's assignment within a few days of enrollment once the participant appeared in the Signal Vine system (Text Ed group) or did not appear in the system (non-message group).[12] Text Ed group members found out about their assignment to the Text Ed group upon receipt of their first text message. Non-message group members were not explicitly informed of their assignment to the non-message group and could have learned about their assignment if they inferred that they were in the non-message group since they were not receiving messages, or if they asked their EOC.

Exhibit B.3 presents characteristics for all participants in the Text Ed group and non-message group at intake. Study participants were 28 years of age, on average, and a slight majority (just over 60 percent) were women. The sample was fairly diverse in terms of race and ethnicity: about 30 percent of clients were Black, 15 percent were Hispanic or Latino, and just over 40 percent were White. Just over half of clients (54 percent) had already applied to and been accepted at their college of choice at the time of study enrollment, and about 37 percent had already completed the FAFSA and received their student aid report. Finally, about three out of four clients reported that they planned to work while attending school.

The exhibit also reports the differences in these group-level averages, the associated standard error of the difference, and the p-value associated with a statistical test of the difference in averages. The p-value indicates the likelihood that the observed difference arose by chance. Differences are considered statistically significant if the p-value is less than 0.05. As the exhibit shows, there are few statistically significant differences between the Text Ed and non-message groups.

Exhibit B.3. Characteristics of Clients in Each Group Before Random Assignment

Characteristic	Text Ed Group (%)	Non-message Group (%)	Difference	Standard Error	P-Value
Age					
Age (average)	27.8	28.1	-0.3	0.3	0.445
Less than 19	14.1	14.5	-0.4	1.1	0.705
19–24	37.5	35.7	1.8	1.6	0.263
25–34	25.9	26.4	-0.6	1.5	0.708
35–44	13.0	14.0	-1.0	1.1	0.384
45–59	8.5	8.3	0.2	0.9	0.846
60 or older	1.0	1.0	0.0	0.3	0.982
Gender					
Female	64.7	62.7	2.1	1.6	0.200
Male	35.3	37.3	-2.1	1.6	0.200
Missing gender data	1.9	1.8	0.1	0.4	0.833
Race/ethnicity					
Hispanic or Latino	14.9	14.2	0.8	1.2	0.508
White	43.6	43.1	0.5	1.6	0.724
Black or African American	28.4	31.0	-2.5	1.4	0.076
Native American	6.3	5.3	1.1	0.8	0.157
Asian	2.2	1.8	0.4	0.5	0.378
Two or more races	3.6	3.9	-0.3	0.6	0.662
Other race or ethnicity	0.8	0.8	0.0	0.3	0.995
Missing race/ethnicity data	1.7	1.3	0.4	0.4	0.333
Eligibility type					
Low income only	8.3	7.9	0.4	0.9	0.700
Potential first generation only[a]	12.4	12.1	0.3	1.1	0.791
Low income and potential first generation	73.4	74.2	-0.8	1.4	0.579
Other	3.4	4.1	-0.7	0.6	0.284
Missing eligibility type data	2.4	1.6	0.8*	0.4	0.039
Childcare needs					
In need of childcare to attend school	15.9	14.0	1.9	1.2	0.094
No childcare needs	84.0	86.0	-2.0	1.2	0.085
Working while in school					
Yes	75.0	72.8	2.2	1.4	0.119
No	25.0	27.2	-2.2	1.4	0.119

(continued)

Exhibit B.3 (continued)

Characteristic	Text Ed Group (%)	Non-message Group (%)	Difference	Standard Error	P-Value
College status					
I have not yet selected a college(s) where I would like to apply	4.1	3.2	0.9	0.6	0.120
I have already selected a college(s) where I would like to enroll and plan to apply, but I have not yet applied	10.7	10.9	-0.2	1.0	0.836
I have already applied to a college(s)/program(s) where I would like to enroll, but I have not yet been accepted	30.9	29.9	1.0	1.5	0.498
I have already been accepted to my college/program of choice and plan to enroll	54.3	56.0	-1.7	1.6	0.273
Free Application for Federal Student Aid (FAFSA) status					
I will not complete a FAFSA application	0.9	0.8	0.1	0.3	0.694
I have not begun the FAFSA filing process	14.5	13.2	1.4	1.1	0.230
I have begun the FAFSA filing process, but have not yet completed it	11.0	11.1	0.0	1.0	0.962
I have completed the FAFSA filing process but have not received my Student Aid Report	35.5	36.5	-1.0	1.5	0.497
I have completed the FAFSA filing process and have received my Student Aid Report	37.3	37.5	-0.1	1.5	0.863
I don't know	0.6	0.7	-0.1	0.3	0.662
Sample size (total = 3,535)	1,768	1,767			

SOURCE: MDRC calculations using data from the study intake and Educational Opportunity Center (EOC) intake forms.

NOTES: Statistical significance levels are indicated as: *** = 0.1 percent; ** = 1 percent; and * = 5 percent.
  The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site.
  To analyze whether students' baseline characteristics were jointly predictive of their research group (that is, Text Ed group or non-message group) an omnibus F-test was performed, which yielded a p-value of 0.5500. Given that the random assignment process operated as intended, the data corroborate that the two groups were not systematically different at the start of the study.
  [a]Potential first-generation college status refers to an individual neither of whose natural or adoptive parents received a baccalaureate degree, or a student who, prior to the age of 18, regularly resided with and received support from only one natural or adoptive parent and whose supporting parent did not receive a baccalaureate degree.

B.2 Data Sources and Key Variables

The study team collected data from several sources to assess the effects of Text Ed and describe its implementation. This section presents details about the data sources used for the study and the variables within these data used to measure the outcomes of interest.

B.2.1 Data Sources

Data came from a survey administered to clients at study enrollment, several sources of administrative data, interviews with EOC directors, and the texting platform. Exhibit B.4 provides detailed information on each of the study's data sources and their use in the study and analysis.

Exhibit B.4. Data Sources

Type of Data	Source(s)	Uses in the Study and Analysis
Demographic	Study intake survey; Educational Opportunity Center (EOC) management information systems (Blumen, Student Access, and FileMaker Pro)	Sample description, impact analysis covariates, and subgroup analyses
College and Free Application for Federal Student Aid (FAFSA) application status (self-report)	Study intake survey	Sample description, subgroup and implementation analysis, used in Text Ed to customize text messages
College enrollment data	National Student Clearinghouse records; administrative records from two technical colleges that do not report to the National Student Clearinghouse	Impact analysis
FAFSA financial aid application data	Administrative data from the Federal Student Aid office	Impact analysis and subgroup analysis
EOC characteristics	EOCs' Annual Performance Reports	Sample description
Text message data	Signal Vine texting platform	Implementation analysis
College academic calendar	The Integrated Postsecondary Education Data System and Postsecondary Education Participants System	Impact analysis
Typical services provided by EOCs	Interviews with EOC directors	Implementation analysis

B.2.2 Key Variables Used

The primary data sources used to assess client outcomes were Federal Student Aid (FSA) data and the National Study Clearinghouse (NSC). The study team submitted a file containing study participant data to FSA and NSC to match to their respective FAFSA and enrollment data using social security numbers, names, and dates of birth. FSA and NSC shared data on FAFSA and enrollment outcomes with the study

team using a secure file transfer website. The following describes the variables from these data sources that were used to construct outcomes of interest.

Variables from Federal Student Aid Databases

The FSA data used in the study draws from two data sources: the U.S. Department of Education's Central Processing System (CPS) and National Student Loan Data System (NSLDS). CPS is an automated system that processes all FAFSA submissions for the Department's Office of Federal Student Aid, calculates eligibility, and notifies applicants and colleges of applicants' eligibility results.[13] NSLDS is the Department's central database for student aid, and "provides a centralized, integrated view of federal student aid loans and grants that are tracked through their entire lifecycle."[14]

The primary variables used for the study from the FSA data are:

- FAFSA submission date

- FAFSA award year (the time period for which the award is granted)

- FAFSA rejection reason (the absence of rejection indicates that the FAFSA was completed)

- Verification selection flag

- Verification selection group (reason for verification selection)

- Verification status

- NSLDS enrollment term start date

Variables from the National Student Clearinghouse Database

The NSC is a non-profit organization that collects student-level data on enrollment and degree receipt at post-secondary institutions. NSC is the primary data source on college enrollment.

The primary variables used for the study in the NSC data, for each term and institution in which a student enrolled, are:

- Term beginning enrollment date

- Term ending enrollment date

- Institution name

- Institution type (two-year or four-year)

Variables from Administrative Records from Two Technical Colleges

Data obtained from the two technical colleges that do not report to NSC included records for each student with a variable indicating enrollment status (for example, enrolled, withdrawn, or never enrolled). This variable was used to determine enrollment at these two colleges.

B.3 Analytic Methods

This section describes the methods used to assess the effects of Text Ed on client outcomes, including the construction of key measures, methods of statistical analysis, and an assessment of the statistical power of the analysis.

B.3.1 Study Measures

College Enrollment

The study team constructed an outcome variable for each participant in the sample to indicate whether they enrolled in a college or university within two semesters of intended college enrollment. The study outcomes for college enrollment are presented in Exhibit C.1 and include (1) enrolled within two semesters of intended college start date (confirmatory) and, within this time frame, (2) enrolled at a two-year institution and (3) enrolled at a four-year institution.

The outcome **college enrollment within two semesters** of intended college start date was constructed using the dates of enrollment variables, in order to capture enrollment during each follow-up semester.[15] Enrollment outcomes were assigned values of 1 or 0 for each semester in the study time period, from spring 2018 to spring 2021. Because colleges' academic calendars vary, the two-semester time frame was operationalized as a fall semester and a spring semester, where summer enrollment was grouped with spring for students who planned to start college in the summer (see Exhibit B.5). Attributing enrollment outcomes to the relevant semester facilitated comparisons across colleges with different academic calendars.

Exhibit B.5. Two-Semester Enrollment Outcome Timeframe Definition

Academic Calendar Type	Allowable Timeframe for Enrollment Within Two Semesters for Those Intending a <u>Fall</u> Semester Start	Allowable Timeframe for Enrollment Within Two Semesters for Those Intending a <u>Spring</u> Semester Start	Allowable Timeframe for Enrollment Within Two Semesters for Those Intending a <u>Summer</u> Semester Start
Quarters	On or after study intake date– March 31st of the year following intended enrollment	On or after study intake date– December 31st of the year of intended enrollment	On or after study intake date– December 31st of the year of intended enrollment
Semesters	On or after study intake date–May 31st of the year following intended enrollment	On or after study intake date–December 31st of the year of intended enrollment	On or after study intake date– December 31st of the year of intended enrollment

Although college enrollment within two semesters of intended enrollment was the key outcome of interest, the study also examined effects on several exploratory outcomes. The outcomes for **enrolled at a two-year institution and enrolled at a four-year institution** were constructed using the approach described in Exhibit B.5, with the addition of a flag for two-year institutions and a flag for four-year institutions. In addition, for participants who enrolled in the study before fall 2019, effects were assessed on enrollment within four semesters of intended enrollment. For example, a participant who intended to enroll in fall 2018 was considered to have enrolled within four semesters if they enrolled in any semester before March/May 31, 2020 (see Exhibit B.6).

Exhibit B.6. Four-Semester Enrollment Outcome Timeframe Definition

Academic Calendar Type	Allowable Timeframe for Enrollment Within Four Semesters for Those Intending a <u>Fall</u> Semester Start	Allowable Timeframe for Enrollment Within Four Semesters for Those Intending a <u>Spring</u> Semester Start	Allowable Timeframe for Enrollment Within Four Semesters for Those Intending a <u>Summer</u> Semester Start
Quarters	On or after study intake date–March 31st two years following intended enrollment	On or after study intake date–December 31st of the year following intended enrollment	On or after study intake date–December 31st of the year following intended enrollment
Semesters	On or after study intake date–May 31st two years following intended enrollment	On or after study intake date–December 31st of the year following intended enrollment	On or after study intake date–December 31st of the year following intended enrollment

FAFSA Completion

The FAFSA outcomes presented in Exhibit C.6 are (1) submitted a FAFSA within two semesters of intended college enrollment, (2) completed a FAFSA within two semesters of intended college enrollment date (confirmatory), (3) completed a FAFSA before intended college enrollment date, (4) completed a FAFSA within the FAFSA application year relevant to the participant's intended college enrollment date, and (5) received federal financial aid within two semesters of intended college enrollment.

For participants who submitted a FAFSA application, the analysis also examined FAFSA rejection and verification requests, overall, as well as rejection and verification request reasons (for example, missing data and missing parent signature, for rejection reasons; income verification and identity verification, for verification request reasons).

A participant was considered to have completed the FAFSA if the participant filed the FAFSA and the FAFSA was not rejected. A FAFSA is considered complete within two semesters of intended college enrollment if it is completed between study entry and the first fall or spring semester following the semester of intended college enrollment.[16]

To track FAFSA completion, the study team obtained individual-level FAFSA completion data from FSA. Using these data, the study team constructed an outcome variable for each participant in the study sample to indicate whether they completed their FAFSA within two semesters of their intended college enrollment.[17] The binary outcome measure coded any participant who does not appear in the FSA data as not having completed the FAFSA within this designated timeframe.

Completed FAFSA within two semesters of intended college enrollment date is the confirmatory outcome for FAFSA measures. In constructing this outcome, any FAFSA application completed after a participant enrolled in the Text Ed study and before the "two semesters after intended college enrollment" timeframe ends was included in the impact analysis (see Exhibit B.7).

Exhibit B.7. Two-Semester Free Application for Federal Student Aid (FAFSA) Completion Outcome Timeframe Definition

Academic Calendar Type	Allowable Timeframe for FAFSA Completion Within Two Semesters for Those Intending a <u>Fall</u> Semester Start	Allowable Timeframe for FAFSA Completion Within Two Semesters for Those Intending a <u>Spring</u> Semester Start	Allowable Timeframe for FAFSA Completion Within Two Semesters for Those Intending a <u>Summer</u> Semester Start
Semester calendar assumed	Begin with whichever comes first: October 1st (the beginning of the FAFSA application year) for the FAFSA year of intended enrollment, or random assignment. End with May 31st of the year following intended enrollment.	Begin with whichever comes first: October 1st (the beginning of the FAFSA application year) for the FAFSA year of intended enrollment, or random assignment. End with December 31st of the year of intended enrollment.	Begin with whichever comes first: October 1st (the beginning of the FAFSA application year) for the FAFSA year of intended enrollment, or random assignment. End with December 31st of the year of intended enrollment.

After limiting the FAFSA application record data in this way, records of FAFSA completion were assigned values of 1 or 0 for each semester in the study time period, from spring 2018 to spring 2021, in the same way college enrollment records were, as described above.

The **FAFSA submission** outcome is similar to the FAFSA completion outcome and used the date of the FAFSA submission to assign the outcome to the relevant semester.

The **FAFSA verification** and **FAFSA verification reason** outcomes are similar to the FAFSA completion outcome and used the date of the FAFSA application record that was flagged for verification to assign the outcome to the relevant semester. The FAFSA verification reason values are presented as they are found in the data; income verification, identity verification, household resources verification, income and identity verification combined, and all verification reasons combined (this last group is a constructed variable).

Notably, the **verification completion status** variable is only used "as is" from the data for Pell-eligible students. Verification completion status is not available for applicants who are not Pell-eligible. For applicants who are not Pell-eligible but were selected for verification, it is assumed that verification was completed if they received any aid, and this variable will be imputed as completed.

The study team constructed a simplified **FAFSA rejection reason outcome**. The FAFSA rejection reason data reflect the many various types of errors (and combinations of errors) that may arise in a FAFSA application. These include missing signatures, mismatches between names and social security numbers, missing data, and issues with parents' tax returns, among others. The FAFSA rejection reasons were grouped into the following four categories: missing parent signature, missing/mismatched/incomplete data, missing signature and missing/mismatched/incomplete data combined, and other.

The **FAFSA aid received** outcome was constructed using the date of the relevant FAFSA application to assign the outcome to the relevant semester. FAFSA applications for which the value of the FAFSA aid amount disbursed was not missing or equal to $0 were assigned a value of 1 to create a binary 1/0 outcome.

B.3.2 Estimating Impacts

Basic Estimation Model

The goal of the impact analysis was to estimate the effect of being assigned to receive the Text Ed messages on college enrollment and FAFSA completion, on average, across all of the participating EOCs. To estimate this effect from data for the multisite trial, the study team used a regression model of the following general form:

$$Y_{ik} = \alpha_k + \beta T_{ik} + X_{ik}\gamma + \varepsilon_{ik}$$

where:

Y_{ik} represents the outcome for study participant i in site k.

α_k represents site, or EOC, fixed effects. α_k is the mean outcome for clients in the non-message group in site k.

T_{ik} is the indicator for assignment to the program condition and is equal to one if study participant i in site k is randomized to the Text Ed group and zero otherwise.

X represents a vector of baseline characteristics for individual i in site k, including the variables listed in Exhibit B.3 (i.e., race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and FAFSA status at study intake).

E_{ik} is a random error that is independently and identically distributed across sample members within sites, with a mean of 0 and a variance of σ^2.

Based on this model specification, the key parameter of interest is β, which represents the effect of assignment to receive the Text Ed messages on the outcome of interest. An estimate of β with a p-value of less than 0.05 is considered statistically significant.

Estimating Impacts for Subgroups

In addition to the primary impact analyses, the study team conducted exploratory analyses with the aim of generating evidence about groups for whom Text Ed might be most effective. The following questions guided the subgroup analyses:

(1) To what extent does the impact of Text Ed vary according to messaging version as defined by the amount of time before students' intended college enrollment date?

Participants could vary in the amount of time between enrollment in the study and their intended college enrollment date. For Text Ed group members this also meant that participants could vary in the duration over which they were able to participate in Text Ed and the frequency with which they received messages. The content of the messages also varied depending on the amount of time between study enrollment and intended college enrollment date. Specifically, participants who received the long Text Ed version received the full suite of messages whereas those in the medium, short, and very short versions received more abridged versions of the full suite of messages. It was possible that Text Ed could be more effective for participants who received the full suite of messages and had a longer time period over which to receive them and act on the direction and guidance that they provided. In contrast, for those who received the outreach over a compressed timeframe, other constraints in their lives may have hindered their ability to act on the messages.

To examine whether there was variation in impacts across the versions, the four Text Ed versions were simplified into two groups; long vs. medium, short, or very short, because of the distribution of the study sample. The newly created groups represented participants with more than 35 days until their intended college enrollment date (long) and participants with 35 days or less until their intended college enrollment date (short). Non-message group participants were likewise assigned into these categories.

(1) To what extent does the impact of the Text Ed messaging strategy vary according to participants' progress on key college-going tasks at the time of study intake?

At the participant level, Text Ed may have been differentially effective depending on where participants were in the college application and enrollment process at the time of random assignment. Specifically, participants who submitted the FAFSA and participants who completed a college application may need less support later in the process, so the intervention may have been more effective for those participants who had made less progress toward accessing financial aid or applying to college.

(1) To what extent does the impact of Text Ed vary according to participant gender and race/ethnicity?

Considering variation in the impact of Text Ed along dimensions such as race/ethnicity and gender has important implications with regard to issues of equity. Students of color are more likely to face barriers to college enrollment, such as higher instances of being flagged for FAFSA verification.[18] It may be that supports such as those provided through Text Ed are especially important for helping certain racial/ethnic or gender subgroups overcome these barriers.

Effects for subgroups of clients were estimated in a similar fashion (using the model shown earlier). With subgroup estimates, the key question of interest is whether the impact for one subgroup is different from the impact for another subgroup. Using the effect estimates and their variances as calculated from the subgroups models, the H-statistic was used to assess whether the differences in impacts between subgroups is statistically significant.

$$H_T = \sum_j (v_j)(\theta_j - \theta)^2$$

Where H_T is the j subgroups' weighted sum of squares effect size estimates θ_j about the weighted mean effect, θ. The weights v_j are the inverse of the variance of the estimate. H_T has a chi-squared distribution with j-1 degrees of freedom, where j is the total number of subgroups.

Treatment of Missing Data

Data on college enrollment and FAFSA outcome measures were requested for all study participants. Consequently, the only missing outcome data would have arisen from an inability to match the student to their data within the NSC and FSA administrative databases. With social security numbers available for nearly all students (96 percent), this was not a source of bias in impact analyses.

If a participant was not found in either the NSC or FSA data, it was assumed that they had not enrolled or filed a FAFSA. For students that were found in the data but did not have records for a given period (for example, no enrollment or FAFSA application record in a specific semester), it was assumed that they were not enrolled and did not file a FAFSA during that time period.

B.3.3 Power Analyses

A minimum detectable effect (MDE) is the smallest true mean effect that a study design can detect at a specified level of statistical significance with a specified level of statistical power. The MDE was calculated for this project in percentage points rather than standardized effect size units (or effect divided by the standard deviation of the outcome) because the main outcomes of interest were easily interpretable in their natural units (for example, the percentage of clients enrolled in college and the percentage of clients who completed a FAFSA).

Assuming a baseline college enrollment and FAFSA completion rate of 50 percent provides conservative estimates of the MDE for that outcome because it is the base rate with the highest possible variance. Similarly, assuming no difference in average outcomes by site yields conservative estimates from a fixed effects model. Exhibit B.8 presents MDEs for a 0/1 outcome, which could be either college enrollment or FAFSA completion. Using the conservative assumption of a rate of 50 percent in the absence of Text Ed (meaning 50 percent of clients in the non-message group complete the FAFSA and 50 percent enroll in college) and the final study sample size of 3,535 participants, with 80 percent power and a 5 percent level of significance, the Text Ed MDE on college enrollment or FAFSA completion is 4.7 percentage points.

Exhibit B.8. Minimum Detectable Effects on College Enrollment or Free Application for Federal Student Aid (FAFSA) Completion

Characteristic	Sample Size	Minimum Detectable Effects
Text Ed version		
Long (36 days to 9 months)	2,307	5.8
Short (35 days or less)	1,228	8.0
Gender		
Female	2,245	5.9
Male	1,290	7.8
Race/ethnicity		
White, non-Hispanic/Latino	1,510	7.2
Not White or Hispanic/Latino of any race	2,025	6.2
Initial FAFSA status		
Participants who had not completed the FAFSA at the time of study intake	939	9.1
Participants who had completed the FAFSA at the time of study intake	2,596	5.5
Initial college application status		
Completed a college application at the time of study intake	511	12.4
Had not completed a college application at the time of study intake	3,024	5.1
Sample size	3,535	4.7

NOTES: The minimum detectable effect (MDE) is the smallest true impact that would generate statistically significant impact estimates in 80 percent of studies with a similar design using two-tailed t-tests and a 5 percent significance level. The average value for the non-message group for outcome of interest is assumed to be 50 percent, providing the most conservative estimates for MDEs.

Assuming a college enrollment rate of 50 percent in the absence of Text Ed provides the largest MDE and was also consistent with expectations at the start of the study. The average college enrollment rate observed from the Annual Performance Report data across the study EOCs in 2015/2016 was 55 percent. However, it was expected that that the FAFSA completion rate would be higher given that annual performance data for 2015/2016 for the participating EOCs indicate that 72 percent of clients completed a FAFSA within one year of their initial visit. With this assumption, the MDE would be lower, at 4.2 percentage points.

Research suggests that effects of this size could be reasonable to expect from Text Ed. Interventions similar to Text Ed have yielded effects on college enrollment of about 3.5 percentage points.[19] However, subgroup analyses showed that participants with low incomes, such as those targeted by the Text Ed study, experienced larger effects, in the range of 5 percentage points to 7 percentage points. Considering FAFSA completion, one study reviewed found effects of about 6 percentage points.[20] Exhibit B.8 also shows that MDEs for subgroups of participants are generally within the 5 percentage point to 8 percentage point range, except for subgroups defined by FAFSA and college application status at enrollment.

SECTION C: SUPPLEMENTAL TABLES FOR THE IMPACT ANALYSIS

This section presents more detail on the impact findings presented in the main report. Information is reported on the key outcomes of interest, exploratory outcomes, and effects for subgroups of clients. In addition, findings are presented from a sensitivity analysis of effects on college enrollment.

C.1. Impacts on College Enrollment

This section provides more detail on the impact findings related to college enrollment.

C.1.1 Impacts for the Full Study Sample

Exhibit C.1 presents data on the extent to which Text Ed improved college enrollment outcomes within two semesters of intended college enrollment.

The table shows that Text Ed did not improve these college enrollment rates. Exploratory outcomes include enrollment by institution type, specifically whether the institution is a two-year or four-year college. Students who visit EOCs with the goal of attending a two-year college, rather than a four-year college, may face more hurdles to enrollment, such as having lower incomes or less academic preparation. These clients may benefit relatively more from Text Ed, leading to a larger increase in enrollment at two-year colleges. Over 90 percent of clients who enrolled in college did so at a two-year college, and Text Ed had no effect on enrollment at two-year colleges or on enrollment at four-year colleges.

Exhibit C.1. Impacts on College Enrollment

Outcome (%)	Text Ed Group	Non-message Group	Difference	Standard Error	P-value
Enrolled in any college within two semesters of intended college start date	58.1	57.6	0.5	1.3	0.726
Enrolled in a two-year college within two semesters of intended college start date	58.1	57.4	0.6	1.3	0.635
Enrolled in a four-year college within two semesters of intended college start date	4.3	5.7	-1.5	0.8	0.083
Sample size (total = 3,535)	1,768	1,767			

SOURCE: MDRC calculations using data from National Student Clearinghouse and from two Educational Opportunity Centers (EOCs) that gathered administrative data on participants' enrollment at two technical colleges.

NOTES: Rounding may cause slight discrepancies in sums and differences.
    None of the differences were statistically significant at the 5 percent level or higher.
The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and Free Application for Federal Student Aid status at study intake. The values in the column labeled Text Ed Group are the regression-adjusted averages for participants randomly assigned to the Text Ed group. The values in the next column are the regression-adjusted averages for participants randomly assigned to the non-message group.

C.1.2 Sensitivity Analysis

In addition to NSC college enrollment data, the study used college enrollment data obtained from two technical colleges. These are colleges that clients from at least two of the study EOCs were expected to attend, but that do not report enrollment data to NSC. As a sensitivity analysis, college enrollment information available in records provided by FSA was used instead of data provided by these two colleges. FSA data provide information on whether a student received federal financial aid and, if so, the institution that they attended with the support of that federal aid. Because students may have enrolled in college without the support of federal aid, the FSA data does not necessarily provide a comprehensive picture of college enrollment. Further, given that observing college enrollment based on FSA data is conditional on a student also receiving federal financial aid, it is possible that these data may provide a biased picture of the effect of Text Ed on college enrollment, given that Text Ed also aims to increase FAFSA completion (and, in turn, access to federal financial aid). Nevertheless, FSA data do provide a second source of college enrollment data and may provide coverage of enrollment at institutions not included in the NSC, including the two technical colleges at which some study participants were expected to enroll. Given the benefits and potential drawbacks of FSA data as a source of information on college enrollment, the study team employed this college enrollment information for the purpose of sensitivity analysis only.

For any sample member who was coded as not enrolled based on the NSC, the study team recoded the sample member as enrolled in the relevant time period if FSA data indicated that they are enrolled. The enrollment records from the two technical colleges from which enrollment data were collected by the EOCs and reported to MDRC were omitted, and FSA enrollment data at those two colleges, as well as at other colleges not reporting to NSC, was used in their place. After recoding the enrollment outcome in this way, the study team re-estimated full sample and subgroup impacts on college enrollment. Exhibit C.2 presents the outcomes of this sensitivity analysis. As shown in the exhibit, the findings are very similar to those presented in Exhibit C.1. Enrollment rates for both groups are slightly higher, but differences between the two groups are small and statistically insignificant.

Exhibit C.2. Impacts on College Enrollment, Sensitivity Analysis

Outcome (%)	Text Ed Group	Non-Message Group	Difference	Standard Error	P-Value
Enrolled in any college within two semesters of intended college start date	59.8	59.5	0.3	1.4	0.825
Enrolled in a two-year college within two semesters of intended college start date	59.8	59.4	0.4	1.4	0.764
Enrolled in a four-year college within two semesters of intended college start date	5.9	7.2	-1.3	0.8	0.142
Sample size (total = 3,535)	1,768	1,767			

SOURCE: MDRC calculations using data from the National Student Clearinghouse and Federal Student Aid.

NOTES: Rounding may cause slight discrepancies in sums and differences.
   None of the differences were statistically significant at the 5 percent level or higher.
The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of the Educational Opportunity Center site, student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and Free Application for Federal Student Aid status at study intake. The values in the column labeled Text Ed Group are the regression-adjusted averages for participants randomly assigned to the Text Ed group. The values in the next column are the regression-adjusted averages for participants randomly assigned to the non-message group.

C.1.3 Subgroup Analyses

This section presents additional information about subgroup analyses related to college enrollment. Subgroups were defined in the following manner:

- Text Ed version: Long (36 days to 9 months) and short (35 days or less). The short subgroup is constructed by merging the "medium," "short," and "very short" versions of the Text Ed messages

- Race and ethnicity: participants who are White, non-Hispanic/Latino, and participants who are non-White or Hispanic/Latino of any race

- Initial college application status: participants who had completed a college application at the time of study intake and participants who had not completed a college application at the time of study intake

- Gender: female/male

- Initial FAFSA status: participants who had completed FAFSA at the time of study intake and those who had not completed FAFSA at the time of study intake. FAFSA status was measured using FSA data (as opposed to participants' self-report at intake)

Exhibit C.3 and Exhibit C.4 share findings across various subgroup analyses. As shown in the exhibits, there were no statistically significant effects of Text Ed across the examined subgroups.

Exhibit C.3. Impacts on College Enrollment by Subgroup

Participant Characteristic	Sample Size	Text Ed Group (%)	Non-Message Group (%)	Difference	Standard Error	P-Value for Difference
Text Ed version						
Short (35 days or less)	1,208	65.7	64.4	1.3	2.7	0.637
Long (36 days to 9 months)	2,327	54.1	54.0	0.1	2.0	0.948
Sample size	3,535					
Initial FAFSA status						
Had not completed the FAFSA at the time of study intake	1,988	50.7	51.5	-0.8	2.1	0.721
Had completed the FAFSA at the time of study intake	1,547	68.0	65.0	3.0	2.4	0.214
Sample size	3,535					
Initial college application status						
Had not completed a college application at the time of study intake	511	38.7	40.9	-2.2	4.1	0.590
Had completed a college application at the time of study intake	3,024	61.3	60.5	0.7	1.7	0.664
Sample size	3,535					
Race/Ethnicity						
Non-White or Hispanic/Latino	1,973	59.2	56.9	2.3	2.4	0.331
White, non-Hispanic/Latino	1,509	57.7	58.2	-0.5	2.1	0.807
Sample size	3,482					
Gender						
Female	2,211	59.7	58.2	1.5	2.0	0.449
Male	1,260	56.4	57.4	-1.0	2.7	0.721
Sample size	3,471					

(continued)

Exhibit C.3 (continued)

SOURCE: MDRC calculations using data from the National Student Clearinghouse and from two Educational Opportunity Centers (EOCs) that gathered administrative data on client enrollment at two technical colleges.

NOTES: None of the differences were statistically significant at the 5 percent level or higher.

The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, and student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and Free Application for Federal Student Aid status at study intake. The values in the column labeled "Text Ed Group (%)" are the regression-adjusted averages for participants randomly assigned to the Text Ed group. Each panel presents impacts for a subgroup split. For example, the top panel presents a difference of 1.3 percentage points in college enrollment for clients in the short Text Ed version and a difference of 0.1 percentage points for those in the long version. Neither difference is statistically significant, as indicated by the p-values in the final column.

Exhibit C.4. Impact Plot of Text Ed Impacts on College Enrollment by Subgroup
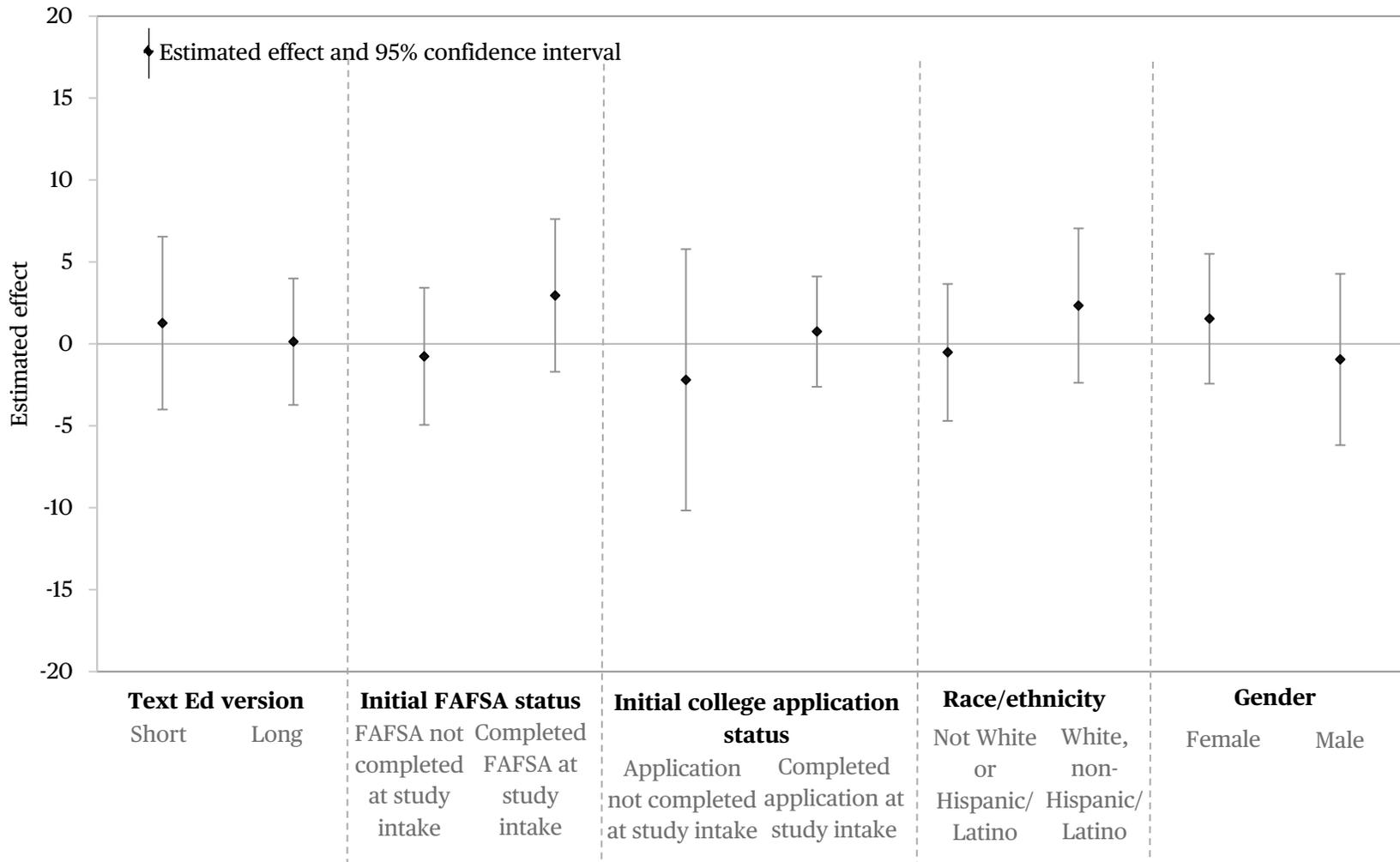

SOURCE: MDRC calculations using data from the National Student Clearinghouse and from two Educational Opportunity Centers (EOCs) that gathered administrative data on client enrollment at two technical colleges.

NOTES: Estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, and student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and Free Application for Federal Student Aid status at study intake. Each marker presents the estimated impact for a subgroup. The confidence interval represents the range of values that are highly likely to include the true impact. A confidence interval that includes zero, therefore, represents a difference that is not statistically significant.

C.1.4 Additional Exploratory Analyses

This section presents the results of an exploratory analysis examining college enrollment outcomes for participants for whom four semesters of data are available. This subgroup consists of participants who intended to enroll in college in fall 2019 or earlier and includes over 2,850 participants. It may be that participants benefit from the Text Ed program over a longer period of time. Longer-run benefits may take the form of a delayed enrollment effect, if participants generally require a longer timeframe to realize the postsecondary goals that they articulated when entering into Text Ed.

Exhibit C.5 presents the results. The difference in enrollment rates is less than 1 percentage point when comparing the four-semester outcomes with enrollment after two semesters. In addition, Text Ed did not affect enrollment after four semesters.

Exhibit C.5. Impacts on College Enrollment After Four Semesters

Outcome (%)	Text Ed Group	Non-Message Group	Difference	Standard Error	P-Value
Enrolled in any college within four semesters of intended college start date	61.4	62.0	-0.6	1.0	0.587
Enrolled in a two-year college within four semesters of intended college start date	61.4	61.8	-0.4	1.0	0.718
Enrolled in a four-year college within four semesters of intended college start date	6.5	8.6	-2.1	1.1	0.064
Sample size (total = 3,382)	1,692	1,690			

SOURCE: MDRC calculations using data from the National Student Clearinghouse and from two Educational Opportunity Centers (EOCs) that gathered administrative data on participants' enrollment at two technical colleges.

NOTES: Rounding may cause slight discrepancies in sums and differences.
   None of the differences were statistically significant at the 5 percent level or higher.
The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and Free Application for Federal Student Aid status at study intake. The values in the column labeled Text Ed Group are the regression-adjusted averages for participants randomly assigned to the Text Ed group. The values in the next column are the regression-adjusted averages for participants randomly assigned to the non-message group.

C.2 Impacts on FAFSA Outcomes

This section provides more detail on the impact findings related to FAFSA completion.

A participant is considered to have submitted the FAFSA if the participant filed the FAFSA, regardless of whether the FAFSA was rejected. Tracking FAFSA submission in addition to FAFSA completion allowed for a holistic look at the federal financial aid application process and the possible identification of barriers in the application process that Text Ed might have helped applicants to overcome. The impacts of Text Ed on the receipt of financial aid was also explored, as access to federal financial aid is the end goal of completing the FAFSA. Further, because receipt of aid is contingent on not only

completing the FAFSA but also navigating the FAFSA verification process if the student is selected, the receipt of aid variable may provide some insight into whether Text Ed helped applicants navigate post-FAFSA completion steps such as verification. Given that receipt of aid is also contingent on participant eligibility for federal aid and participant enrollment in college, financial aid receipt encompasses all these steps and is also included as an exploratory outcome.

C.2.1 Impacts for the Full Study Sample

Exhibit C.6 shows data on FAFSA completion outcomes, as well as other exploratory outcomes related to the FAFSA application process. As shown, Text Ed did not affect FAFSA completion rates within two semesters of intended enrollment, nor did it affect other FAFSA outcomes, such as rejection rates and verification requests.

Exhibit C.6. Impacts on Free Application for Federal Student Aid (FAFSA) Outcomes

Outcome (%)	Text Ed Group	Non-Message Group	Difference	Standard Error	P-Value
FAFSA submitted within two semesters of intended college enrollment date	85.6	85.6	0.0	1.0	0.998
FAFSA rejected within two semesters of intended college enrollment date	7.1	7.4	-0.2	0.9	0.792
Completed FAFSA within two semesters of intended college enrollment date	84.7	85.1	-0.4	1.1	0.754
Completed FAFSA before intended college enrollment date	82.5	83.5	-1.0	0.9	0.292
Completed FAFSA within a year of intended college enrollment date	85.3	85.5	-0.2	1.1	0.834
FAFSA verification requested	33.1	33.9	-0.8	1.8	0.664
FAFSA aid received within two semesters of intended college enrollment date	49.9	49.5	0.3	1.3	0.804
Sample size (total = 3,535)	1,768	1,767			

SOURCE: MDRC calculations using Federal Student Aid data and data from the study intake and Educational Opportunity Center (EOC) intake forms.

NOTES: Rounding may cause slight discrepancies in sums and differences.
    None of the differences were statistically significant at the 5 percent level or higher.
    The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and FAFSA status at study intake. The values in the column labeled Text Ed Group are the regression-adjusted averages for participants randomly assigned to the Text Ed group. The values in the next column are the regression-adjusted averages for participants randomly assigned to the non-message group.

C.2.2 Subgroup Analyses

This section presents information about subgroup analyses related to FAFSA completion through Exhibit C.7 and Exhibit C.8. As Exhibit C.7 shows, no statistically significant effects were found within the examined subgroups. None of the p-values for the estimated impacts are less than .05. Exhibit 8 presents the impact information graphically. The 95 percent confidence intervals each include zero, illustrating that the estimates are not statistically significant.

Exhibit C.7. Impacts on Free Application for Federal Student Aid (FAFSA) Completion by Subgroup

Participant Characteristic	Sample Size	Text Ed Group (%)	Non-Message Group (%)	Difference	Standard Error	P-Value for Difference
Text Ed version						
Short (35 days or less)	1,208	89.9	87.0	2.9	1.7	0.085
Long (36 days to 9 months)	2,327	82.2	83.9	-1.7	1.4	0.219
Sample size	3,535					
Initial FAFSA status						
Had not completed the FAFSA at the time of study intake	1,988	73.2	73.1	0.1	1.8	0.950
Sample size	1,988					
Initial college application status						
Had not completed a college application at the time of study intake	511	67.6	68.3	-0.7	3.5	0.836
Had completed a college application at the time of study intake	3,024	87.6	88.0	-0.4	1.1	0.712
Sample size	3,535					
Race/Ethnicity						
Non-White or Hispanic/Latino	1,973	83.9	85.5	-1.6	1.5	0.281
White, non-Hispanic/Latino	1,509	86.0	84.6	1.4	1.6	0.377
Sample size	3,482					
Gender						
Female	2,211	86.9	85.9	1.0	1.3	0.426
Male	1,260	81.1	83.9	-2.8	1.9	0.142
Sample size	3,471					

SOURCE: MDRC calculations using Federal Student Aid data.

NOTES: None of the differences were statistically significant at the 5 percent level or higher.

   The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of Educational Opportunity Center site, and student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and FAFSA status at study intake. The values in the column labeled "Text Ed Group (%)" are the regression-adjusted averages for participants randomly assigned to the Text Ed group. Each panel presents impacts for a subgroup split. For example, the top panel presents a difference of 2.9 percentage points in college enrollment for clients in the short Text Ed version and a difference of -1.7 percentage points for those in the long version. Neither difference is statistically significant, as indicated by the p-values in the final column.

Exhibit C.8. Impact Plot of Text Ed Impacts on Free Application for Federal Student Aid (FAFSA) Completion by Subgroup
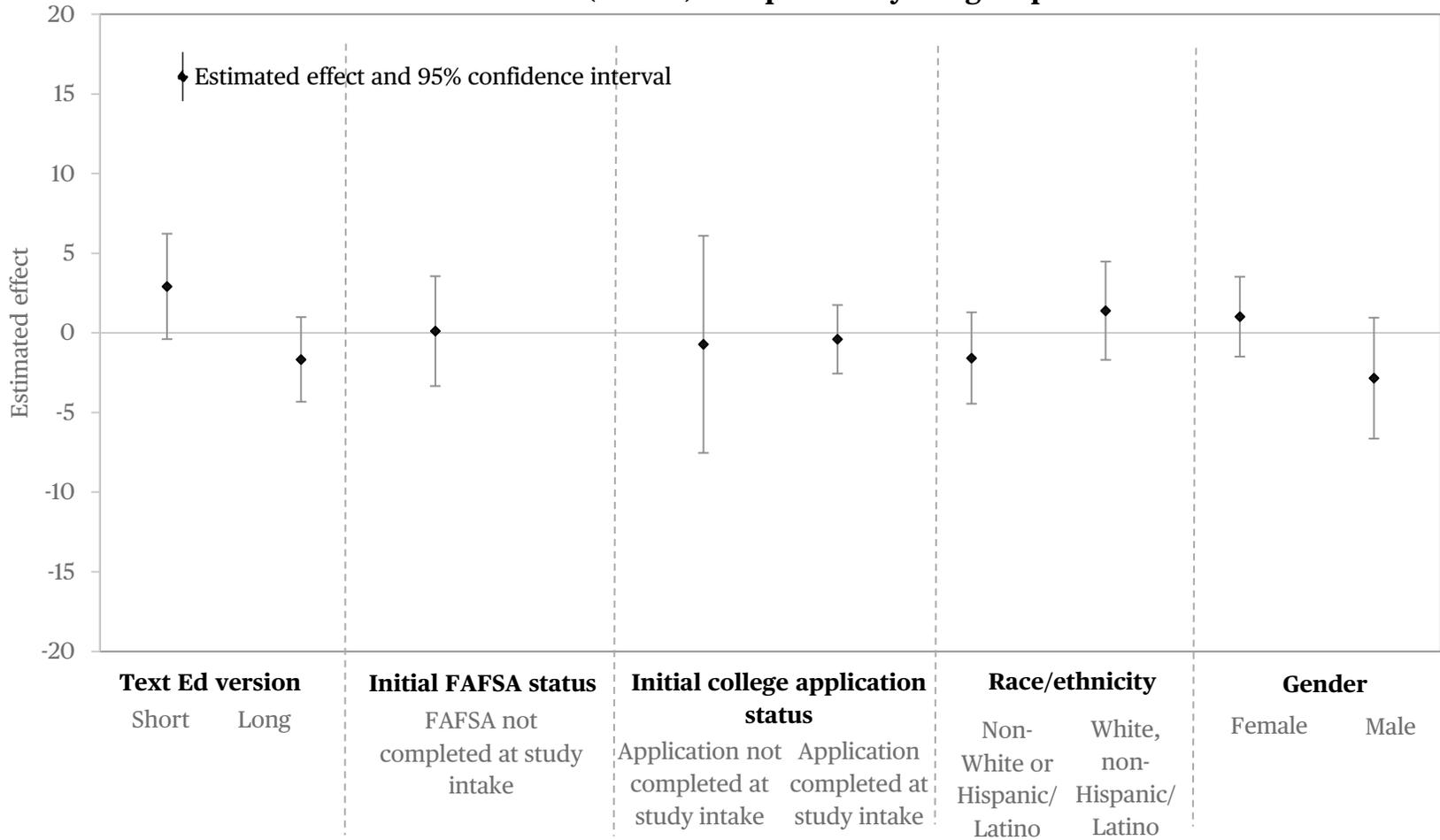
SOURCE: MDRC calculations using Federal Student Aid data.

NOTES: Estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of Educational Opportunity Center site, and student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and FAFSA status at study intake. Each marker presents the estimated impact for a subgroup. The confidence interval represents the range of values that are highly likely to include the true impact. A confidence interval that includes zero, therefore, represents a difference that is not statistically significant.

C.2.3 Additional Exploratory Analyses

This section presents the results of several exploratory analyses related to the FAFSA and federal financial aid. The first analysis examined FAFSA completion outcomes for participants for whom four semesters of data are available. These participants are those who intended to enroll in college in fall 2019 or earlier. Exhibit C.9 presents the results, showing no effect of Text Ed on this longer-term outcome.

Exhibit C.9. Impacts on Free Application for Federal Student Aid (FAFSA) Completion Within Four Semesters of Intended Enrollment

Outcome (%)	Text Ed Group	Non-Message Group	Difference	Standard Error	P-Value
Completed FAFSA within four semesters of intended college enrollment date	86.2	86.4	-0.2	1.1	0.849
Sample size (total = 3,382)	1,692	1,690			

SOURCE: MDRC calculations using Federal Student Aid data and data from the study intake and Educational Opportunity Center (EOC) intake forms.

NOTES: Rounding may cause slight discrepancies in sums and differences.
　None of the differences were statistically significant at the 5 percent level or higher.
　The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and FAFSA status at study intake. The values in the column labeled Text Ed Group are the regression-adjusted averages for participants randomly assigned to the Text Ed group. The values in the next column are the regression-adjusted averages for participants randomly assigned to the non-message group.

The second set of analyses examined FAFSA rejection and FAFSA verification among participants who submitted the FAFSA. Examining the rates and common causes of FAFSA rejection and verification allowed the study team to better understand the barriers participants faced to successfully completing the FAFSA and ultimately receiving federal financial aid. Exhibit C.10 presents the findings, which are non-experimental given that they are estimated only for participants who submitted the FAFSA. The exhibit shows that most rejections are due to missing parent signatures, and most verification requests center around income verification. There is only one statistically significant difference in these outcomes between the Text Ed and non-message groups. The Text Ed group was less likely than the non-message group to have FAFSA verification requested for both income and identify verification, although the difference of 1.2 percentage points is small and overall rates for both groups are less than 3 percent. The second panel of the exhibit presents verification completion rates. This analysis is conducted for Pell-eligible clients only, given that verification completion information is not available for individuals who are not Pell-eligible. The exhibit shows no differences between the two groups on verification completion.

Exhibit C.10. Free Application for Federal Student Aid (FAFSA) Outcomes Among FAFSA Filers

Outcome (%)	Text Ed Group	Non-Message Group	Difference	Standard Error	P-Value
FAFSA rejected	8.3	8.6	-0.3	1.1	0.766
Missing parent signature	5.2	5.3	0.0	0.8	0.986
Mismatched, and/or incomplete data	1.1	1.1	0.0	0.6	0.999
Both missing parent signature and					
mismatched and/or incomplete data	2.7	3.5	-0.8	0.6	0.210
FAFSA verification requested	38.6	39.5	-0.9	1.9	0.662
Income verification	32.4	32.1	0.3	2.0	0.875
Identity verification	6.3	6.2	0.1	0.8	0.890
Both income and identity verification	1.3	2.5	-1.2	0.3	0.001
Sample size (total = 3,027)	1,508	1,519			
FAFSA verification completed, among Pell-eligible participants	25.2	26.6	-1.4	1.8	0.447
Sample size (total = 2,671)	1,305	1,366			

SOURCE: MDRC calculations using Federal Student Aid data and data from the study intake and Educational Opportunity Center (EOC) intake forms.

NOTES: Rounding may cause slight discrepancies in sums and differences.
The estimated differences are regression-adjusted using ordinary least squares, controlling for indicators of EOC site, student race/ethnicity, age, gender, low income, first generation, childcare need, working, college application status at study intake, and FAFSA status at study intake. The values in the column labeled Text Ed Group are the regression-adjusted averages for participants randomly assigned to the Text Ed group. The values in the next column are the regression-adjusted averages for participants randomly assigned to the non-message group.

SECTION D: DETAILED IMPLEMENTATION ANALYSIS

To place the study findings in context, this section examines the services that study EOCs reported typically providing before the implementation of Text Ed. It then explores the implementation of Text Ed, using text message data from the Signal Vine platform.

D.1 Levels of Support and Client Follow-Up Typically Provided by Study EOCs

Prior to the implementation of Text Ed, the study team conducted structured interviews with the director of each participating EOC to gather site-level information about typical practices and services provided to clients. This section presents additional analyses of data collected via these interviews beyond those described in the main body of the report. These data help to assess the extent to which the text-based outreach and communication via Text Ed represents a meaningful departure from the standard practices of the participating EOCs. Because these data on typical practices were collected at the site level, they do not provide information on the specific supports received by individual study-eligible clients.

D.1.1 Cross-Site Variation in Individualized Support and Completion of Key College-Going Tasks During Clients' First Interactions with the EOCs

Most of the EOCs' work with clients, such as assistance completing FAFSA and applying to college, takes place during the first visit. The first panel of Exhibit D.1 presents site-level information on the reported share of clients who receive individualized support as part of their first EOC interaction. Individual EOCs are presented in ascending order. The exhibit shows that all but two EOCs report providing individualized support to at least half of their clients in the first interaction, and about half of EOCs provide this support to the large majority of their clients. Thus, across all the EOCs, most clients received some type of individualized support.

The second and third panels of Exhibit D.1 show the share of clients, as reported by EOCs, who complete and file a FAFSA (panel 2) and complete and submit a college application (panel 3) during their first interaction with the EOC. These data show a similar story, in that most EOCs report that the majority of their clients complete these two tasks at the first visit.
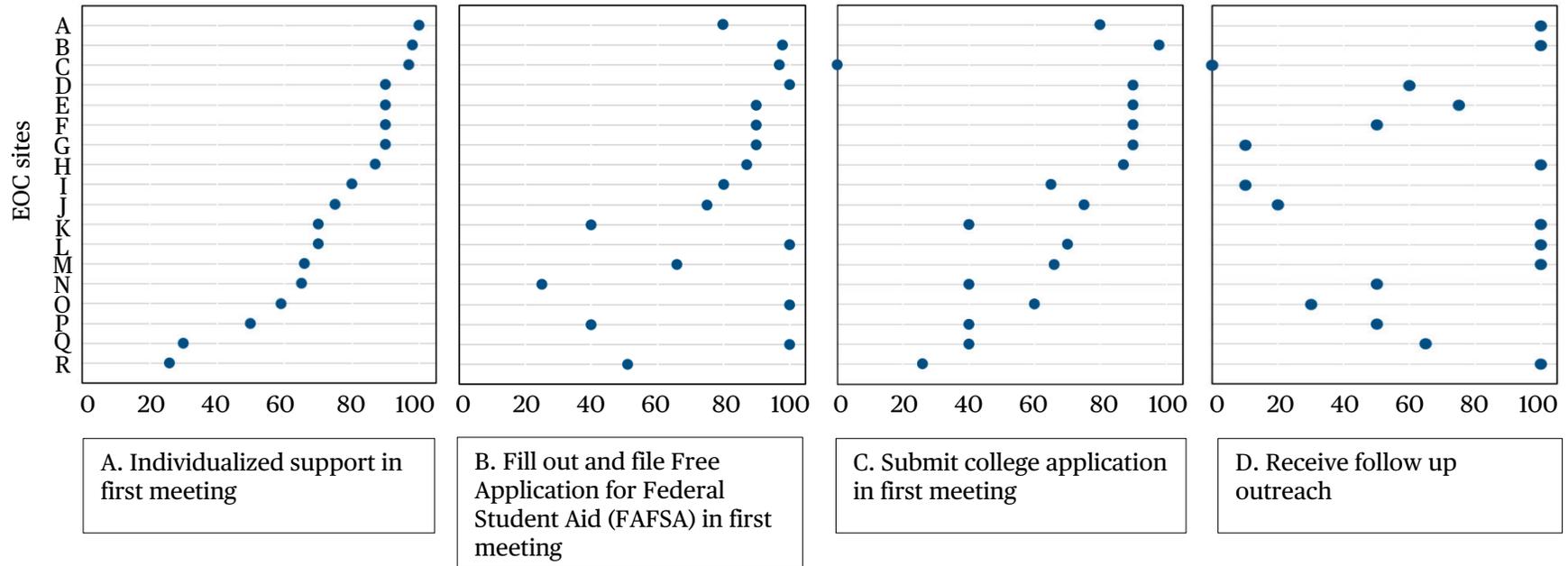
Finally, the fourth panel presents the share of clients to whom each EOC reports providing proactive outreach following the first EOC-client interaction. Here there is more variation across EOCs. Seven of the EOCs report conducting follow-up outreach for all their clients, and five EOCs report doing so for fewer than half of their clients.

D.1.2 Frequency with Which EOCs use Various Modes of Communication for Client Follow-Up

Sites that conduct follow-up with their clients after the initial interaction may do so in a variety of ways. Examining these modes is important to compare these efforts with the follow-up provided by Text Ed. Exhibit D.2 shows the extent to which EOCs reported using various modes of communication to conduct proactive follow-up with clients beyond their first interaction prior to the implementation of Text Ed. Each cell indicates the share of EOCs that report using a given mode of communication at a given frequency.

The data from the EOCs indicate that outreach is typically not frequent, and it is rarely via text messaging. The majority of EOCs (72 percent) never follow-up via text messaging, and the majority of those that do use this mode do not use it regularly. More common modes of follow-up include email and paper letters. In terms of frequency, most follow-up reported by EOCs is quarterly or at strategic points. For example, 28 percent of EOCs reported making phone calls weekly and 67 percent made them quarterly or at strategic points.

Exhibit D.1. Share of Text Ed Eligible Participants Receiving Specific Support, by Site, as Reported by Educational Opportunity Centers (EOCs)

A. Individualized support in first meeting

B. Fill out and file Free Application for Federal Student Aid (FAFSA) in first meeting

C. Submit college application in first meeting

D. Receive follow up outreach

SOURCE: MDRC calculations using data collected via interviews with EOC directors.

NOTES: Panel A presents site-level estimates of the share of Text Ed-eligible clients who receive individualized support in their first interaction with an EOC. Panels B and C present the share who fill out and file the FAFSA and fill out and submit a college application, respectively, in their first interaction with an EOC. Panel D presents the share who receive follow up after their first interaction with an EOC.

Exhibit D.2. Percentage of Study Educational Opportunity Centers (EOCs) Reporting Various Modes of Communication Prior to Text Ed for Client Follow-Up, by Frequency

Mode of Communication (%)	Never	Every Week	Every Two Weeks	Monthly	At Strategic Times/Quarterly
			Frequency		
Email	11.1	11.1	0.0	5.6	72.2
Text[a]	72.2	5.6	5.6	0.0	16.7
Phone call	5.6	27.8	0.0	0.0	66.7
Paper letter	33.3	11.1	0.0	5.6	50.0
Social media[b]	0.0	0.0	0.0	0.0	0.0
Sample size (total = 18 EOCs)					

SOURCE: MDRC analysis of EOC director interview responses.

NOTES: [a]The EOC director of the one EOC that sends weekly text messages explained that this was not part of their standard practices, saying that "it depends on the person."

[b]EOCs reported using social media to post general information, but not to conduct individualized follow-up.

D.2 Analytic Approach to the Implementation Analysis

To evaluate whether Text Ed was implemented with fidelity, the study team analyzed text message data from the Signal Vine platform. These analyses investigated the extent to which the automated, preprogrammed text messages were sent as planned, whether participants responded via text to the outreach, and whether EOC staff members engaged by responding via text to participant communication or engaging with the Signal Vine platform to facilitate the proper delivery of preprogrammed messages.

Analysis of the text message data were used to answer four questions:

1. How many preprogrammed text messages were sent to clients in the Text Ed group, on average, and do these average values fall within the expected range of messages?

2. What share of participants in the Text Ed group opted out of receiving text messages?

3. What share of participants in the Text Ed group responded to the Text Ed messages at least once? What share responded two to three times, and what share responded more than four times? How many messages did participants send, on average?

4. What share of participants in the Text Ed group were sent personalized, non-automated text communication from an EOC staff member? How many staff messages were sent to participants, on average?

D.2.1 Preprogrammed Messages Sent

In the absence of any technical errors or a participant's request to stop receiving messages, participants in each Text Ed version were scheduled to receive a specific number of preprogrammed messages. As described in Section A, participants within each version could be sent a different number of messages

based on factors such as their status on key college-going steps at the time of intake. The extent to which participants within each Text Ed version were sent a number of messages that falls within the expected range is an indicator that Text Ed was implemented as planned. Exhibits D.3 and D.4 compare the minimum, maximum, and average number of messages sent to participants in each version with the expected range of messages for that version.

Because of character limits on text messages, some Text Ed messages were distributed across more than one distinct text. These sets of texts can be considered a single message for the purposes of this analysis, and Exhibit D.3 reports on the number of preprogrammed messages expected and actually sent to participants in this fashion. Exhibit D.4 reports on the total number of distinct preprogrammed text messages expected and actually sent to participants, counting each distinct text message as one message even when it was sent as part of a set of simultaneous texts.

Exhibit D.3. Number of Preprogrammed Messages Sent to Participants in the Text Ed Group, by Text Ed Version

			Number of Messages			
Text Ed Version	Number of Text Ed Group Participants	Percentage of Text Ed Group Participants	Minimum	Maximum	Mean	Expected (Range)
Long	1,170	66.2	0	34	20.2	15–23
Medium	150	8.5	1	30	17.2	13–18
Short	123	7.0	2	32	16.8	13–15
Very short	325	18.4	1	22	12.1	9–11
Sample size (total = 1,768)						

SOURCE: MDRC analysis of Signal Vine text message data.

Exhibit D.4. Number of Distinct Preprogrammed Messages Sent to Participants in the Text Ed Group, by Text Ed Version

			Number of Messages			
Text Ed Version	Number of Text Ed Group Participants	Percentage of Text Ed Group Participants	Minimum	Maximum	Mean	Expected (Range)
Long	1,170	66.2	0	57	39.4	33–56
Medium	150	8.5	4	51	34.3	29–49
Short	123	7.0	5	68	32.6	26–42
Very short	325	18.4	1	37	23.9	19–31
Sample size (total = 1,768)						

SOURCE: MDRC analysis of Signal Vine text message data.

The exhibits show that the majority of study participants were placed into the long version of Text Ed, meaning that they had intended to enroll in college between 36 days and 9 months after study entry. The next largest group was in the very short version, planning to enroll within 19 days or less after study entry.[21] Data on the number of messages sent indicate that Text Ed was implemented as planned. Participants in the long version, for example, were sent on average 20.2 preprogrammed text messages, within the expected range of 15 to 23 messages (Exhibit D.3). This group was sent an average of 39.4 distinct text messages, also within the expected range of 33 to 56 messages (Exhibit D.4). The number of messages sent were also within the expected range for participants in each of the other versions.

D.2.2 Participant Opt-Out and Other Barriers to Messaging

The study team calculated the proportion of participants assigned to the Text Ed group who subsequently opted out of receiving messages. These are participants who replied "STOP" after the messaging began. Opt-out behavior in the form of "stop requests" provides an indication of the extent to which participants were willing to receive the messages in Text Ed.

Data from Signal Vine (presented in Exhibit 8 of the main report) show that 9 percent of participants opted out of receiving Text Ed messages immediately after receiving their first message. This rate indicates that the large majority of study participants were neutral to positive about the messages and generally willing to receive them when the messaging began.

Participants in the Text Ed group could also request to stop receiving messages at later time points, after they had more experience with the messages. This might occur if participants judged that the outreach was not (or was no longer) useful to them, either because they did not like or did not benefit from the outreach. Exhibit D.5 presents data on stop requests received from participants after their second message or any point following that. The exhibit shows that fewer than 11 percent of participants in each version requested to stop receiving text messages after this point.

Exhibit D.5. Text Stop Requests, Wrong Numbers, and Programming Errors

Issue Description	Number of Participants Impacted by Issue	Percentage of Text Ed Group Participants
Requested to stop receiving messages at some point after receiving the first set of messages		
Long	111	9.5
Medium	16	10.7
Short	9	7.3
Very short	24	7.4
Wrong numbers	75	4.2
Any programming or implementation errors resulting in unsent text messages	61	3.5
Sample size (total = 1,768)		

SOURCE: MDRC analysis of Signal Vine text message data.

Exhibit D.5 also presents information on wrong numbers and other technical errors that may have prevented the sending of text messages. A number could be non-viable, for example, because it was not the correct cell phone number for the participant, the number had gone inactive, or the number was for a landline rather than a cell phone. Very few participants had wrong phone numbers (4.2 percent) or experienced other technical difficulties (3.5 percent).

D.2.3 Participant Response to Messages

The text message transcript data allow for the analysis of clients' text-based participation. Text messages from participants are the clearest observable indication that they received, reacted to, and potentially acted upon the preprogrammed messages. It is important to note that the absence of text messages from a participant does not mean that the participant was not engaged with the Text Ed messages they received or that they did not benefit from them. The messages participants were sent may have been sufficient to encourage them to take next steps on their own or to follow up with their EOC via another means of communication, such as over the phone or in person. Yet for participants who did use text messages to stay connected with their EOC, their text message responses serve as one indication of their active participation with Text Ed.

Exhibit D.6 presents the percentage of participants who responded at different frequencies to the Text Ed messages. Overall, about 80 percent responded at least once to the messages. Just under 50 percent responded four or more times during follow-up. The measure of participant response to texts that prompt "preprogrammed messages in a way that requires EOC staff intervention" gives a window into how much staff intervention was needed to ensure that Text Ed was implemented as designed. About 10 percent of participants responded to "Yes/No" questions in a way that required intervention, suggesting that the responses did not typically require additional effort from staff members.

Exhibit D.6. Participant Response to Messages, Overall and by Text Ed Version

Frequency of Response	Percentage of Text Ed Group Participants
Responded once	
Overall	13.1
Long	11.1
Medium	12.7
Short	10.6
Very short	21.5
Responded on 2–3 occasions	
Overall	18.6
Long	16.9
Medium	19.3
Short	22.8
Very short	22.8
Responded on 4 occasions or more	
Overall	48.4
Long	51.6
Medium	53.3
Short	52.0
Very short	33.2
Ever responded to a scheduled message that prompted preprogrammed follow-up in a way that required Educational Opportunity Center staff member intervention	
Overall	10.4
Long	9.5
Medium	20.0
Short	13.8
Very short	8.0
Sample size (total = 1,768)	

SOURCE: MDRC analysis of Signal Vine text message data.

D.2.4 Staff Member Follow-Up

This section discusses how participants experienced staff member engagement with the Signal Vine platform. As with the participant messages, staff members' text messages provide partial information regarding the extent to which Text Ed prompted more robust communication between EOC staff members and participants. EOC staff members could have resolved participants' questions over the phone or in person, so staff member engagement with the Signal Vine platform may only provide a partial look at staff members' follow-up with participants and their engagement as a whole. Nevertheless, characterizing the extent of staff members' follow-up via text gives some indication of whether Text Ed represents a robust strategy for EOC-client two-way communication.

Exhibit D.7 presents the share of participants who interacted directly with EOC staff members via the Signal Vine text messaging platform, as well as the share who received automated text messages that would have failed to send without staff member intervention. The top rows present information on the number of "manual" text messages sent by staff members, referring to messages sent by a staff member to an individual participant, rather than preprogrammed Text Ed messages. For participation in the long version, for example, about 56 percent of participants received at least one manual message from a staff member, and the average number of messages sent was roughly three over the follow-up period. The level of manual texting suggests a fair amount of interaction between staff members and clients.

Exhibit D.7. Staff Member Follow-Up, Overall and by Text Ed Version

Staff Member Follow-Up	Percentage of Text Ed Group Participants
Participants received at least one "manual" text message from a staff member at their Educational Opportunity Center (EOC)	
Overall	54.4
Long	55.9
Medium	63.3
Short	53.7
Very short	44.9
Average number of "manual" text messages participants received	
Overall	2.7
Long	2.9
Medium	3.7
Short	2.2
Very short	1.6
Participants ever received a customized scheduled message that would have failed without EOC staff member intervention	
Overall	3.5
Long	2.1
Medium	10.7
Short	7.3
Very short	4.0
Sample size (total = 1,768)	

SOURCE: MDRC analysis of Signal Vine text message data.

The final set of rows presents the measure "Participants ever received a scheduled message that would have failed without EOC staff member intervention," which speaks to the extent to which staff members needed and were able to provide individual follow-up. While the Signal Vine system could interpret a variety of variations on affirmative or negative answers, if a participant sent a reply that the system could not interpret, the system was unable to send an appropriate reply until an EOC staff member manually interpreted the valance of the participant message for the system. EOC staff member engagement with Text Ed in this way is important for the successful customization of the messaging. The extent to which staff members were required to and actually did engage in this way provides insight into the level of effort required from staff members to customize the messages in response to clients' incoming texts and the feasibility of providing that level of effort. The findings suggest that staff members did not consistently engage with the Signal Vine platform in a way that facilitated real-time customizations to the text messages. This kind of engagement requires substantial effort from staff members and is not always necessary for a coherent text message exchange.

ENDNOTES

[1] Castleman and Page (2015, 2016); Page, Castleman, and Meyer (2020); Page and Gehlbach (2017).

[2] Choy (2002); Ross-Gordon (2011); Johnson, Rochkind, Ott, and DuPont (2009).

[3] Harackiewicz, Tibbetts, Canning, and Hyde (2014).

[4] Mayer, Calmeyer, Cullinan, and Patterson (2015).

[5] Farrell, Smith, Reardon, and Obara (2016).

[6] Baird, Cullinan, Landers, and Reardon (2016).

[7] Dechausay, Anzelone, and Reardon (2015).

[8] Bhargava and Manoli (2015).

[9] Hastings and Weinstein (2008).

[10] Mayer, Kalil, Oreopoulos, and Gallegos (2019).

[11] In rare instances a participant could have received their first text message on or after their target enrollment date if the participant entered an EOC just a few days prior to their intended enrollment date and successfully enrolled. These participants would have been assigned to the very short Text Ed version.

[12] Staff members did not directly learn the group to which clients were assigned in order to minimize the chances that they provided additional follow-up to clients who did not get assigned to the Text Ed group. Although follow-up data on individual outreach were not available, it is unlikely that such outreach occurred. Staff members would need to go into the Signal Vine platform in order to find out who was receiving Text Ed messages, cross check these data with their own caseload, and infer which of their clients were not receiving these messages.

[13] United States Department of Education (2020).

[14] Federal Student Aid (2020).

[15] Except for the enrollment data collected from the two technical colleges, which are already organized by semester.

[16] If the outcome is completed within the application year for the semester of intended enrollment, it will count even if it was completed before randomization. If the outcome is completed in a winter or summer term that falls between the intended enrollment semester and the following semester, it will count as completed as well. More details about outcome variable creation can be found in Appendix B.

[17] Participants self-reported their intended college enrollment date at study intake.

[18] Holzman and Hanson (2020) found that, net other factors, FAFSA verification rates for Black, Hispanic and Asian/Pacific Islander students as well as students from other racial/ethnic backgrounds were higher than FAFSA verification rates for White students.

[19] Page, Castleman, and Meyer (2020); for similar studies, see Castleman and Meyer (2020); Castleman and Page (2017); Castleman, Page, and Schooley (2014); Page and Gehlbach (2017).

[20] Page, Castleman, and Meyer (2020).

[21] Fewer than 1 percent of study participants planned to enroll after 9 months. Text messages were sent to this group once their intended enrollment date was 9 months away.

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