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The Student Experience of Two-Way Text-Message College Advising: A First Glimpse

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Cover Page Footnote

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ABSTRACT

This study examines the experiences of students enrolled in a text-messaging advising program in order to understand the conditions for impact in this rapidly proliferating intervention model. The program under study was a 15-state text-messaging college advising trial that attempted to increase the college enrollment outcomes of over 30,000 students who attended U.S. high schools with large percentages of low-income students. Data came from 3600 advisees who responded to text-message queries about their experiences in the texting program. The content of the queries was informed by focus group responses from 18 program participants. Results indicate that text-message college advising offered students a combination of information, assistance, nudges, and emotional support that many students perceived kept them on track for a successful college process. Text-message advisees who were disengaged or critical of the program mistakenly believed that the advising was fully automated, had sufficient support elsewhere, or were not receiving the texts because of incorrect contact information. Study findings suggest that text messaging is best suited to providing advising on financial aid and other topics requiring specific information and concrete tasks. Students' reports of their experience in the program provide potential explanations for the mixed results that are beginning to be reported for texting programs and suggest implications for more effective designs. The study is useful as one of the first investigations of student responses to virtual advising, but its modest response rates suggest the need for new approaches to collecting evaluation data from participants in text-message advising campaigns.

Keywords: college access, low-income students, text-message advising, virtual advising

Despite considerable policy efforts to increase equity in access to higher education in the U.S., wide socioeconomic gaps in postsecondary enrollment and degree attainment are well documented and appear to be widening (Bailey & Dynarski, 2011; Chetty et al., 2017; Shapiro et al., 2019). Researchers have produced a large body of evidence about the factors that hinder college access for low-income students, including those who are additionally minoritized on the basis of race, ethnicity, immigration background, or first-generation status. College-intending students from these groups face financial barriers as well as informational and procedural challenges across the complex, multiple steps in the college-going process (Deil-Amen & Turley, 2007; Goldrick-Rab et al., 2007; Holzman et al., 2019; Page & Scott-Clayton, 2016).

College-going Interventions

With a high degree of consensus about the factors that impede college access for underrepresented groups, researchers and policy makers have increasingly turned to the study of effective interventions to close enrollment gaps associated with family

income (French & Oreopoulos, 2017; Herbaut & Geven, 2020; Page & Scott-Clayton, 2016). High school counselors and face-to-face college access programs are the most common structures for providing low-income high school students with information, assistance, and encouragement in the complex college access process (Avery et al., 2014; Swail & Perna, 2002).

School counseling resources are often inadequate in schools with a high percentage of low-income students, however, with an average school counselor caseload in high-poverty schools nearly twice the ratio recommended by the American School Counseling Association (ASCA 2020; Gagnon & Mattingly, 2016; McKillip et al., 2012; Perna et al., 2008). School counselors in public schools are able to spend little time on college counseling (Clinedinst & Hawkins, 2009; McKillip et al., 2012) and many counselors in high-poverty high schools have insufficient training and higher education advising experience to guide students in the full range and complexity of college choice and financial aid activities (Civic Enterprises, 2011).

Community-based nonprofit organizations have attempted to supplement school counseling resources, with studies showing positive effects of selected programs on college behaviors, such as FAFSA filing, college enrollment, and follow-through on college plans in the summer after high school graduation (Avery, 2013; Barr & Castleman, 2018; Bettinger et al., 2012; Bos et al., 2012; Carrell & Sacerdote, 2017; Page & Schooley, 2014). However, both in-school and out-of-school college preparation and advising programs are generally less available in low-income neighborhoods and outside of urban centers (Swail et al., 2012; Tierney & Hagedorn, 2004). And, as Avery et al. (2020) note, even accessible, high-quality programs "are often expensive—sometimes thousands of dollars per student served—and dependent on one-on-one in-person interactions between students and program staff. As a result, they can be difficult to scale" (p. 3). Together, the shortfall in college advising resources and the difficulty and expense of scaling up intensive in-person programs has led to the rapid expansion of experimentation with technology-delivered "light touch" advising (Hyman, 2020).

Text-messaging advising using semi-automated and individual college counseling is a light touch intervention that is rapidly proliferating (Bettinger et al., 2019; Bird et al., 2019; Castleman, 2015; Castleman & Page, 2016; Fesler, 2020; Fesler et al., 2019; Oreopoulos et al., 2020; Page et al., 2020; Phillips & Reber, 2019). Some of these low-cost texting programs have proven effective in decreasing summer melt and increasing behaviors such as FAFSA filing or renewal in relatively localized settings (Bird et al., 2019; Castleman & Page, 2015, 2016, 2017; Page & Gehlbach, 2020). The first published results from very large scale text-message advising campaigns have been disappointing, however, with randomized controlled trials failing to show positive effects of the text-

message advising treatment (Bergman et al., 2019; Bettinger et al., 2019; Gurantz et al., in press; Hyman, 2020; Page et al., 2019, 2020; Phillips & Reber, 2019). In particular, it appears that information-only text messaging—even one-way text messaging from an advisor that is personalized to the student's situation—is not effective in increasing college enrollment (Bird et al., 2019; Gurantz et al., in press). The 75,000-student intervention trial that is the focus of the study reported in this paper likewise produced null results in college enrollment outcomes, although the program used two-way, individualized text messaging in which students and advisors exchanged personal communications (Avery et al., 2020). Experiments with text-message trials continue, however, because of the potential that advising using this readily-available virtual communications mode can increase higher education equity affordably on a national scale.

Purpose of the Present Study

Understanding whether and how the potential of text-message advising might be realized is therefore a pressing issue. Investigating the motivations and experiences of students in text-message college advising programs offers a likely avenue for increasing understanding about the conditions for impact in text-message advising. To date, little is known about the student perceptions of text-message college advising. How do students experience advising via text message? What topics and issues do they bring up over text message? Do advisees find this virtual mode of advising helpful? Do they believe that text-message support has a positive impact on their postsecondary choices and preparation activities? Why do some students sign up for advising and then fail to participate in the texting program? Our study investigated these issues with the following research questions:

How do students perceive the effects of their participation in a two-way, national text-message college advising program?

How do students who sign up for the text-message advising program but fail to participate explain their lack of engagement?

How do participating students evaluate the text-message program?

Theoretical Framework

Principles of behavioral economics and nudge theory (Thaler & Sunstein, 2008) provide a framework for understanding how and why students, particularly those from low-income backgrounds or who are minoritized in other ways, make suboptimal postsecondary decisions.

Although previously utilized in the fields of health, finance, law, and other areas of public policy, behavioral economics principles are entering the education policy sphere (Castleman & Page, 2015; Castleman & Meyer, 2019; Lavecchia et al., 2016).

Historically, economists have used human capital theory to make sense of individuals' college choices (Becker, 1962). This approach, however, presumes that students are rational beings who view education as a long-term investment and consequently weigh the costs and benefits of college attendance as part of their decision-making process. As evidenced by low college enrollment and attainment rates, high school students do not predictably follow this pattern for a variety of contextual and developmental factors (Boatman et al., 2014; Castleman et al., 2015; Lavecchia et al., 2016). Combining research from psychology, neuroscience, and sociology, behavioral economics provides an alternative lens to understand these deviations that students take from human capital theory when making college decisions (Castleman & Meyer, 2019; French & Oreopoulos, 2017; Lavecchia et al., 2016). Drawing from this work, more education researchers are beginning to use behavioral economic principles to formulate education policy suggestions and interventions including text-message advising and nudging to improve college access and success (Castleman & Page, 2015; Ross et al., 2013), reduce summer melt (Castleman & Page, 2015), and increase FAFSA completion and submission (Page et al., 2020).

Behavioral economics principles provide important insights about how students respond to challenges related to the "informational complexity, procrastination, status quo bias" associated with college decision-making (Castleman & Page, 2015, p. 144). For example, when faced with imminent distractions including financial, family, friend, and work-related responsibilities, students are less likely to make a present-day sacrifice for a future benefit (Castleman & Page, 2015). Referred to as time-inconsistent preferences, students often procrastinate on completing essential steps of the college process including filling out the FAFSA or registering for the SAT even if they want to go to college (Dynarski & Scott -Clayton, 2006). Students might also deviate from the expected behavior, human capital theory suggests, because they have inaccurate or insufficient information to weigh the benefits of college (Lavecchia et al., 2016). Information about college application and financial aid processes may be less accessible for students from low-income backgrounds whose families are unfamiliar with higher education options and the complex college-going process (Avery & Kane, 2004). Without accessible and timely information, students' tendencies to rely on familiarity, routine, and automatic thinking can result in ill-informed decisions (Lavecchia et al., 2016). Last, when faced with too many choices, students can be cognitively overloaded with complex information and select default or simple options that do not actually serve their best interests (Scott-Clayton, 2011).

Nudge theory has demonstrated significant effects on program participation and take-up (Bettinger et al., 2012). In essence, a behavioral nudge encourages individuals to take specific actions that will lead to more favorable outcomes without limiting choices or making

choices more costly (Hausman & Welch, 2010; Thaler & Sunstein, 2008). In the field of college access and success, nudge theory has been utilized as a personal assistance mechanism to disseminate college information, provide one-on-one support, and remind students about essential college and financial aid deadlines (Bird et al., 2019; Lavecchia et al., 2016). As previously noted, the effects of behavioral nudges in the form of large-scale college advising text-message interventions have produced disappointing results thus far in terms of college attainment (Bird et al., 2019; Hyman, 2020; Oreopoulos & Petronijevic, 2019). Empirical research investigating how students perceive this form of college assistance is just beginning to appear (e.g., Oreopoulos et al., 2020). This information could provide essential insight into students' decision-making and the ways that they are receiving interventions intended to influence their college-going behaviors.

The DIMES Intervention

The program that was the focus of this study was a large-scale text-messaging college advising trial that used behavioral economics principles to attempt to increase the college enrollment outcomes of students who attended U.S. high schools with high percentages of low-income students and low college-going rates. Digital Messaging to Improve College Enrollment and Success (DIMES) was a U.S. Institute for Educational Studies (IES)-funded randomized controlled trial conducted in collaboration with the College Board (Avery et al., 2020). DIMES participants were 75,000 students who attended one of 745 U.S. high schools in 15 states. DIMES high schools had substantial proportions of students who were eligible for free and reduced lunch (Mean=63%) and low two- and four-year college-going rates (Mean=26% and 30%, respectively). Among students who had taken at least one College Board assessment, the average college-going rate was approximately 56% across the study high schools.

Students signed up for the DIMES program in the spring of their junior year of high school at the point of taking the PSAT and were randomly divided into equal-size treatment and control groups. The treatment group was 28 percent white, 19 percent black, 36 percent Latinx, and 7 percent Asian. In keeping with national trends, women were 55 percent of the sample. Students' academic profiles were generally consistent with averages for their schools, with a mean high school GPA of 3.3 and PSAT scores in the low 40s in each section (approximately the 33rd percentile of the PSAT/NMSQT score distribution for 11th graders). Because sampling was done at the school level, individual-level socioeconomic data were not available.

The DIMES intervention for the 31,408 treatment group students consisted of 15 months of two-way, individual advising in the form of cell phone text messages.[1] The intervention was designed to help high school

[1] The full treatment sample (N=36,521) was reduced in size to this number by removing students without valid cell phone numbers. (See Avery et al., 2020 for additional details of the DIMES intervention design and sample.)

students complete all of the steps in the college and financial aid application process. The program began in the spring of a student's junior year of high school and continued until the end of the summer after their high school graduation.

DIMES treatment group students were each assigned an individual, full-time professional college access advisor from uAspire—a leading college access organization with a focus on college affordability. Once or twice a month, students received a standardized outgoing "broadcast" text from their individual advisor, personalized with their name. The topic of each automated broadcast text related to an issue or task pegged to the calendar of testing, college application, and financial aid processes. In between these automated broadcast messages, the uAspire advisor and student exchanged manual text messages that either the student or the advisor could initiate. Each of the 18 message flows in DIMES consisted of the automated broadcast text(s) from the uAspire advisor that introduced a new advising topic or issue and the ensuing set of any manual text-message exchanges between the student and advisor that took place before the next automated broadcast text. Table 1 on page 87 summarizes the content and timing of the message flows.

Methods

The primary source of DIMES data for this study of student experiences with the texting program consisted of the text messages of the 3577 students who responded to end-of-study questions asking about their DIMES experiences and outcomes. Focus groups with 18 DIMES participants informed the development of the text message evaluation queries and provided some additional context for the large text-message data analysis findings.

Exploratory Focus Groups

The DIMES qualitative study co-principal investigators conducted a total of four student focus groups that took place in February 2016 and in May 2016. The purpose of this data collection was to explore the nature and range of student experiences in the advising program as a foundation for designing end-of-study evaluation text message queries for the full treatment group. To achieve the goal of focus group participants who were likely to have rich information, we chose a purposive sample of DIMES high school seniors in the treatment group who had experienced significant engagement with their advisors (Patton, 2002). (We defined significant engagement as having responded to at least five of the first seven message flows.) The College Board provided a random sample of these students to uAspire. In order to yield two focus groups of 5-7 students each, we sent invitations to the first 60 students on the College Board list asking if they were willing to participate in an online focus group and offering an incentive of $50 for participation. The initial text message invitation was marked with their advisor as sender. In one indication of the difficulty in collecting

Table 1.
DIMES Message Content and Timeline

Timeline	Message content
Spring/summer of junior year (2015)	• Encouragement to start and guidance on college search • Encouragement to register for SAT (customized on whether already registered) • Guidance on SAT exam preparation and score sending • Inform student about potential financial aid eligibility
Fall of senior year (2015)	• Personalized college search guidance • Additional messaging about SAT taking/re-taking (customized on SAT history) • Acquiring and using fee waivers • College application guidance
Spring of senior year (2016)	• Information about state-specific FAFSA deadlines and resources • Support with FAFSA completion • Assistance reviewing financial aid award letters • Assistance with college choice and deposit decisions
Summer after high school (2016)	• Finalizing financial aid and evaluating tuition bill payment options • Information and guidance about required summer tasks • Program evaluation questions (final message)

program evaluation data, 50 students opened the invitation to participate but only 14 continued to the short online survey to fill out contact and scheduling information. Of these, 10 students agreed to participate and were assigned to one of two online video focus groups. The one-hour focus groups centered on understanding students' motivation to participate in advising, how they experienced advising, and how advising affected their knowledge, actions, and emotions related to tasks and decisions. Using the same procedures, the co-PIs each conducted a second pair of online student focus groups in May 2016. Eight students participated in one of the two groups. The May focus group protocol included an additional question that asked about students' perceptions of the role of advising in their college and financial aid decisions and outcome. The focus group interview protocol appears in Table 2 on page 89.

We conducted holistic thematic analysis of the focus group conversations from each of the recorded online conversations (Saldaña, 2015). This process involved identifying and writing about students' stories of their DIMES experience, with particular attention to their motivations, their ideas about the role and purpose of the advising, their view of the advising relationship, and any conclusions about the effects of advising on their college choices and preparation activities. We used this high-level analysis rather than line-by-line coding in keeping with the goals of using focus group information to inform our text-message evaluation questions and contextualize the findings from that larger sample.

End-of-Program Evaluation Queries: Sample, Procedures and Analysis

In order to learn about students' experiences with the texting program, advisors initiated the final (18th) DIMES text-message flow at the end of the 15-month program by texting one evaluation question to each of their advisees. A total set of 10 queries was spread over batches of treatment group students, with each batch of approximately 2800 advisees receiving one of 10 questions.[2] Sending a single question to each student was appropriate for the program's existing text-message mode and more likely to elicit a response than a longer, multi-item survey.

Like all other new DIMES topics, the message that solicited student feedback began with an advisor sending a broadcast text message to each student's cell phone. As with all DIMES messages, the standardized text of the automated broadcast message that began the program's final message flow was personalized with the student's name and marked as coming from the assigned advisor. In this case, the initial automated broadcast text message began with a standard opening alerting students that the texting program would be ending at the beginning of

[2] The three questions designed for the subgroup of never-engaged students were divided evenly among that total subgroup, making the number of students in each never-engaged batch slightly larger than the batch size of the ever-engaged students.

Table 2.
Focus Groups Protocol: February and May 2016

Topic	Message content
Assumption of automation	At the beginning of the program, did you think you were texting with a robot at first? What convinced you that there was an actual person responding?
Advising effects	In general, how—if at all—have the texts been helpful to you? How have you used them? (prompts for knowledge and information, actions, decisions). (May only): How, if at all, have the texts helped you with deciding where to apply and where to attend?
Emotions	How (if at all) has the text advising affected your feelings about going to college?
Relationship with advisor	Can you tell me about your relationship with your advisor? Do you feel that your advisor knows the answers to your questions? How were your concerns addressed?
Highlights	What was the most helpful advice you received or the most meaningful aspect of the texting?
Text-message mode	What was it like to receive this advising through text messages? (prompts for advantages/ disadvantages; how differs from in-person or school counselor advising; issues or questions that are ill-suited to texting)?
Fit with other supports	Besides these texts, there could be other sources of information and advising that you rely on for making decisions about college. Think about all the people and places where you've gotten help. How does the texting fit in?
Evaluation	What would you tell a junior at your high school who asked whether they should do this next year? Would you recommend this to your friends? Lots of students text back with questions but others have never written us back. Do you have any guesses as to why this might be? Is there anything we could do differently to get those students who haven't texted us back to start texting back?
Suggestions	How could we improve the text advising?

September and inviting them to text back to their advisor with any final questions. The second part of the text message included one of the 10 open-ended or close-ended queries asking students about their experience with advising or their evaluation of the program and its usefulness. The list of queries appears in Table 3 (page 91) and Table 4 (page 92), along with associated response rates for the group that received that question.

The following is an example of one automated end-of-study text message from the advisor that initiated the final DIMES message flow. It begins with common opening language that all students received and concludes with a sample question received by one batch of 2774 treatment group students who had previously texted back to their advisor during DIMES:

> Hi (first_name). This texting program ends Sept 2. Please text me your college and financial aid questions while I'm still around! I do have one quick question for you. Can you please describe something you learned as a result of me texting you about college?

Once a student texted back, advisors responded individually and any subsequent text messages were individualized exchanges.

Students received the final message with the single evaluation query in July or August after high school graduation. One of the first three questions was sent to separate batches of approximately 2900 students each; this "never-engaged" group had signed up to participate in DIMES but had never texted back to their advisor. Students who had not participated were asked whether they had read DIMES texts, why they had not responded, or what they planned to do after graduating. One of the remaining seven questions was sent to batches of approximately 2800 students each. This "ever-engaged" group included students who had texted back at least once to their advisor over the course of the advising program. Students who had texted their advisors received a question about anything they learned as a result of the program, any actions they took based on advising, how helpful they found the DIMES program, any specific ways they were helped, who else was helping them with college planning and financial aid, whether they would recommend the texting program to other students, or what suggestions they had for improving text advising.

Response Rate

We received text message responses from 3577 students for an overall response rate of 13%. Table 3 summarizes the response rate and frequencies for the group of "never-engaged" students who had never previously texted their DIMES advisors. Table 4 presents the data for "ever-engaged" students who had texted back to their advisor over the course of the previous 17 message flows. The tables list the queries, show the number of students who received that question, and indicate the response rate for each question. The tables also present the frequencies for

Table 3.
End-of-Study Queries and Responses for Never-engaged Students (N=339)

Query Number	Query content and close-ended frequencies	Number receiving query	Number responding	Percent responding	Of respondents, percent answering query
1	Did you read the text messages I've been sending you this past year about college? YES: 36% NO: 64%	2897	104	3.59%	42.31%
2	Can you share why you didn't respond to any of the messages we sent?	2889	158	5.47%	15.82%
3	What is your Fall plan? College: 56% Job: 26% Military: 6% Other: 6% Not Sure: 6%	2896	77	2.66%	68.83%
TOTAL		**8682**	**339**	**4%**	**36%**

Note. Percentages for close-ended queries 1 and 3 are for students who responded to the question.

Table 4.
End-of-Study Queries and Responses for Ever-engaged Students (N=3238)

Query Number	Query content and close-ended frequencies	Number receiving query	Number responding	Percent responding	Of respondents, percent answering query
4	How helpful was this texting program? Text back a number rating the program from 1 (not helpful) to 5 (very helpful) 1–4% (not helpful) 2–3% 3–14% 4–24% 5–55% (very helpful) Mean = 4.24	2780	534	19.21%	65.17%
5	Please describe something you learned as a result of me texting you about college.	2774	343	12.36%	34.40%
6	Please describe something you did related to college planning as a result of me texting you.	2766	442	15.98%	19.91%
7	In what way were my texts helpful for college planning?	2779	419	15.08%	41.29%
8	Besides my texts who else was helping you with college planning and financial aid?	2807	497	17.71%	61.17%
9	Would you recommend this texting program to the new Class of 2017 seniors? YES: 92% NO: 8%	2753	615	22.34%	71.66%
10	How can we improve this texting program for students in the future?	2784	388	13.94%	38.92%
TOTAL		**19,943**	**3238**	**17%**	**50%**

Note. Percentages for close-ended queries 4 and 9 are for students who responded to the question.

close-ended question responses. The final column in each table shows the percentage of respondents who texted back to their advisor by responding to the end-of-survey query they received as opposed to bringing up a different topic or asking an unrelated question.

Unsurprisingly, the lowest response rates were from the "never-engaged": students who had signed up to participate in DIMES and been assigned to the treatment group but who had neither opted out of receiving text messages nor texted back to their advisor. (Never-engaged students made up 24% of the 31,400 treatment group students with valid cell phone numbers.) Although it is notable that we received nearly 350 responses from students who had never texted their advisor over the previous 15 months of DIMES, this constitutes only 4% of this 'never-engaged' group. The response rate of students who had texted their advisors at some point during DIMES was higher: 17% of this "ever-engaged" group texted back after receiving the evaluation request. The response rate for subgroups of the ever-engaged students receiving specific questions varied from 12% to 22%. Response rates were higher for close-ended queries that asked for a single-word response, a category, or a numerical rating than for open-ended queries.

The response rates indicated in Table 3 and Table 4 include exchanges in which the student texted back to the advisor by providing an update on their college situation, thanking the advisor, asking a question, or requesting assistance. Some of these students also answered the program evaluation question that the advisor had posed. About half did not: of the 3577 participants who responded to the text messages in some capacity, 1740 (49%) answered the program evaluation question they received.

A quarter of the students (24.75%; *n*=879) who texted back to their advisor asked one or more questions. Three-quarters of these questions were about finances, including financial aid, FAFSA, scholarships, loans, and student bills. The remaining quarter were questions about college matriculation tasks, transferring and alternatives to college, and individual student situations. Many students texted to express their thanks and appreciation for their advisor's assistance (20.39% of cases; *n*=725). In 8% of cases, students and advisors had substantive advising conversations, which we defined as back-and-forth exchanges about questions or pending issues in which the student contributed at least five text messages.

Text Message Analysis

We conducted thematic coding (Saldaña, 2015) on the responses to the 10 end-of-program text-message queries. Each case consisted of the entire set of student and advisor text messages that began with the outgoing query of the message. Using a qualitative data analysis program (Hyperresearch), we separately coded the part

of the text-message exchange in which the student answered the question they received, and the part of the text in which they asked additional questions or wrote about something else that was unrelated to our query. In the case of close-ended questions, we did frequency counts of Yes/No or numerical responses. For open-ended responses, we used a constant comparative method (Miles & Huberman, 1994; Saldaña, 2015), in which we coded student texts line by line, labeling text segments with provisional thematic codes, such as "advising helped with understanding financial aid." We defined each code with written definitions. We refined the codes and revised and clarified the associated definition until two independent coders achieved an interrater reliability rate of ≥80%.

Findings

Text-message exchanges constitute the primary source of data for this findings section and provide the first glimpse into how students experience virtual text-message advising. Focus group participants' responses contextualize the text-message findings with more in-depth information regarding the emotional experience of receiving text-message advising, the nature of the student-advisor relationship, and the role of DIMES in students' lives. We organize the findings to correspond with our research questions: what students gain from this form of college advising, why some students fail to participate, how students evaluate the text-message advising program, and the benefits and limitations of this intervention strategy.

How do Students Perceive the Effects of Their Participation in a Two-way, National Text-message College Advising Program?

The purpose of DIMES is to help students with the information, actions, and decision-making that lead to enrolling in a well-matched and affordable postsecondary institution. In evaluating DIMES, we therefore asked students how the text messages were helpful, what they learned from advising, or what they did related to college planning as a result of participating in the text-message advising program (See Table 4, questions 5, 6, 7).

Additionally, we asked one batch of ever-engaged students directly to indicate how helpful they had found their DIMES participation by texting back a number between 1 (not helpful) to 5 (very helpful) (Table 4, question 4). The mean rating of the 534 students who responded to this question was 4.24. Just under 80% of the students gave the program a rating of 4 or 5. Only 7% of students rated the program as a 1 or 2. Overall, the text messages indicate that text-message advising offered responding students a combination of information, assistance, nudges, and emotional support that many students perceived kept them on track for a successful college process.

Information, Assistance, and Nudges

A quarter of the ever-engaged students who answered one of the open-ended advising queries listed specific ways in which advising influenced them. Students reported that it was helpful to receive information, guidance, and reminders of deadlines and required actions from their advisor. Informational assistance was especially important for students without a family history of college or knowledge of U.S. higher education. Student text messages highlighted the importance of learning from advising about the higher education system and the processes for choosing and applying to colleges.[3] For instance, a student from an immigrant family texted: "My family isn't from America so we didn't really know how the college process worked but you helped me stay on track." Another student wrote: "your texts would bring up useful information and stuff that my guidance counselors didn't even mention to me. stuff that i didn't know to do or think about doing and important dates."

The majority of students' comments about program effects fell into two categories: financial aid and negotiating processes. Most frequent were comments in which students said that DIMES advising had helped them understand how financial aid worked and assisted them in applying for aid. A quarter of the ever-engaged students who responded to the questions about DIMES effects referred to financial issues. This emphasis corresponds with the heavy concentration on financial topics in the student-initiated questions in this final set of text-message exchanges. For example, an advisee wrote that, "The FAFSA info and [college] websites you gave me are the reasons I'm already enrolled." Another student cited both college and financial aid assistance: "you basically told me everything i needed to know about college and how to make it easier and you helped me stay on track of the important things i needed to do in order to get more aid." Students texted about the importance of advising in completing the FAFSA, seeking scholarships, and applying for loans.

In keeping with nudge theory (Thaler & Sunstein, 2008), the second largest category of DIMES effects comprised student comments about the usefulness of receiving reminders and specific guidance about what they should be doing in the college process. They reported specific actions they took in regard to financial aid as a result of advising: "I looked into fafsa, and as such, was able to afford a more prestigious school," "I checked up on more scholarships due to you texting me," and "I visited many financial aid workshops at my school to get a better understanding of how my payment would be set up for each term." Students repeatedly pointed to the importance of learning about important deadlines. Relatedly, students reported that it was helpful to learn about the logistics or steps to apply to college. Advisees felt they had gained from having someone guide them

[3] All student text messages are quoted verbatim with original spelling, punctuation, and abbreviations.

through the process. As one student texted, this was crucial for students to navigate the process: "you walked me through the steps and you helped me choose the right path."

In addition to the most-frequent financial and navigational categories of DIMES effects, students texted about ways their advisors helped them with information about a particular issue, such as the difference between early decision and early action, that affected their admission process. Other students acknowledged their advisor's help in solving a financial aid issue or another problem specific to their personal situation. Only a handful of students said that DIMES advising affected their choice of where to apply to college, possibly because the timing of the text-message queries was so long after the application period that they were less likely to recall any effects of advising on their application list. Timing might not have explained this finding, however, as Fesler's (2020) study found that students engaged with their text-message advisor much more productively around financial aid issues than college lists. Several students did acknowledge the importance of their advisor's suggestion to apply to multiple colleges. For example, one advisee texted that because of DIMES: "i saw colleges differently. like it doesn't have to be the most popular colleges."

Emotional Support

Students also commented that DIMES advising carried emotional benefits. Having an ongoing connection to an advisor reduced stress and insecurity during the process of applying to college for the student who texted: "your texts made me feel like i had someone to talk to. the whole process of getting into college and applying for scholarships can be really overwhelming." Another advisee's text mentioned emotions and self-concept:

> there are so many things i did resulting from your texts [advisor name], i can't possibly pick one. everything just fell into place one topic at a time. you were very helpful and easy to contact. you really helped me gain confidence to get into college and not be nervous.

Focus group participants provided in-depth accounts of the emotional support they received through virtual text-message advising. For example, a first-generation Latina student said that she had absolutely nobody to help her and would have been "lost without my advisor." Her DIMES advisor, she said, had reassured and guided her throughout her process and was the reason she was going to her state flagship university instead of a two-year community college.

> I'm from [Big City] High and we have about 4000 students at this one high school. So it's extremely huge. And often our advisors are---there's not many of them for as many students as there are. So I have tried to get help from my college advisor at [Big City] High. But I haven't really stressed it, because I have one on my phone!

The text message quoted below is from a single student who echoes many of these points, concluding that their college enrollment was a result of DIMES advising. The student describes getting into college as a "long and laborious process" whose successful attainment resulted in increased confidence in the ability to take on the complex challenges of higher education. The text message continues to hint at the emotional aspect of advising, as the student implies that it was sometimes annoying to receive advising texts and includes a final emoji ("xd" signaling happiness or laughter) that communicates warm feelings to the advisor.

> Something i have learned from you is that applying for college is like a complex mathematical equation. there [*sic*] are many parts to it and certain steps you need to take in order to solve it. it can be a long and laborious process, but the moment you find your solution (or when you get into a college) it feels like anything in life is conquerable. now onto the next equation, getting good grades... i'd always forget about college but with you constantly reminding me throughout the year it pushed me towards actually getting it down. i might not have went to college if you didn't bug me about it so much xd

How do Students who Sign up for the Text-message Advising Program but Fail to Participate Explain their Lack of Engagement?

Any program or treatment requires engagement by participants in order to be effective. In the case of DIMES, approximately a quarter of the students who signed up for advising and were assigned to the treatment group never texted back to their advisor over the course of the 15-month program. Because these "never-engaged" students were not among the small group who had opted out of receiving texting,[4] advisors continued to send program texts to the cell phone number that the student provided at the point of signing up for DIMES. To investigate the reasons for students' lack of participation, we sent one of three end-of-program evaluation queries to each of three batches of approximately 2900 never-engaged students (Table 3, questions 1, 2, and 3). We present findings here about the rate and type of responses we received from previously non-participating students, the reasons they gave for not having engaged with their advisors, and the relevance of college advising for students' expressed postsecondary plans. Previously unengaged treatment group students texted back at a very low rate (4%), which is unsurprising given their non-responsiveness throughout DIMES. Given the extremely small numbers of never-engaged students who texted for the first time at the very end of DIMES in response to an evaluation query, it is important to reiterate that the findings about this group are suggestive but that patterns from their data cannot be generalized to the overall group of non-respondents.

[4] Over the period of DIMES, 9% of the treatment group opted out of receiving messages (Avery et al., 2020).

Student-initiated Questions From Never-Engaged Students

Students who had never texted back to their advisor were even more likely than the ever-engaged sample to pose questions of their own without answering the evaluation query (64%), suggesting a response bias in the already-small sample. Their questions were even more concentrated on financial aid topics than the student-initiated questions of advisees who had texted with their advisors in the past. Interestingly, slightly over a third (36%) of responding never-engaged students answered "Yes" to the question about whether they had read DIMES advising messages (Table 3, question 1).

Messaging Problems

The text messages from never-engaged students show problems behind the scenes in delivering the advising treatment. We received texts from non-students, saying that the phone number where they had been receiving messages was incorrect and that they were not the recipient named in the messages. Sometimes people associated with the student, usually a parent, texted back that it was they who had been receiving the messages. A few students wrote back to express confusion about how the program worked, assuming that the messaging was fully automated, not understanding that it was possible to text back, or expressing reluctance to incur cell phone message and data charges. One student indicated that the appearance of cell phone text messages might have been problematic: "some of the messages look like spam so i didn't seem to pay attention to them."

We coded 332 "messaging problems" across the sample, including among ever-engaged students. Over half of these had to do with suspicion about the source of the text messages. Having apparently forgotten that they signed up for the DIMES program and despite having received outgoing messages from the same advisor over the past 15 months, students responded to the final message by saying they were unfamiliar with the texter: "who are you?" and "who is this!" Many students did not understand that there was a human writing the messages. As one student texted: "sorry i didn't answer i didn't know you were a real person." Even some respondents from the ever-engaged group held this misconception, like the student who texted: "to improve this texting program stop using bots to send messages students want personalized messages that they can relate to not a robot to show how useless people are really becoming."

We received responses from previously unengaged students who had received DIMES messages but wrote that they were too busy to reply, did not feel like responding, or found the texts annoying. One parent wrote to say her student was having "a rough year."

Reliance on Other Sources of Support

A handful of never-engaged students reported that they had not needed DIMES

advising because they had received help elsewhere or were already set for their postsecondary plan. The many questions they asked about the college process indicated that many of them could have benefitted from advising. Many of their questions were extremely basic, like "how does financial aid work?" Although advisors answered each student, there was little they could do to help students at a point in the year when financial aid deadlines were past, most college admissions processes were effectively finished, and the DIMES program was ending.

We attempted to learn more about the relevance of pre-college advising for non-respondents by asking one batch of never-engaged students about their postsecondary plan (Table 3, question 3). Nearly 60% of the students who answered this question reported that they were planning to attend college in the Fall, indicating that the program content would have been directly relevant to their plans. The remainder were planning full time employment and a few (6%) were joining the military. Even students who were not planning to start college immediately, however, sent questions asking advisors about how to pursue higher education in the future.

How do Participating Students Evaluate the Text-message Program?

We posed two specific questions and analyzed relevant texts across all sub-questions in order to investigate students' evaluation of the DIMES program itself (Table 4 questions 9 and 10). One batch of ever-engaged students received a query asking: "Would you recommend this texting program to the new Class of 2017 seniors? YES/NO." Among the 440 students who responded to this query and provided the requested response, 92% responded "yes."

Appreciation and Gratitude

Along with the high percentage of advisees who answered that they would recommend DIMES to their peers, the predominance of text messages where students thanked the advisor for their guidance and support is an indication of respondents' positive experience in DIMES. Nearly half of all codes applied to the student text messages across all end-of-study queries were expressions of appreciation and thanks (46% of 7245 codes applied to the full body of student texts in the final DIMES message flow). There were numerous questions from students about whether they could continue to receive advising after the end of DIMES: "can i sign up for this next year too? or next semester? because it is a great help having you." Some advisees expressed dismay that DIMES was ending. "Wow, that sucks. stay longer so we can have you forever lol," one student texted, while another wrote, "Nooo why do you have to go!"

Variation and Critiques in Student Evaluations

Like in-person advising experiences, the apparent need for assistance and perceived

outcomes of DIMES varied greatly across participants' evaluations of the program. We saw a substantial range of understanding of the role of text-message advising and the advising relationship. One focus group participant, an African American student, shared that she found the messages helpful but that receiving them made her feel guilt and stress when she was avoiding college application tasks. A White focus group participant who reported having additional sources of assistance saw the advising as a "business relationship." This advisee used the texting to reassure herself that she wasn't missing any deadlines and to double-check information and advice from her parents or school counselor. Yet another student saw her advisor as a friend and important person in her life, even though they had never met in person.

It is likely that the advisees who were most likely to respond to their advisor's final text query were students who had questions and those who had a positive experience with their advisor and the program. Even given this likely response bias, there were students who texted that they had not gained any useful information or assistance in DIMES: "I didn't use [advising texts] at all really." More specifically, a number of students said that the advising program's offer of help with college choice and applications in September and October occurred too late to be of assistance to them. Some students had made all their decisions about where to apply or already applied to college by this time. One student who found the schedule of topics mistimed across the program, wrote: "didn't find [the texting] helpful at all. by the time you text me, i already had the topic finished. maybe if you started the program sooner it would have been helpful." And a few students responded with hostility to the message saying that the advising program was ending: "so your [*sic*] going to finally leave me alone."

Additionally, it is likely that some students were not helped by DIMES advising because they had sufficient assistance with the college process from other sources. Focus group findings underscored the ways in which differing needs, motivations, and expectations affected students' experience of text-message college advising. One of our focus group participants, a young White man whose family had hired a college coach for him, said that he texted his advisor because he wanted "to be polite." We therefore asked a batch of ever-engaged students about who else was helping them with college planning and financial aid (Table 4 question 8) in order to learn more about any unique effects of DIMES advising. In keeping with the focus group results, some students texted back that they were entirely reliant on their DIMES advisor for information and assistance. One student, for instance, responded to their advisor's question of who was helping them with this text: "u, honestly, have [come] much farther to help. i have looked for help but, it always seems like the help doesn't stay long." Others, like the following advisee, seemed to have little need for DIMES: "besides ur texts i was

being helped by my mom & some of my other family members who have been to college before & have experienced enrolling." Of the 304 students who answered this question directly, most named parents or other family members, followed by school counselors (20%) and teachers (7%) as providing them with advice and guidance.

Evaluation of Program Components

Focus group participants provided further insight into which components of the text-message advising format they found most useful. Text-message advisees appreciated the flexibility of texting, which afforded them the opportunity to initiate or respond to texts at their convenience. Nearly all focus group participants said they thought it was possible to have a relationship with an advisor over text message and that they were comfortable with this form of communication. Short form texts worked for many topics, they said, although one student said that more complex conversations were better suited to sit-down conversations with a school counselor. Several students pointed to the semi-anonymity of texting as an advantage when they felt unsure about their knowledge or worried that they would be unsuccessful in the college admission process.

Areas for Program Improvement

A second batch of ever-engaged students received a question about how to improve the program (Table 4, question 10). A group of the 388 advisees who responded to this query provided suggestions for improvement or offered critiques of the text-message advising program itself. These included issues of timing, including the suggestion to start the program earlier and to align the focus of each message flow more closely with what students were working on at that point in the process. DIMES advisor messages about FAFSA completion, for instance, arrived when some students had already completed their financial aid forms although others had yet to begin any financial aid tasks.

Another area of critique had to do with the need for more clarity about who was delivering the advising and why and how students should use DIMES advising. Students who mistakenly assumed that the advising was fully automated criticized the use of "chatbots" instead of human advisors. The misconception that advising was provided by robots was widespread at the beginning of DIMES and persisted to the end of the program for some advisees. Some students were also confused about how advising worked and how they could most usefully engage in the program. A student who texted with a suggestion for improving the program suggested that advisors needed to initiate the advising more effectively: "maybe when you guys first start this you should introduce yourselves more properly and state what you guys are doing, cause i have no idea what this is for."

Suggestions for improvement indicated that some DIMES advisees wanted even more

contact and advisor availability. Engaged students complained that sometimes the advisor did not reply immediately to text messages or that they received an automated message that the office was currently closed: "sometimes it was annoying when i had a question but i had to wait until monday or i waited too long afterschool and the office was closed. otherwise, very helpful." Some asked for even more information and reminders, for example: "the only way i could think to improve it would be more tips/texts in general" and "maybe you all can follow up when texting students like send a double text if it's been two hours or longer since the student has replied because we tend to forget."

Discussion

Students who responded to questions about their participation in DIMES were generally positive about their experience in the text-message college advising program: 80% said they found it helpful and more than 90% would recommend it to future high school seniors. In focus groups, students said that it was possible to develop a relationship with an advisor solely through text messaging. Indeed, nearly half of the codes from the 3577 students who participated in the final message flow were applied to text-message excerpts thanking advisors for their assistance and support. Advisees reported that DIMES advising helped them learn how the college process worked. They credited the program with assistance in navigating college and financial aid processes and carrying out required tasks. Text-message advisors helped them stay on track, students said, by reminding them of deadlines, nudging them to complete tasks, and helping them solve problems. Students also pointed to the tangible and emotional benefits of receiving support from a knowledgeable and accessible advisor.

It could have been that the overall intervention was unsuccessful in affecting enrollment rates for treatment group students because students who never responded never saw the messages (were not actually "treated") or because those students did not need advising because they were not planning to go to college. There was some support for the failure to treat: apparently, some students had failed to respond because of problems with cell phone numbers. However, the responses we got from never-engaged students indicated that many of the students who never texted back to their advisers were, in fact, reading the messages. Most of these previously unresponsive students reported that they were planning to go to college in the Fall, suggesting that the program content was relevant to their postsecondary plan. This group posed numerous questions about applications and financial aid in their texts, indicating that they were planning to go to college and did not have ready access to other sources of information and assistance.

On the other hand, a minority of students reported that they did not need DIMES

because they had other sources of support. Some found the flow of messages annoying; others reported that the message topics were mistimed. Some seniors were too busy or insufficiently focused on college tasks to reply. A few students were still confused about what the program entailed and who was texting them, having forgotten that they signed up to participate. Even after more than a year in the program, a group of respondents persisted in the misconception that the advising was entirely automated and that they were texting with a robot. Only a few students said they failed to respond because they were not planning to go to college.

The positive overall results from the end-of-program evaluation queries must be considered alongside other measures of DIMES program impact and in recognition of limitations in the quality of the sample. According to quantitative analyses reported elsewhere (Avery et al., 2020), the DIMES intervention did not make an overall impact: treatment and control groups did not have significantly different college enrollment outcomes. Engagement in the program among students who signed up for advising was relatively low, even among those who texted back to their advisor at least once over the 15 months of DIMES (Avery et al., 2020). Approximately a quarter of the treatment group students never returned a text. It is important to reiterate that the 3577 students who answered the end-of-program survey constituted a small sample that was almost certainly unrepresentative of the full group of treatment group members. Even though the DIMES program was ending and the year's college process was effectively completed, roughly half of the responding students responded to our request by texting back with their own advising questions instead of answering our evaluation query. It is highly likely, therefore, that the respondent group included an overrepresentation of treatment group members who still needed help. Another potentially overrepresented group were advisees who texted back because they had found advising helpful or because they had experienced a warm relationship with their advisor over the course of DIMES.

A related important finding has to do with response rates in DIMES. Characterizing the student experience of virtual advising requires obtaining representative samples of students that can be generalized to the population of intervention participants. Unfortunately this ideal is currently unobtainable, except perhaps in programs that require student evaluations as a condition of receiving funding, offer a significant incentive, or award an educational credential. Many college assistance programs struggle to enroll students who are invited to participate (Bettinger et al., 2012; Gurantz, 2018). Among students who do take up the invitation to receive advising, the amount of engagement with their advisors is variable and generally quite low (Page et al., 2020). Typical student response mechanisms, like web-based surveys, suffer from low response rates (Fosnacht et al., 2017; Lin et al., 2017). Non-response for surveys and attrition from

longitudinal studies is not random: underrepresented and struggling students are the least likely to respond to evaluation queries or to remain in repeated measures studies (Kelfve et al., 2017; Standish & Umbach, 2019). In the case of DIMES, the data set did not allow us to analyze the demographic or engagement characteristics of the participants who responded to the final message. The 3500 DIMES participants who did answer the evaluation queries at the end of the program likely include an over-representation of students who had established a good relationship with their advisors and students who still needed help or had questions. Interview and focus group samples, like qualitative samples in general, are too small to make statistically sound inferences about population groups. Like the widespread problem of low enrollment ("take -up") rates in college advising programs, there is currently no good answer to the question of how to induce students to respond to requests for evaluation data.

Despite the null results in the overall DIMES program and limitations in the sample, the student evaluation data are still valuable. Although results should be understood as tentative, the topics and patterns in this group constitute the first direct empirical evidence about how students experience text-messaging college interventions. These results can be tested in other interventions and used to improve program design. Carrying out qualitative studies that look inside the black box of text-message programs is particularly important because DIMES is one of several recent texting interventions that have shown disappointing outcomes (Bird et al., 2019). It is too soon to abandon the effort to deliver affordable college and financial aid advising at scale, however. In particular, the period of the COVID-19 pandemic has highlighted the need for college access counselors and organizations to use virtual and text message outreach to students.

Several findings are particularly important to highlight, study further, and integrate into future advising programs. First is the predominance of financial aid as a topic of the evaluation responses and student advising questions. This finding corresponds with a rigorous text-mining analysis of the entire corpus of DIMES student text messages (Arnold et al., 2020). The organization that delivered the advising, uAspire, specializes in college affordability. This focus might have affected the heavy representation of financial issues in student texts. However Fesler (2020) also found that text messaging engaged students most productively when concerning financial aid. Low-income students and their families are keenly and centrally concerned with how to pay for college. Financial issues span the entire college process, from the decision about whether and where a family can afford to apply to how to pay the first college bill and buy textbooks after being admitted. These concerns might lead students to accept the offer of convenient help for individual financial aid issues and questions in completing forms and tasks. It is highly unlikely that a texting program that offers

only financial aid assistance will be effective, however, given the interconnection of financial tasks and decisions with entrance examinations, college lists, applications, and enrollment choices. It is therefore vital to design and test affordable, scalable interventions such as DIMES that offer comprehensive, sustained support to students.

A second large finding has to do with the relative effectiveness of text-message advising across different types of college issues and tasks. Financial aid is a topic that lends itself to the kind of concrete information and reminders of specific actions and deadlines that suit text-message communications. College testing, such as the SAT or ACT, is another concrete topic that seems particularly well-suited to advising through text messages. College entrance examinations did not come up in the student responses about program effects, however, possibly because advising on this topic happened at the beginning of DIMES up to a year before we collected evaluation data. Better timed for our evaluation request were matriculation issues such as housing, course registration, orientation, and finances. Students in the final message flow brought up these focused matriculation topics, again suggesting that text messaging can be effective in communicating information and assisting students with discrete, concrete topics and tasks.

"Our findings raise the hypothesis that text messaging is best suited to providing information and assistance focused on financial aid and other topics requiring specific information and concrete tasks."

The relative absence of comments about DIMES effects on college choice corresponds with what Fesler (2020) found in her study of college advising text messages. It appears likely that some aspects of college choice are difficult to address with text messaging. As a focus group student told us, considering whether and where to apply to college might be topics that require extended, face-to-face conversations. Complicated financial and family issues might also be counseling issues that are poorly suited to text messaging. Similarly, sorting out admission offers alongside the ramifications of financial aid awards might be difficult discussions to conduct over text messages. In support of this inference, there was a drop-off in DIMES student responses in May and June at the point in the admission cycle where college admission and financial aid offers were complete.

Our findings raise the hypothesis that text messaging is best suited to providing information and assistance focused on financial aid and other topics requiring specific information and concrete tasks. The kinds of counseling interactions that appear to be needed for larger discussions of students'

goals, decisions, and personal situations are still necessary, however. Interventions like DIMES that are delivered solely by text message, this interpretation implies, might be more effective if they are modified to include some aspects of in-person or technologically-mediated face-to-face discussion. This possibility is supported by the findings of other college intervention studies, in which researchers found that only in-person treatment conditions produced impacts on college enrollment (Bettinger et al., 2012; Carrell & Sacerdote, 2017).

A third large conclusion from our analysis relates to lessons about the various sources of messiness in conducting large-scale, virtual interventions such as DIMES. To be effective, advising needs to deliver the intended treatment to students who need it. Responses from our queries indicated that some program messages had been going to incorrect cell phone numbers. It is important to acknowledge that an unknown number of students in texting programs will not receive the intended treatment. It is probably impossible to solve the problem of incorrect cell phone numbers or to measure the magnitude of the gap between treatment and intent-to-treat. It is likewise difficult to know which students in a large-scale intervention need advising and which are already well-served with family and school support. This was clear from the range of available college guidance sources reported by our focus group participants as well as text-message respondents.

It is also important to provide treatment at the time that students can use it effectively. DIMES advisees suggested that the program begin earlier. There is mixed evidence about the effects of timing of college advising interventions for high school students, however (Bird et al., 2019; Smith, 2018; Sullivan et al., 2019). As our results show, students pursue different timetables within the broad requirements of the college admission cycle.

Setting the size of caseloads so that advisors can really get to know their advisees' situations and individualize assistance would be an avenue to minimizing all of these sources of messiness. This would raise the expense of text-message college advising programs, however. And no texting intervention can fully overcome students choosing not to respond because they are busy or avoiding working on college tasks.

This investigation shows the difficulty of studying students' experience in remotely-delivered interventions. High school seniors like those in our population are unlikely to respond to survey questions, even when embedded in the existing texting mode with their own advisor. Despite a generous incentive, very few students agreed to participate in one of our online focus groups. Achieving a high response rate would seem to require some sort of high-stakes requirement, such as a high school exit interview or scholarship requirement. The timing of data collection within the college application cycle

will affect what issues students bring up. The potential to muddy the advising relationship by posing evaluation queries in the middle of advising is a problem, however, and is the reason we collected these data at the very end of the DIMES program. More studies are needed that explore innovative ways to study the experiences of texting program participants that will yield representative samples and longitudinal data. Future research should also examine associations between students' experiences in virtual advising campaigns by demographic and engagement factors, analyses that the DIMES dataset did not allow.

Our study also holds implications for designing an effective text-messaging program. It is vital, we discovered, to acculturate students at the beginning of the program. Such orientation should include setting expectations for the purpose of the program and the roles of the student and advisor. Introductions and early communications should be structured to make it clear that the program is not automated, establishing that students are talking to a human being and not a computer. This can be done with informal language and relationship building. Introductions might include a video of the advisor or an initial phone call or video chat. Similarly, advising would almost certainly be more effective if the tasks and timeline were entirely individualized. School counselors, parents, or teachers might be effective allies in endorsing the program to students, reminding them to text their advisor, and intervening when students stop engaging. Holding some conversations by audio or video, involving parents or school staff, and avoiding automation, would require small advising caseloads, however, which would increase the time and cost of advising. In another potentially worthwhile model, organizations can continue text-message advising after students begin college.

Conclusion

This study contributes to understanding how the increasingly popular text-messaging mode of college counseling functions for participants and what students need from this type of virtual advising. DIMES is one of the most ambitious such interventions to date. Students' reports of their experience in the program provide potential explanations for the mixed results that are beginning to be reported for texting programs (Bird et al., 2019; Gurantz et al., in press; Phillips & Reber, 2019) and suggest implications for more effective designs. Programs that use text messaging exclusively or in tandem with other forms of communication are worth pursuing. Lessons from DIMES can inform the design of future large-scale intervention models in which students will be induced to stay in contact with an advisor who can provide tailored assistance throughout the complex process of choosing, applying, and paying for college. uAspire and other organizations are already making changes in texting programs. With such improvements, more students will be able to establish a

sustained relationship with a college advisor that gives them the concrete and emotional support they need. As one DIMES student wrote to their advisor: "i'm okay, after this long run with you, i made it to college, wish me luck in the real world…"

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