Connecting Community College Students to Non-Tuition Supports During the COVID-19 Pandemic

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The COVID-19 pandemic had a substantial impact on American higher education, particularly on community colleges where enrollment declined by 8 percent from 2019 to 2022 (National Student Clearinghouse, 2023). Instruction often changed modality, many students lost jobs, and staff members often struggled to meet students' pandemic-related needs (Brown, 2020). This exacerbated an already difficult situation; according to nationally representative data about one in four community college students experiences food insecurity and/or homelessness while in school (Goldrick-Rab, 2023). Housing insecurity (i.e., trouble paying rent and utilities) affects as many as half of all community college students (Broton, 2020; Crutchfield & Maguire, 2018; Goldrick-Rab et al., 2020). With average out-of-pocket costs for a year of community college (after grants and scholarships) exceeding $15,000 per year, providing supports to address students' basic needs can help them stay enrolled, healthy, and well (Broton et al., 2023; Ma et al., 2023). But to be effective, those services need to consider students' stress and mental health as well as institutional resource constraints (Hodara et al., 2023a; Riggs & Hodara, 2024).

Even before the pandemic, community colleges were trying to connect students with several types of non-tuition support, including small-dollar emergency aid funds and advisors who could help access programs like unemployment insurance or the Supplemental Nutrition Assistance Program (SNAP) (Deal, Lewis Valentine, Price, Goldrick-Rab & Looker, 2020; Daugherty, Johnston, & Berglund, 2020; Freudenberg, Goldrick-Rab & Poppendieck, 2019). The pandemic accelerated this outreach. Beginning in the latter half of 2020 the federal government funded emergency aid at all community colleges for the first time, and philanthropy increased its support too (Congressional Research Service, 2020; Hall, 2023; Thurston, 2023). Moreover, in early 2021 eligibility for public benefits expanded for college students, making it easier for students to qualify.

Both during and before the pandemic, however, those supports were notably under-utilized, even among students with evident financial need. For example, a fall 2020 survey at community colleges nationwide found that while 61% of students experienced basic needs insecurity, almost half did not receive any public assistance and nearly 80% did not receive emergency aid (The Hope Center, 2021a). An analysis of administrative data conducted on a smaller institutional sample during the same period found even larger utilization gaps (Riggs and Hodara, 2024).

According to that fall 2020 survey, a lack of information about these programs was the leading reason why students did not connect with support, a finding since echoed in several other studies (Broton et al., 2022; Community College League of California, 2023; Community College Survey of Student Engagement, 2022; Valentine & Deal, 2023). Two-thirds of students had not heard of an emergency aid program at their institution, almost three-fourths mistakenly thought they were ineligible for public benefits, and half did not know public assistance programs existed or how to apply. In addition, stress, anxiety, and depression were widespread. A smaller but substantial number of students (about one in four) said they were embarrassed to apply for help (The Hope Center, 2021a).

Many community college programs rely on word-of-mouth from staff or faculty and other informal networks as their primary mechanism of outreach (Garcia et al., 2014; Small, 2009). While these are a common source of information, they are hampered by the quality and quantity of information available in the network, which is often incomplete or inequitably dispersed (Ainsworth et al., 2020; Bettinger et al., 2012; Cohodes et al., 2022). Moreover, several studies suggest that those most stigmatized for seeking help are least likely to use

informal networks, hampering the efficacy of this approach for those who are structurally marginalized (Pattyn et al., 2014; Snowden, 1998).

There is some evidence that in the community college setting it is more both important and more challenging to disseminate information effectively and broadly to students (Goldrick-Rab, 2010; Rosenbaum et al., 2006; Crutchfield et al., 2020b; Goldrick-Rab et al., 2020; Henry, 2020; Stebleton et al., 2020). Information requirements are high because of the wide range of courses, services, and contexts available to students to align with their varied needs (Bailey et al., 2015). Yet budgets for advising, communications and marketing, and other types of navigational support are much smaller on a per-student basis at community colleges as compared to most other higher education institutions (Kahlenberg, 2019). Some means by which community colleges distribute information can also exacerbate inequality, for example distribution through word-of-mouth within constrained social networks (Hoxby & Turner, 2013; Wiswall & Zafar, 2015; Bettinger et al., 2012; Bhargava & Manoli, 2015; Page, Castleman, & Meyer, 2020). Moreover, most community college students navigate many competing priorities for their attention, experience time poverty, and are unlikely to reside on campus where information is most often distributed (Conway et al., 2021; Goldrick-Rab, 2016). Yet, since many also lack college-experienced parents, friends, and family to guide them, reliable and timely information about college supports can be particularly helpful (Longwell-Grice & Longwell-Grice, 2023; Nin & Keeton, 2019).

This study examines the impact of centralized text messaging that aimed to alert community college students to available non-tuition supports during the pandemic and urge them to apply. The setting is a large urban community college district in Texas. Previous “nudge-like” studies have focused on the content or timing of text message interventions and are primarily

aimed at increasing financial aid or registration take-up. This study extends that literature by considering their efficacy for the use of non-tuition related supports, focusing on two popular types—emergency aid and college navigators. We also consider the role of framing, particularly specifically defined to reduced stigma. We compare two messaging strategies (stigma-reducing and information-only) aimed at improving the framing by which practitioners reach out to students. In addition, since targeting messages to specific groups of students is an option for improving efficacy, we examine whether the effects of texting varied for different groups of students.

Theoretical Framework and Prior Research

A lack of information and feelings of shame and stigma at receiving or taking up help are core challenges when it comes to connecting community college students to non-tuition supports. This paper tests a strategy to overcome these challenges by communicating campus resources to students using nudges drawing on models and insights from sociology, psychology, and economics.

Students will not use available supports if they are unaware of them. Economic theory suggests that individuals cannot act rationally, in this case by seeking support, without access to relevant and accurate information (Simon, 1955). While disseminating information is a common problem for many safety net programs, there are two challenges with community colleges' traditional approaches to outreach (i.e., word-of-mouth, physical mailings, or email). First, nearly all community college students commute to campus and many attend part-time. In turn, given the smaller amount of time they spend on campus (compared to full-time, residential students) they have less knowledge of on-campus resources from word-of-mouth or on-campus postings (AACC, 2016). Second, some students do not rely on their institutional email regularly,

potentially making emails less effective at disseminating information (Ha et al., 2018), though they may do so more in small rural community colleges (Goldrick-Rab et al., 2021).

Nudging

This study extends past research on nudging, an approach to addressing low utilization rates of supports by providing information on and/or encouragement to take up services. Higher education studies have centered on nudging for traditional financial aid, study skills, and advising and find mixed to null results on academic outcomes (Bird et al., 2021; Castleman & Page, 2016; Page, Castleman, & Meyer, 2020; Page, Lee, & Gehlbach, 2020; Oreopoulos & Petronijevic, 2019). For example, a study of a national dataset of approximately 10,000 students found nudging toward Free Application for Federal Student Aid (FAFSA) re-filing improved re-filing rates but had no discernable impact on actual aid or academic outcomes (Page et al., 2019). Another study, which took place at a four-year public university, identified positive effects of phone-based outreach from a call center on rates of on-time FAFSA re-filing for continuing students, slightly increasing the amount of aid (primarily state aid) that students received. However, the increase in aid did not increase retention to the next year of college (Cannon & Goldrick-Rab, 2015).

Our study differs from prior research in several important ways. We focus on a new and fast-growing area of community college supports which aim to help students with non-tuition expenses to address basic needs insecurity. Emergency aid, unlike traditional financial aid, is designed to operate with much less administrative burden and hassle for students (Bell et al., 2023). College navigators provide access to public assistance and related social services, which in the past were not resources tapped by colleges (Duke-Benfield & Saunders, 2017; Hodara et al., 2023b). Studies show that students welcome the growth of these supports on campus and feel

that colleges are exhibiting care by providing them, strengthening their sense of belonging (Goldrick-Rab & Cady, 2018; Strayhorn, 2023). However, some students hesitate to use public assistance programs due to a sense of stigma and/or shame, barriers which need to be overcome to help them receive support (Broton et al., 2022; Crutchfield et al., 2020a; Peterson et al., 2022).

We build on a handful of prior studies that suggest nudging may be particularly helpful in this context. One, conducted pre-pandemic in a small rural community college, nudged students to use a centrally located basic needs center on campus and as a result more than doubled students' use of that key support. In turn that translated into at least some academic gains: students in developmental education (a key stumbling block on the road to completion) were about 20% more likely to pass their courses and move on to college-credit-bearing coursework (Goldrick-Rab et al., 2021). In addition, a study examining a nudging campaign at Western Michigan University employed text messages to encourage students to use food pantries and found that increased retention rates by 12 percentage points, easing food insecurity (Collier et al., 2021).

Some students may benefit more than others from texting, depending on their needs, access to information, pre-existing level of resource utilization, and so on. For example, many scholars find Black and Hispanic/Latino men experience disproportionate amounts of shame and stigma when seeking help (Kalmuss & Austrian, 2010; Walton & Cohen, 2007, 2011); men in general, have different help-seeking behaviors than women (Courtenay, 2000; Levant & Wimer, 2014; Smith et al., 2006) and/or help-seeking empowerment may vary based on a student's current and previous experiences securing financial resources for their education (Castleman & Page, 2013; Goldrick-Rab, 2016, Langhout et al., 2009).

It is also possible that students respond to texting differently based on their financial needs. However, institutions of higher education use a framework for assessing need that brings several limitations to analyses of this issue. The standard assessment relies on students' EFC, computed using the Free Application for Student Financial Assistance (FAFSA). Firstly, this requires the filing of a FAFSA which is notably difficult because of the administrative hurdles (Dynarski & Wiederspan, 2012; Goldrick-Rab, 2016). Next, the value of the EFC is typically truncated at zero, even though for the most financially marginalized students it may be less than zero (Conroy et al., 2021). In a recent project, The Hope Center explored the use of negative EFCs with several colleges in Texas and determined that approximately 40% of students have an EFC *below* zero with a range of $-4,005 to $1,176 (The Hope Center, 2021b). This study uses that calculation to allow for a comparison between texting effects for students with a "true" EFC of $0 and those for students with a negative EFC.

Reducing Shame and Stigma

In addition to how students learn about the availability of support services, they must want to access these services and feel good about themselves and how they are seen in doing so Thus, the framing of support services may also affect how students take these services up.

Past research finds that students can fail to take up learning resources when these resources seem to come with an implicit negative judgment (Yeager et al., 2014); shame and stigma can also dissuade people from accessing public welfare benefits (Hall et al., 2014). In interpersonal contexts, sometimes the most effective help is invisible to recipients, for this invisibility mitigates such barriers (Bolger et al., 2000). If students in community college feel ashamed, stigmatized, or judged about using available supports, they are unlikely to enroll in social insurance type programs.

Community colleges often deploy cash transfers as "emergency aid." Yet standard messaging about this support may risk conveying that potential beneficiaries are deficient or helpless (Crutchfield et al., 2020b; Goldrick-Rab et al., 2021). Such representations directly harm students' confidence and ability to sustain their efforts in demanding academic environments (Bauer et al., 2021; Hernandez et al., 2021).

Yet such aid need not be represented as a handout to compensate for the deficiency or helpless of the beneficiary. A revealing study of residents living in informal settlements in Nairobi, Kenya showed that it is possible to represent aid in empowering ways (Thomas et al., 2020). Participants received a small cash payment equivalent to two days' wages. For some residents, this payment was attributed to the "Poverty Alleviation Organization" whose goal involved "reducing poverty and helping the poor meet their basic needs," a typical representation of aid. For others, the payment was attributed to the "Individual Empowerment Organization" or the "Community Empowerment Organization" whose goals, respectively, were to enable people "to pursue personal goals and become more financially independent" and "to support those they care about and help communities grow together." The representations replaced labels of recipients as poor by highlighting their abilities and potential for growth. Both led residents to choose to watch more videos teaching business skills important to their work (e.g., how to calculate a profit) rather than leisure videos (e.g., soccer highlights). They also led recipients to feel greater self-efficacy to accomplish life goals and to anticipate greater improvement in their social standing over the next two years.

Table 1 outlines five principles or tools for how to communicate "bad" events in ways that forestall pejorative interpretations (Walton & Brady, 2020). For example, the anti-poverty cash aid interventions discussed above foregrounded Principles 1 (prevent negative labels) and 5

(recognize opportunities). The present study incorporated these lessons in designing the messaging for one of the two nudge versions. We describe the resulting messages as "psychologically attuned," for they are sensitive to the predictable stigmatizing questions that can arise when students are offered help. As illustrated in Table 2, these messages are often longer, more specific, and different in tone than information-only messages. We see these elements as essential to the narrative they convey; however, future research can examine whether these elements, on their own, contribute to any differences in effects.

<<Table 1 about here>>

The Present Study

We tested the efficacy of texting in a large urban community college with a substantial and diverse sample, texting for multiple types of supports, and an examination of message framing to reduces stigma and shame. We used the design principles in Table 1 and relevant past research to develop those messages. This study also takes place during the pandemic when students especially needed help. The following research questions were examined:

(1) Does different text messaging (information-only or "attuned" framing) affect students' sense of belonging with their institution or empowerment toward help-seeking behaviors?

(2) Do texting about non-tuition support programs increase community college students' use of non-tuition support programs?

(3) Do the effects of texts on resource utilization differ by the message framing?

(4) Do the effects of texts on resource utilization vary by students' demographic characteristics (gender, race/ethnicity) or Expected Family Contribution?

(5) Do texts affect academic outcomes such as retention and degree completion?

We first examined whether different text message framing impacted students' sense of belonging at their institution or their self-empowerment in a non-causal framework. Specifically, we explored whether the two types of messages (informational vs. attuned) improve students' utilization of key resources when compared to a third control group of students that did not receive texts. We also examined whether increased resource utilization translated into improved academic outcomes.

Setting

Dallas College, one of the largest community colleges in Texas, enrolls a racially, ethnically, and educationally diverse group of approximately 80,000 students who have substantial non-tuition needs. While tuition at Dallas College is low compared to other colleges and universities in the country, the cost of living is high. Among the country's 20 largest metropolitan areas, at the time of this study Dallas was the fifth most expensive (Manfield, 2020).

Surveys of Dallas College students conducted before the pandemic (in Fall 2016 and 2019) found that 58% of respondents experienced basic needs insecurity (Wisconsin HOPE Lab, 2017). Despite an increase in non-tuition supports offered by Dallas College over this period, basic needs insecurity did not markedly decline. One reason might be that just 31% of students experiencing basic needs insecurity used campus supports: only 18% of students used the campus food pantry, just 5% accessed help obtaining SNAP, and only 1% received emergency aid.

This study took place during the first term following the start of the COVID-19 pandemic. In addition, before program implementation and at the start of the pandemic, Dallas County Community College District comprised seven individual colleges. These colleges

merged to become Dallas College at the start of the 2020-21 academic year, which included the centralization of resources across the various campuses. This included a variety of supports, including emergency aid delivered on the Edquity platform (now called Beam) and staff ("College Navigators") to help students connect to public benefits programs as well as other resources for food and housing. These supports were available to all students and were advertised using Dallas College's standard marketing practices (e-mail, flyers, newsletters).

Intervention

To enhance existing marketing practices and improve resource utilization, we designed text message nudges, which Dallas College then delivered to students using the Signal Vine platform.[5] Prior to sending the messages broadly, we conducted usability testing through focus groups with Dallas College students to garner concrete feedback on content, wording, and timing. For example, students suggested providing more information in a single text than less to avoid the text looking like spam or feeling impersonal.

Table 2 offers an example of the two types of text messages: one only provided information about the resource while the other focused on empowering students and reducing stigma, thus offering "attuned" message about the resource. The specific resource named in the texts varied over time, emphasizing emergency aid and the availability of college navigators as well as financial aid supports. Students were individually randomized to receive texts of a specific type or not receive texts, and then received those same types of texts (or no texts) during the study.

<<Table 2 about here>>

Texts went to students once per week beginning in mid-September 2020 and continued through spring 2021; in total 30 texts were sent over 31 weeks. The exact dates and times that

texts were sent was coordinated to ensure that the on-campus Dallas College Navigator office was prepared for an increase in students reaching out for help. Emergency aid was available 24/7 to students and could accommodate shifts in volume through the app. All texts were attributed to "Alex with Dallas College" and included consistent links to resources.

Texts were sent to students who were deemed likely to benefit from additional supports for their non-academic expenses. Specifically, eligible students were enrolled in Dallas College but were not in a dual-credit program (mainly excluding those under 18), filed a FAFSA or Texas Application for Financial State Aid, and had an Expected Family Contribution that put them at 200% or less of the Pell eligibility threshold (among those who filed FAFSA). In other words, this was a verifiably moderate- to low-income community college student population. About 18,000 students met the eligibility criteria for this study.

Within-Sample Psychological Experiment

To better understand the effects of attuned versus informational messaging on students' sense of empowerment and belonging we surveyed a random subsample of students eligible for the texts in late 2020 (see Experimental Sample section for more detail). This sample included 1,500 students from each of the two text message groups and 1,000 students from the non-text message control group for a total of 4,000 students. To encourage participation, students received one email and four texts, and incentives were provided to all students who participated in the survey: $15 for the text-message groups and $20 for the control group.[2] The final response rate was 33% for students who were text messaged and 43% for the control group.

Across study groups, treated students were provided information-only and attuned messages for four campus-based resources: emergency aid, financial aid, public benefits, and campus food and housing. The survey included questions about belongingness, empowerment,

and perceptions of support at Dallas College in response to each message. (e.g., "How respected would you feel by this text?")[1] Students were asked to provide their responses on five-point Likert scales (*Not at all*, *Slightly*, *Moderately*, *Very*, and *Extremely*). Table 3 depicts the results. Overall, as expected the attuned messages produced greater feelings of belongingness and connection to Dallas College than information-only messages.

However, these relationships varied somewhat by the specific resources referenced. Attuned messages produced more positive psychological effects than information-only messages when referencing public benefits, food, and housing assistance. However, differences were attenuated when messages referenced emergency and financial aid resources, possible because these services may be less stigmatized.

<<Table 3 about here>>

Given the limited, though statistically significant, variation from different text messages, there may be minimal differences in the impact of nudging on service uptake based on the type of text messaging. However, as shown in Table 3, there is reason to believe that these different types of messaging may have more of an influence on students' sense of empowerment and belonging when referring to certain types of supports.

Analytic Framework

We used a causal framework to examine the impact of nudging on utilization outcomes and pre-registered the analytic plan with Open Science Framework (see https://osf.io/9fap3). Approximately 18,000 students met the eligibility criteria and half were assigned to nudging while the other half were not and serve as a comparison group. Fifty percent of the 9,000 students who were sent texts were sent information-only messages while the other half were sent

attuned messages. Comparisons were analyzed across treatment and control groups as well as between types of nudging within the treatment group.

The three resulting groups of students, two texted and one not texted, were equivalent on observable characteristics before the intervention began (Table 4). This means that all subsequent differences may be appropriately attributed to texting. The students are predominantly female, Hispanic/Latinx or Black, approximately 26 years old, with an average Expected Family Contribution of $1,725. Almost two-thirds of students were enrolled part-time, held an average GPA of 2.87, and possessed nearly 30 credits as of fall 2020.

We estimated program impacts using the following equation:

$$(1) \qquad Y_i = \alpha + \beta * Texted_i + X_i + \varepsilon_i$$

where y_i refers to an outcome for student *i*; $Texted_i$ indicates whether the students received a text (information only or stigma-reducing) rather than the group not texted; X_i is an indicator for student-level covariates (e.g., race/ethnicity); and ε_i is a student-specific random error term. When analyzing subgroups, we included an additional covariate or set of covariates to examine subgroup-specific impacts (e.g., Nudged x Male). We use both linear and logistic regression. The results are not sensitive to the choice of modeling.

The coefficient beta (β) in Equation (1) represents the causal effect of being encouraged to seek out non-tuition supports on the outcome measure "Y_i" (e.g., apply for emergency aid). This is known as an intent-to-treat (ITT) estimate and represents an important policy parameter. Because information and/or encouragement interventions are relatively low-cost (compared to providing more services), even small effects can be meaningful (Kraft, 2020).

<<Table 4 about here>>

Implementation and Engagement

We assessed program implementation two ways: rates of opt-out from text messages and website activity. Overall, opt-outs of receiving text messages are low; just 7% of students in the nudged groups opted out during the fall 2020 term, and only 4% opted out during the winter/spring 2021 term. Opt-out rates did not vary by type of text message sent.

Using data from the resource links provided in each text we examined the utilization of the two resources that could be tracked with student-level data—emergency aid and college navigators. Figure 2 shows that website activity consistently peaked almost immediately after nudges were sent (denoted by vertical lines) and dissipated as the week progressed. Notably, activity was higher at the beginning of each term and the emergency aid link was by far the most utilized resource.

<<Figure 1 about here>>

Average Impacts of Texting on Use of Supports

We next examine whether texting increases students' emergency aid applications or outreach to college navigators.[3] Table 5 shows the average impacts, revealing that texted students were more likely to access both resources. Texting increased the rates at which students apply for emergency aid from approximately 31% to 36% ($p<0.001$), a 15% relative improvement. Texting also increased the rates at which students contacted college navigators from 3.04% to 3.65% ($p<0.05$). While that is a 20% relative improvement, most students did not contact a navigator and the absolute magnitude of those results are small. Those results do not differ by the type of messaging in the text.

In summary, we find that while the *type* of text did not affect resource utilization, texting itself had a positive impact on students' use of resources.

<<Table 5 about here>>

Heterogeneous Impacts of Texting on Use of Supports

While we find no differences in overall student responsiveness according to the text message type, different messages may have differential impacts for specific groups of students. We conducted two types of heterogeneity analyses. The first examined differences by students' gender, race/ethnicity, and age. The second examined differences by students' financial need.

Descriptively we found differences among the types of students that applied for emergency aid and/or contacted college navigators. Moreover, we identified some differential responses among students to the texting (Table 6).

In comparison to Latinx students, both Black and White students were more likely to apply for emergency aid. Yet texting did not change their use of that support, while it boosted use among Latinx students, reducing that gap. On the other hand, White students were less likely than Latinx students to use college navigators, but texting improved their usage rates – and it did so for Black students as well.

In comparison to male-identified students, female-identified students were much more likely to apply for emergency aid and seek support from college navigators. Texting had a substantial positive effect only for female-identified students, improving the odds that they would apply for emergency aid and/or reach out to college navigators, while it did not improve use among male-identified students. Thus, it increased the gender gap.

Non-tuition supports may be especially important for students with greater financial need, and indeed the differences in responsiveness to texting is most pronounced based on students' EFC. Students with negative EFCs were more likely emergency aid and seek support from a college navigator, likely because they have particularly substantial financial needs for that support. However, texting boosted the odds of emergency aid applications among students with

zero or positive EFCs while reducing the odds of applications among students with negative EFCs. Indeed, this group is the only one that incurred negative effects from texting.

<<Table 6 about here>>

Impacts of Texting on Academic Outcomes

Next, we examine the impact of texts on academic outcomes. We explore how texting students to access emergency aid impacts credit attainment (using a credits attempted-to-completed ratio), GPA, retention, and completion across three terms. Importantly, the first two terms examined are measured concurrently with the receipt of the texts allowing us to estimate an immediate impact if one is present.[4]

The results show relatively small differences, and they are not statistically different from zero. We find no impacts of texting on the percentage of credits completed, GPA, subsequent enrollment, or eventual degree completion, and this is true both during and after the texting period. We also considered whether there might be impacts for some subgroups of students and not others. Tests for heterogeneous impacts (not shown but available on request) did not provide evidence for that hypothesis.

<<Table 7 about here>>

Discussion and Conclusion

Community colleges are actively seeking ways to connect students to non-tuition supports to help them succeed in college. New federal investments in higher education offered during the pandemic provided additional resources, and some states are now investing in their own emergency aid programs, setting up basic needs centers, hiring resource navigators, and so on. But for students to benefit from those supports, they must use them—and utilization rates often lag rates of need.

This study demonstrates that texting students can increase students' use of emergency aid and college navigators, suggesting that information remains a barrier to utilization and proactively providing additional information can help lower that barrier, at least for some. While the absolute magnitude of impacts may be modest, given the low costs of texting, they may be cost-effective. However, there are several limitations of the present study to keep in mind when developing new lines of inquiry.

First, we examined text outreach conducted the pandemic when students (and college staff) were experiencing high level of stress, receiving frequent electronic communications from their college while also trying to attend online courses, and being nudged to use virtual services. Prior studies, some of which had bigger effects, were conducted prior to the pandemic and students were urged to use services on campus, offered by staff with whom they were familiar.

Second, we have limited information about how students perceived the different message framings, and more information from some groups than others. Moreover, we did not capture student responses to texts in ways that would facilitate textual analysis of differential responses to framing. While the observed effects were in the predicted directions, these factors limit our ability to draw strong conclusions about how students perceived the different messages. Future research might capture students' *in vivo* responses to the messages and analyze them via textual analysis or validate the messages in a separate pilot study.

We are particularly struck by the differences in responses to texting based on EFC and urge more investigation into the finding suggesting that texting students with negative EFCs may be deterred them from applying for emergency aid. (The EFC was recently revised into the Student Aid Index (SAI) and negative values are being shared with colleges and students.) Had we observed positive effects for students with higher EFCs, but not observed negative effects for

other students, it might have been because emergency aid may be more important to students who receive relatively *less* grant support in their financial aid packages and those who are less likely to qualify for public benefits programs, leaving them more reliant on other financial supports such as work. For example, students with a $5,000 EFC will receive a much smaller Pell grant and are less likely to qualify for SNAP than a student with a negative EFC (which as traditionally computed would tend to show up as a $0 EFC and receive a full Pell). As work disappeared during the pandemic, individuals with relatively higher EFCs might be especially helped by a reminder to seek emergency aid. However, this does not help us make sense of the apparent negative impacts from reminding lower EFC students that help is available.

We also lack data to confirm how much emergency aid students received, and what sorts of support college navigators provided, which could help make sense of the lack of academic impacts. The pandemic brought federally funded emergency aid to campus, and broadened access to public assistance programs. At the same time, it did not make it easier for colleges to obtain and/or link data on students' use of those supports to share with evaluators. While we know that a student connected with a navigator or received emergency aid, we do not know anything about the experience they had as a result or whether support was meaningful. It is also possible that not enough time had passed for the improvements in service usage to generate academic returns or that basic needs support needs to be bundled to be effective. However, other studies found that basic needs centers improved retention and/or developmental education pass rates, using meal vouchers improved community college graduation rates, and an experimental study of emergency aid boosted community college persistence (Anderson, 2021; Broton et al., 2023; Goldrick-Rab et al., 2021; What Works Clearinghouse, 2022). This is therefore an important area for continued research. This study was also unable to examine whether using

supports helped students afford college, improve their overall well-being and health, and/or affected them in other ways we cannot observe or examine. Again, these are topics that researchers and practitioners should examine going forward.

Even with these limitations in mind, we believe that this study contributes to a growing literature indicating that it is worthwhile for colleges to invest in proactive outreach to students about non-tuition supports, and this has implications for many areas of institutional programming. Text messages are inexpensive to send and students who can benefit from this support are easily identified using administrative data. Students do not appear unhappy to receive such messages from their colleges; they do not opt out at high rates or send rejecting messages. Moreover, there is value to the psychological outcomes the messages generate—whether students feel respected and valued and connected to their college matters and may be enhanced by attuned messaging.

The modest size of the response to text messaging in this study also suggests that it is important to also invest in additional efforts to support the use of non-tuition supports. For example, it may help reduce the administrative hassles (paperwork, wait time, etc.) students experience when applying for help. This is suggested by prior research (Bell et al., 2023) but we are unable to interrogate in this study whether students who did not use a given resource lacked the time and tools needed to do so. Coordinating outreach about non-tuition supports with financial aid outreach, streamlining eligibility criteria and applications, targeting outreach based on other information about students' use of public assistance and/or financial aid programs, and investing in peer, faculty, and/or institutional cultures of care are additional strategies now being tried by practitioners and deserving of evaluation.

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NOTES

[1] The survey also included questions on experiences with existing supports and basic needs insecurity. However, these serve as contextual information at baseline and are not analyzed in this paper.

[2] Due to low initial response rates one month into fielding the survey (December 2020-January 2021), we added a lottery for an additional $100 for the remaining respondents and adjusted recruitment text accordingly.

[3] Data for use of college navigators is much less complete as it was collected by hand and thus may reflect either a lower usage rate than the Edquity app *or* may simply be a result of missing data in program administration.

[4] The only data for which we can connect utilization to student identifiers is the Edquity app and thus this analysis is limited to use of the Edquity app alone.

[5] Dallas College employed a text-messaging service to send students information and every student has a valid number in their student data that the college regularly verifies.

TABLES

TABLE 1 | ATTUNED MESSAGING: PRINCIPLES FOR REDUCING PERJORATIVE CONSEQUENCES OF "BAD" EVENTS

PRINCIPLE	DESCRIPTION
1. Prevent negative labels	When people experience negative events, they risk labeling themselves in fixed, negative ways or perceiving that others could label them as such. Effective reframings forestall negative labels, and encourage a fundamentally positive view of the self, of factors that led to the bad news (e.g., normal, malleable), and of the person's prospects.
2. Communicate "You're not the only one"	People can think that they are the only one facing a particular challenge. Effective reframings recognize others who have faced the same challenge and describe how they addressed that challenge productively.
3. Recognize specific nonpejorative causes	People can fear that bad things reflect, or could be seen as reflecting, a deficiency (e.g., laziness, stupidity, immorality). Effective reframings acknowledge specific, nonpejorative causes of challenges or setbacks and legitimize these as normal obstacles that arise for many people.
4. Forecast improvement	People can fear that negative events forecast a fixed, negative future. Effective reframings emphasize the possibility of improvement, focus on process, and often represent this process collectively (we're on the same team/I'm not judging you).
5. Recognize opportunities	In some cases, it is possible to represent aspects of the "bad" event as positive, meaningful, or useful, and thus not just as something to be overcome but as a harbinger of or opportunity for growth and improvement.

Source | Adapted from Walton & Brady, 2020.

TABLE 2 | TEXT EXAMPLES

Information-Only Messaging	Attuned Messaging
Hey, this is Alex with Dallas College. If you need extra financial support, check out our emergency grants. Available to students taking 6+credits. You can apply once per semester. Click this link to apply: www.dcccd.edu/emergencyaidtext	Hey, this is Alex with Dallas College. We know many students are facing financial challenges. Whatever situation you face, our emergency grants are intended to help you meet your needs and make progress toward your goals. Available to students taking 6+ credits! You can apply once per semester. Click this link to apply: www.dcccd.edu/emergencyaidtext

TABLE 3 | COMPARISON OF STUDENT PERCEPTIONS OF ATTUNED VS. INFORMATION-ONLY TEXT MESSAGES, BY RESOURCE TYPE

	Public Benefits	Food & Housing Assistance	Financial Aid	Emergency Aid
Feel Respected	n/s	n/s	+	n/s
Feel Empowered	+ +	+ +	++	n/s
Feel Motivated	+ +	+	n/s	n/s
Feel Understood	+ +	++	n/s	n/s
Feel Cared For	+	n/s	n/s	n/s
Feel Supported	n/s	n/s	n/s	n/s
Feel Connected to DCCCD	+ +	n/s	n/s	n/s

Source | Data from survey fielded to sample of eligible students.

Notes | Where t-test comparisons between categories did not meet a $p<0.10$ bar, responses are labeled n/s. Where perceptions of attuned messages were more positive than information-only messages: + at $p<0.10$, and ++ at $p<0.05$ significance levels.

TABLE 4 | BASELINE CHARACTERISTICS AMONG ELIGIBLE STUDENTS, BY STUDY GROUP

	Info-Only Texts (n=4,500)		Attuned Texts (n=4,500)		Any Texts (n=9,000)		Control (n=9,287)		Diff: Control vs Any	
Category	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**ES**	**N**
Gender Identity (%)										
Female	68.08	0.47	67.13	0.47	68.99	0.47	67.62	0.46	0.04	12,493
Race/Ethnicity (%)										
African American/Black	29.10	0.45	29.30	0.46	29.06	0.45	29.04	0.45	0.00	5,313
Hispanic/Latinx	44.29	0.50	44.34	0.50	44.03	0.50	44.53	0.50	0.01	8,097
Expected Family Contribution ($)										
EFC	1,719	2,884	1,699	2,846	1,709	2,865	1,741	2,927	0.01	16,048
Negative EFC	-3,396	9,712	-3,584	11,914	-3,490	10,867	-4,063	57,301	0.01	16,048
Transcript Information										
Part-Time	64.84	0.48	64.72	0.48	64.98	0.48	64.76	0.48	0.01	11,736
Cumulative Credits Through June 2020	28.82	26.00	28.77	26.74	28.79	26.37	28.85	26.53	0.00	18,287

Source | Student characteristics provided by Dallas College administrative data.
Notes | Table reports the effect size of difference between treatment and control groups. Effect size is estimated using Hedges G or Cox's Index, as appropriate. Missing FAFSA data due to students who did not fill out an application for the 2020 academic year. Missing GPA data due to students who dropped out of college, records with missing information were imputed with zeros. Percentages may not add up to 100 due to rounding.

TABLE 5 | COMPARISON OF ADJUSTED IMPACTS OF TEXTS ON EMERGENCY AID AND COLLEGE NAVIGATOR ENGAGEMENT RATES, BY STUDY GROUP

	Emergency Aid				College Navigator			
	Ref (avg) (%)	Impact (%)	Standard Error (se)	p-value	Ref (avg) (%)	Impact (%)	Standard Error (se)	p-value
(1) Any Texts vs Control (ref)	31.43	4.86	0.03	0.000	3.04	0.61	0.082	0.022
(2) Attuned vs Info-Only Texts (ref)	34.52	0.81	0.04	0.419	3.41	0.00	0.11	0.999
(3) Attuned Texts vs Control (ref)	31.77	5.26	0.04	0.000	3.09	0.61	0.1	0.067
(4) Info-Only Texts vs Control (ref)	31.77	4.46	0.04	0.000	3.09	0.61	0.1	0.067
N = 18,287								

Source | Data on Dallas College Navigator (DCN) engagement are from DCN case management system where Navigators input student engagements via phone, email, or web referrals. Data on Edquity engagement are based on applications for emergency aid submitted.
Notes | 'Impact' represents log odds based on a logistic regression which controlled for race/ethnicity and FAFSA application status (not equivalent at baseline)

TABLE 6: HETEROGENEITY OF ADJUSTED IMPACTS ON EMERGENCY AID AND COLLEGE NAVIGATOR ENGAGEMENT RATES, BY STUDY GROUP

	Emergency Aid			College Navigators		
Category	**Impact (b)**	**Standard Error (se)**	**p-value**	**Impact (b)**	**Standard Error (se)**	**p-value**
Model 1: Student Gender						
Male	-0.47	0.05	0.000	-0.28	0.14	0.044
Texts x Female (ref)	0.22	0.04	0.000	0.22	0.10	0.023
Texts x Male	0.04	0.07	0.532	-0.10	0.19	0.613
Model 2: Student Race/Ethnicity						
African American / Black	0.84	0.05	0.000	0.03	0.13	0.844
White/Caucasian	0.31	0.07	0.000	-1.12	0.27	0.000
Other	0.33	0.07	0.000	-0.47	0.21	0.027
Texts x Hispanic/Latinx (ref)	0.26	0.05	0.000	-0.06	0.12	0.612
Texts x African American / Black	-0.05	0.08	0.521	0.38	0.18	0.041
Texts x White/Caucasian	-0.16	0.10	0.121	0.82	0.34	0.016
Texts x Other	0.04	0.10	0.692	0.49	0.28	0.084
Model 3: Negative EFC						
EFC < $0	0.96	0.05	0.000	0.53	0.16	0.001
Texts x EFC >= $0 (ref)	0.48	0.06	0.000	0.27	0.18	0.133
Texts x EFC < $0	-0.36	0.07	0.000	-0.03	0.21	0.877

Source | Data were collected by Dallas College staff obtained from Dallas College and from Edquity applications.

Notes | Impacts are log odds modeled using logistic regression, and controlled for student race and ethnicity, and whether the student completed the FAFSA. Other race/ethnicity includes American Indian, Southeast Asian/Pacific Islander, Multi-Racial, International, and Unknown categories. All other missing outcomes were imputed as zero. Where applicable, missing demographic and outcome data were imputed as zero.

TABLE 7 | ADJUSTED IMPACTS OF TEXTING ON ACADEMIC OUTCOMES (ITT)

		Difference Between									
		Control vs Texts					Texted Groups				
		Nudged	Control	Impact (%)	Standard Error (se)	p-value	Attuned	Info-Only	Impact (%)	Standard Error (se)	p-value
Fall 2020											
Credits (%)	Ratio of Attempted to Completed	68.15	68.25	-0.07	0.59	0.903	67.84	68.46	-0.61	0.47	0.606
GPA (%)	3.0 to 4.0	50.97	51.49	-0.48	0.73	0.514	50.93	51.00	-0.05	1.04	0.959
	2.0 to 2.9	18.47	18.39	0.05	0.57	0.925	18.07	18.87	-0.80	0.82	0.328
	Under 2.0	30.57	30.12	0.42	0.68	0.530	31.00	30.13	0.85	0.96	0.376
Degree Persistence and Completion (%)	Enrolled in Next Term	69.86	69.48	0.36	0.68	0.598	70.07	69.64	0.44	0.96	0.648
	Enrolled in Next Term or Completed Degree	72.57	72.46	0.10	0.66	0.882	72.80	72.33	0.49	0.94	0.603
	Cumulative Degree Completion	9.78	9.57	0.24	0.44	0.591	10.16	9.40	0.73	0.63	0.245

		Difference Between									
		Control vs Nudging					Nudged Groups				
		Nudged	Control	Impact (%)	Standard Error (se)	p-value	Attuned	Info Only	Impact (%)	Standard Error (se)	p-value
Spring 2021											
Credits (%)	Ratio of Attempted to Completed	46.72	46.11	0.59	0.68	0.384	46.65	46.79	-0.54	0.83	0.517
GPA (%)	3.0 to 4.0	35.52	34.99	0.53	0.70	0.452	35.80	35.20	-0.56	1.00	0.578
	2.0 to 2.9	12.49	12.42	0.05	0.49	0.912	12.02	12.96	-0.91	0.70	0.193
	Under 2.0	51.99	52.59	-0.58	0.73	0.428	52.18	51.80	0.35	1.04	0.737
Degree Persistence and Completion (%)	Enrolled in Next Term	58.91	59.30	-0.38	0.73	0.597	59.60	58.20	-0.30	0.89	0.740
	Enrolled in Next Term or Completed Degree	64.94	65.72	-0.77	0.70	0.274	65.56	64.33	1.22	1.00	0.225
	Cumulative Degree Completion	20.20	20.87	-0.66	0.60	0.271	20.40	20.00	0.41	0.85	0.535

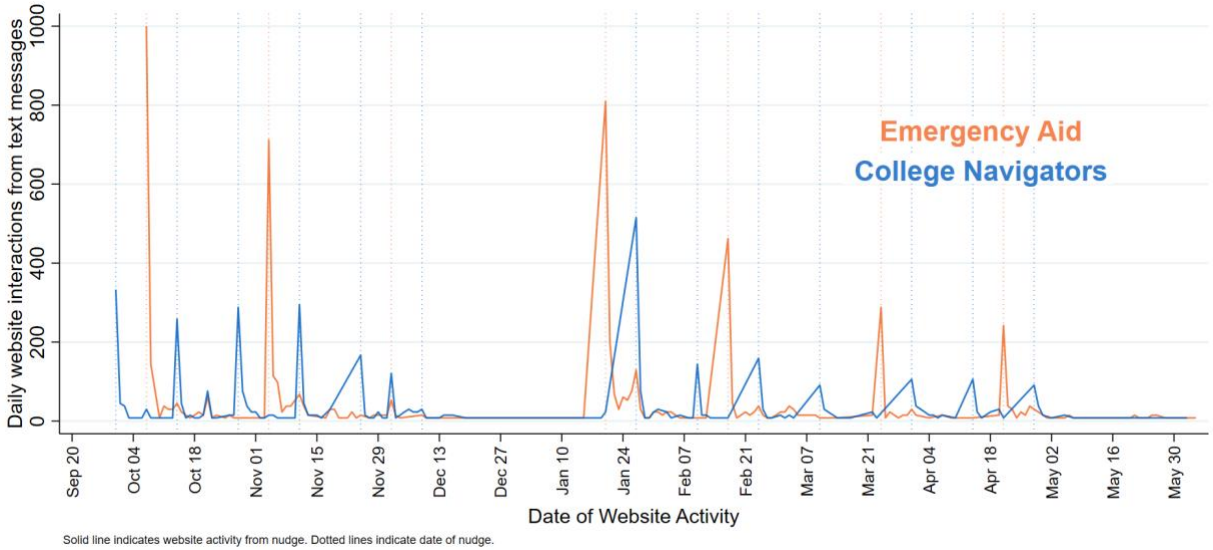
		Difference Between									
		Control vs Nudging					Nudged Groups				
		Nudged	Control	Impact (%)	Standard Error (se)	p-value	Attuned	Info Only	Impact (%)	Standard Error (se)	p-value
Fall 2021											
Credits(%)	Ratio of Attempted to Completed	32.03	32.05	-0.02	0.65	0.971	32.36	31.69	0.68	0.93	0.464
GPA (%)	3.0 to 4.0	23.04	22.97	0.09	0.62	0.880	23.20	22.89	0.30	0.89	0.731
	2.0 to 2.9	8.92	8.84	0.06	0.42	0.883	9.02	8.82	0.21	0.60	0.728
	Under 2.0	68.03	68.19	-0.16	0.69	0.821	67.78	68.29	-0.51	0.98	0.600
Degree Persistence and Completion (%)	Enrolled in Next Term	49.00	49.12	-0.11	0.74	0.886	48.47	49.53	-1.13	1.05	0.281
	Enrolled in Next Term or Completed Degree	59.34	60.03	-0.66	0.72	0.361	58.87	59.82	-1.02	1.03	0.321
	Cumulative Degree Completion	26.89	27.68	-0.79	0.66	0.228	27.18	26.60	0.58	0.93	0.535

N = 18,287

Source | Dallas College and Equity administrative data
Notes | Ratio of Attempted to Completed are the number of credits a student completed over the number of students attempted in a particular semester. A student completed a degree if the school indicated that the student accumulated the number of credits necessary to obtain a degree in their field of study, and the student accepted the degree. 'Impact' represents percent point differences in outcome by students in each group based on linear or logistic regression (where appropriate), and controlled for student race and ethnicity, and whether the student completed the FAFSA; SE denotes Standard Error of the 'Impact.' All missing outcomes were imputed as zero.

FIGURE

FIGURE 1 | DALLAS COLLEGE WEBSITE LINK ACTIVITY, BY RESOURCE TYPE



Solid line indicates website activity from nudge. Dotted lines indicate date of nudge.