

Can Texting Parents Improve Attendance in Elementary School? A Test of an Adaptive Messaging Strategy

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Can Texting Parents Improve Attendance in Elementary School? A Test of an Adaptive Messaging Strategy

September 2020

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American Institutes for Research

Chronic absence is a nationwide problem, even among young students. Those with poor attendance are more likely to face challenges later in school and in life. This study tested four versions of an adaptive text messaging strategy to see which, if any, would reduce chronic absence among 26,000 elementary school students. During the fall of the study year, families randomly assigned to one of the text messaging groups received “basic” messaging, which consisted of low-cost, low-burden weekly reminders about the importance of attendance and same-day notifications when their children missed school. In the spring, messages were “adapted”: parents of students with few absences continued with the basic messaging, while parents of students who were frequently absent in the fall received additional intensified messaging. The study compared two approaches to basic messaging and two approaches to intensified messaging, to learn how a texting strategy might work best. Students in the messaging groups were compared to students whose parents received no messages to rigorously assess whether the messaging improved attendance and achievement.

Key Findings

- **All four versions of the adaptive text messaging strategy reduced chronic absence.** The messaging lowered the expected chronic absence rate of 20.5 percent for students overall by 2.4 to 3.6 percentage points. For students with a prior history of high absence, the messaging lowered the expected chronic absence rate of 47.1 percent by 3.5 to 7.3 percentage points.
- **The two approaches to basic messaging were similarly effective at reducing chronic absence, but one approach to intensified messaging was better than the other for certain students.** The two approaches to basic messaging compared whether it was better to focus on the benefits of attending school or the consequences of being absent - the study found both approaches were equally effective. But intensified messaging that involved school staff directly texting parents reduced chronic absence rates in the spring more than the other more automated intensified approach, for students with a prior history of high absences.
- **The text messaging strategy did not improve achievement.** Although the four versions of adaptive text messaging improved student attendance, they did not improve reading or mathematics achievement during the study year for students in Grades 3 through 5.

Almost 4 million elementary school students were chronically absent during the 2015-2016 school year.¹ Chronic absence is typically defined as missing 10 percent or more of school days. Missing this much school in early grades is linked with lower reading and math achievement by Grade 3 and higher absenteeism in middle and high school.² In addition, chronically absent students are at greater risk of dropping out of high school,³ using drugs and alcohol, and engaging in crime.⁴

Schools need cost-effective strategies to improve student attendance. Thirty-six states and the District of Columbia hold schools accountable for improving rates of chronic absence as part of high-stakes accountability under the Every Student Succeeds Act (ESSA). However, programs that have had positive effects on attendance, such as Success Mentors and the Early Truancy Prevention Project, tend to be expensive.⁵

One low-cost way to improve attendance in early grades may be to use text messages. Research has shown that informing parents about their child’s attendance through periodic letters and postcards can reduce chronic absence, but findings are limited for texting.⁶ Texting is of particular interest because it has been effective in

changing behavior in other fields, such as public health and prevention.⁷ And, unlike mailings, texts can reach most parents quickly: cell phone ownership is high,⁸ and most received texts are read within minutes.⁹

This study examined an adaptive text messaging strategy to see if low-cost, low-burden messaging to parents could improve their children’s attendance in elementary school. After an initial period of “basic” text messaging in the fall, the messaging was “adapted” by sending additional “intensified” texts in the spring to parents of children who were still frequently absent in the fall. The texting strategy was based on theories about changing beliefs and behavior from the fields of health and prevention (see Exhibit A1: Logic Model, in Appendix A).¹⁰

Basic texts began in fall 2017. Basic messages included automated weekly reminders on Sundays about the importance of attendance (see example at right), coupled with actionable tips addressing common reasons for absences. Basic messages also included automated same-day notifications when a parent’s child was absent. These same-day notifications were personalized with the child’s name and the total number of days the child had been absent that school year (see example below).¹¹ To learn whether a positive or negative framing would work best - a common question when trying to motivate desired behavior - the study tested basic messages that emphasized either the *benefits of regular attendance* or the *consequences of missing school*.¹²

Children who miss 2 or more days a month starting in elementary school are less likely to graduate from high school. (*consequences framing*)

We missed Ann in school today. Ann has missed a total of 5 days of school this year. Going to school every day will help Ann learn important reading and math skills. (*benefits framing*)

Intensified texts were designed to provide parents with additional motivation and more tailored information than the basic texts, but only when the basic messaging did not seem sufficient. In the spring, all parents continued to receive basic messaging. However, parents of students who were frequently absent during the fall - i.e., missed more than 8 percent of school days - received additional intensified messaging on top of basic messaging.¹³ One intensified approach - *school staff outreach messaging* - entailed school staff directly texting parents to enhance feelings of engagement and provide opportunities for ongoing discussion and

individualized support. Given the cost and burden of using staff time, the study also evaluated a more automated intensified approach: *goal commitment messaging*. Goal setting approaches have been used to effectively increase positive behaviors such as physical activity and decrease negative behaviors such as smoking and drinking.¹⁴ In this case, weekly texts on Sundays asked parents to set goals for perfect attendance for the upcoming week (see example at right), with feedback sent each Friday. Additionally, parents in the goal commitment group were given the opportunity to request additional attendance tips on topics of interest each Sunday.

Children lose opportunities to learn when they miss school. Will you make it a goal that Ann attends school every day this week? Reply YES to join other parents in setting this goal. (*goal commitment*)

The text messages were sent only to families assigned to a text messaging group (not to a no-messaging group, see Exhibit 1), although the study texts were not the only form of communication with parents about attendance. Rather, they were in addition to schools’ typical attendance-related practices that applied to all parents, which may have included making robocalls to parents when students were absent, sending letters to parents about the importance of attendance, and developing intervention plans with families.

STUDY DESIGN

Who participated

Schools: 108 elementary schools in 4 large, urban districts; 90 percent were Title I eligible, and overall, they had chronic absence rates of 20 percent (20 percent of their students missed at least 10 percent of instructional days in the prior year).

Students: 26,843 students in Grades K-5, of whom 23,133 were included in analyses because they were enrolled in participating schools for the entire 2017-2018 year, were not opted out of the study by a parent after random assignment,¹⁵ and had complete demographic data; 83 percent were eligible for the federal free or reduced-price lunch program, 84 percent were nonwhite, and 17 percent spoke Spanish at home; 27 percent had a prior history of high absences, defined as missing 10 percent or more of school days during the 2016-2017 school year or during the first month of the 2017-2018 school year.

How the study was conducted

Random assignment: In each school, families were assigned to benefits-framed basic messaging, consequences-framed basic messaging, or a no-messaging group in October 2017. Among those in the two basic messaging groups, families with a child who was absent 8 percent or more of school days between October and the end of December were then also assigned to begin receiving either school staff outreach or goal commitment intensified messaging in January 2018. Families continued to only receive the basic messages if their child (or children) missed less than 8 percent of school days in the fall.¹⁶

Analysis: The study's use of random assignment at two points in time, based on whether or not the basic messaging was sufficient, made it a Sequential, Multiple Assignment, Randomized Trial (SMART) design. SMART designs make it possible to rigorously examine the effectiveness of adaptive strategies and to identify if specific components of the strategies work better than others.¹⁷ The analysis for this study tested whether any of the four versions of the adaptive messaging strategy - created by combining basic and intensified approaches (see Exhibit 1) - reduced absences and increased achievement compared to the no-messaging group. The analysis also tested which of the two basic messaging approaches was most effective and which of the two intensified messaging approaches was most effective.¹⁸

Data used

Absences: Daily school-reported attendance in the study year (2017-2018) was used to create two types of measures within each of three time periods (fall, defined as October 1 through the end of fall semester; spring, defined as January 2 through the end of spring semester; and over the school year, defined as October 1 through the end of spring semester): (1) whether a student was chronically absent, defined as missing 10 percent or more of school days, and (2) number of days absent. The impact of the texting strategy on chronic absence rates was the primary analysis for the study; its impact on the number of days absent was a secondary analysis.

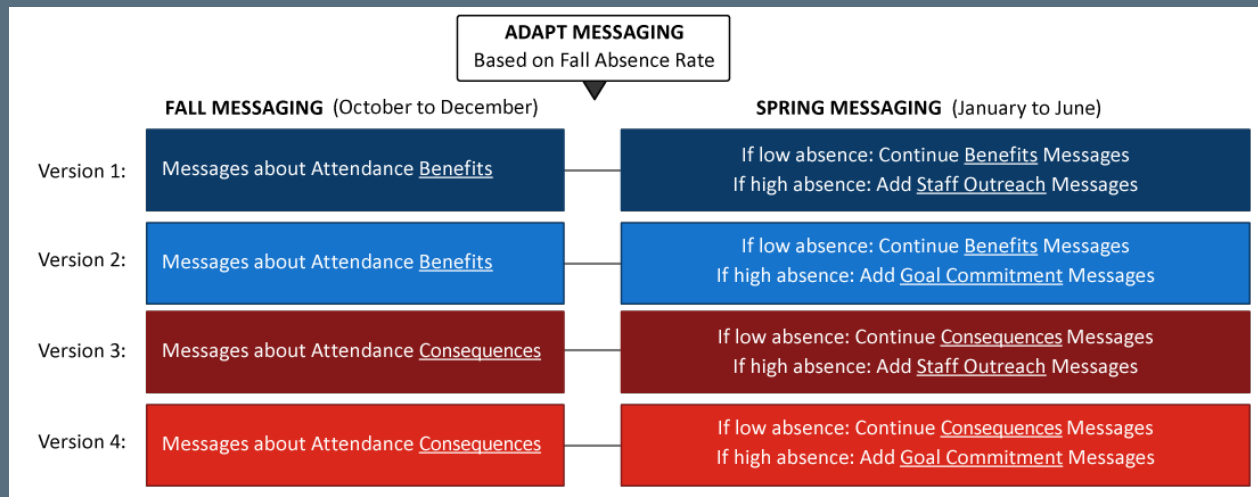
Achievement: State assessment test scores in math and reading for students in Grades 3 through 5 for the study year.

Implementation of the texting: Data on messages sent and delivered, collected daily from the text messaging provider's text messaging platform.

THE STUDY'S TEXT MESSAGING REDUCED CHRONIC ABSENCE

In combination, the two basic messaging approaches and the two intensified messaging approaches formed four versions of the adaptive text messaging strategy (see below).

Exhibit 1. Four versions of the adaptive text messaging strategy

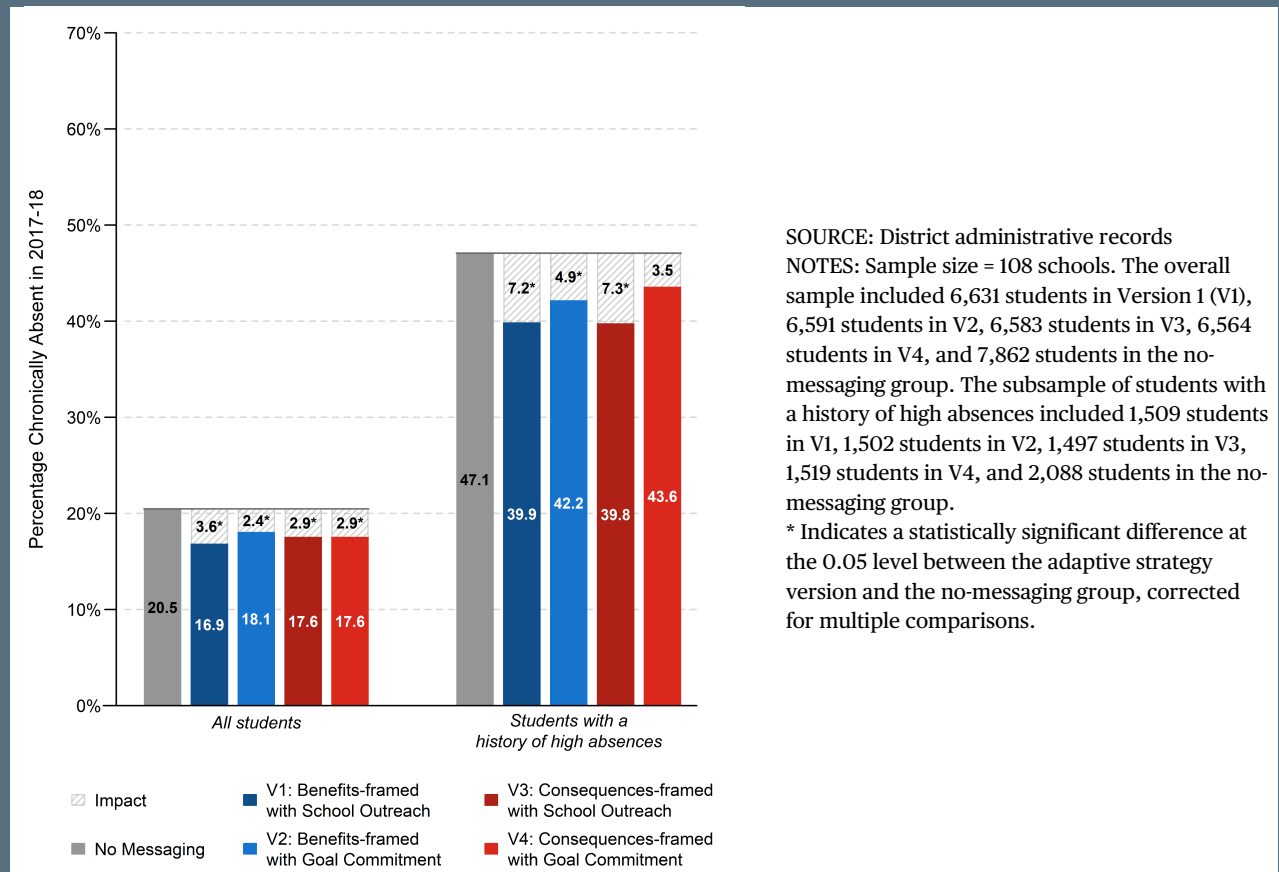


The study tested whether the four versions of adaptive text messaging reduced chronic absence rates for two main student groups: students overall and students with a prior history of high absences.¹⁹ Students with a history of high absences were of particular interest because it seemed likely their attendance had more room for improvement than students who had a prior history of low absences. The reasons frequently-absent students miss school may also be different from those with low absences, and the text messages may be more relevant for families in different types of circumstances. In addition to chronic absence, the study examined number of days absent (results were similar and are reported in Appendix C).²⁰ Students were included in analyses if they were enrolled for the entire 2017-2018 school year, had not been opted out of the study by a parent after random assignment, and had complete demographic information in the district data system - a total of 23,133 students.²¹

All four combinations of basic and intensified messaging strategies reduced chronic absence. Each version of adaptive text messaging reduced chronic absence, compared to no messaging (Exhibit 2). Among students overall, the reduction in chronic absence rates during the school year ranged from 2.4 to 3.6 percentage points, from a chronic absence rate of 20.5 percent in the no-messaging group. In other words, the messaging reduced chronic absence for students overall by 12 to 18 percent.

For students with a prior history of high absences, the reduction in chronic absence rates during the school year ranged from 3.5 to 7.3 percentage points, from a chronic absence rate of 47.1 percent in the no-messaging group. Thus, the messaging reduced chronic absence for students with a prior history of high absences by 7 to 15 percent.

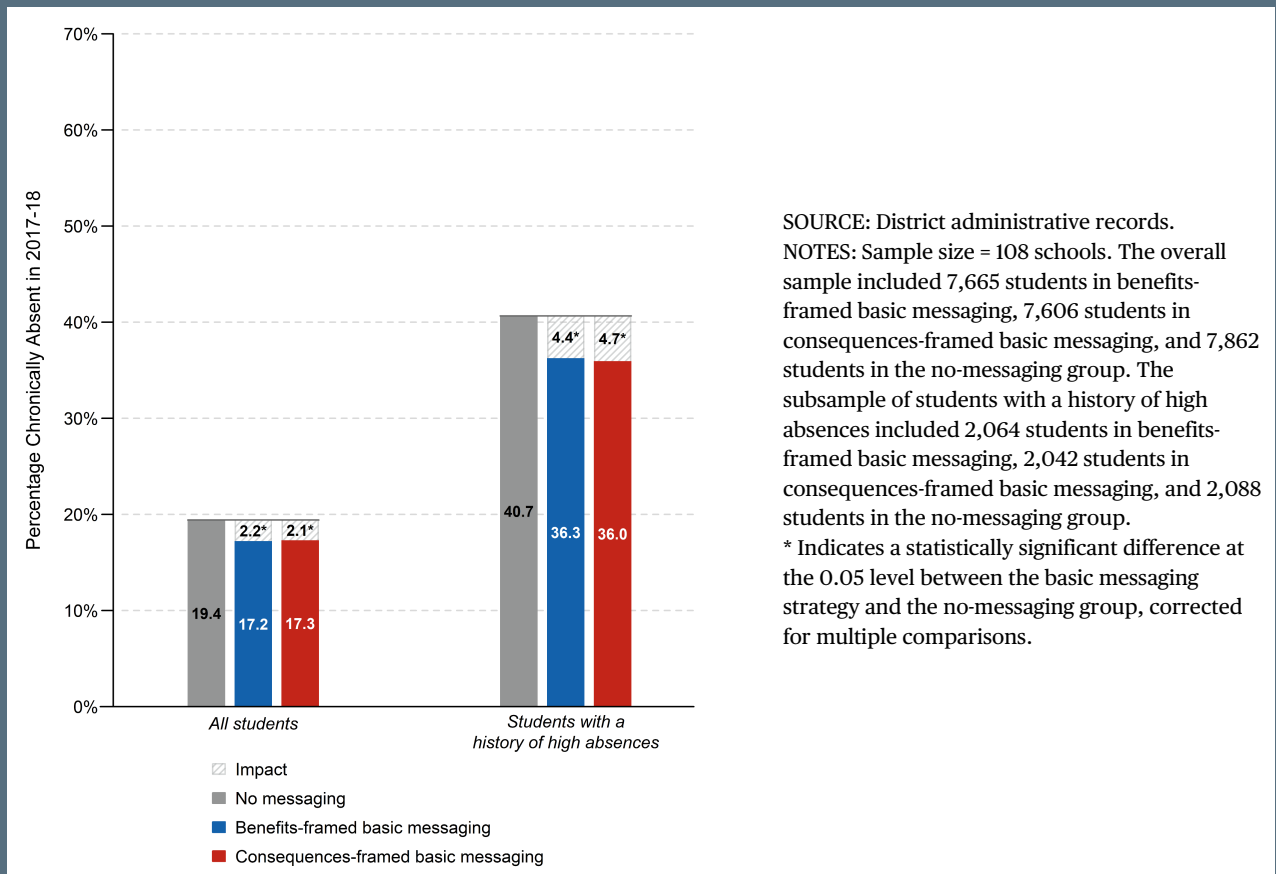
Exhibit 2. Percentage of students who were chronically absent during the 2017-2018 school year, by messaging group



Basic messaging alone reduced chronic absence. Basic messaging, regardless of whether it focused on the benefits of attendance or the consequences of absences, reduced rates of chronic absence during the fall. Nearly 20 percent of students in the no-messaging group were chronically absent at the end of the fall, and basic messaging between October and December reduced chronic absence by 2.1 to 2.2 percentage points (Exhibit 3). In other words, basic messaging reduced fall absence rates for students overall by about 11 percent.

For students with a prior history of high absences, rates of chronic absence in the fall were reduced by 4.4 to 4.7 percentage points, from a chronic absence rate of 40.7 percent in the no-messaging group (Exhibit 3). That is, like students overall, basic messaging reduced fall absence rates for students with a prior history of high absences by about 11 percent.

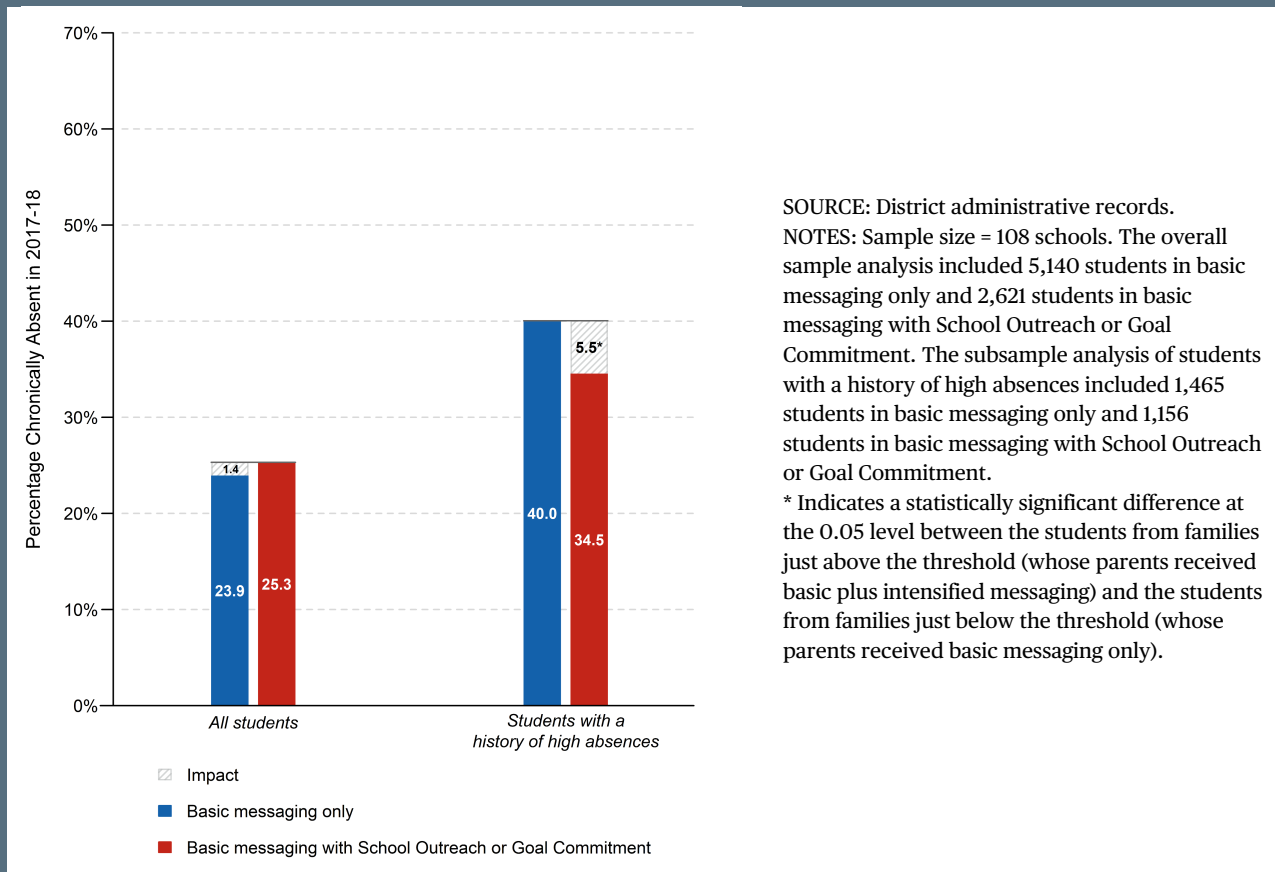
Exhibit 3. Percentage of students who were chronically absent in fall 2017, by messaging group



Adding intensified messaging reduced chronic absence more than basic messaging alone for students with a prior history of high absences, but not for students overall. The study was designed with the assumption that parents of students who were frequently absent in the fall, despite basic messaging, needed something more intensive in the spring. Therefore, all families assigned to basic messaging who had one or more children who were frequently absent in the fall were assigned to intensified messaging for the spring. To test whether these families (and their students) benefited from the addition of intensified messages, the study compared spring absences for those just above the high absence threshold (who received intensified messaging) with those just below the high absence threshold (who continued with basic messaging alone). Students from families on either side of this threshold differed in the messaging their parents received but were otherwise similar. Comparing the students from these families provides a way to examine whether adding intensified messages to the basic messages further improved attendance.²²

Results show that intensified messaging did not reduce spring chronic absence rates over and above basic messaging alone for students in the study overall. However, for students with a prior history of high absences, the intensified messaging reduced spring chronic absence rates by an additional 5.5 percentage points (Exhibit 4).

Exhibit 4. Percentage of students from families near the fall absence threshold who were chronically absent in spring 2018, by messaging group



THE DIFFERENT APPROACHES TO BASIC AND INTENSIFIED MESSAGING WERE SIMILARLY EFFECTIVE IN REDUCING CHRONIC ABSENCE

A key goal of the study was to learn about how text messaging might work best. Specifically, the study examined whether (a) any of the four versions of the adaptive messaging strategy were more effective than the others, (b) framing basic messages in terms of benefits or consequences worked better during the fall, and (c) School Staff Outreach or Goal Commitment messages worked better during the spring.

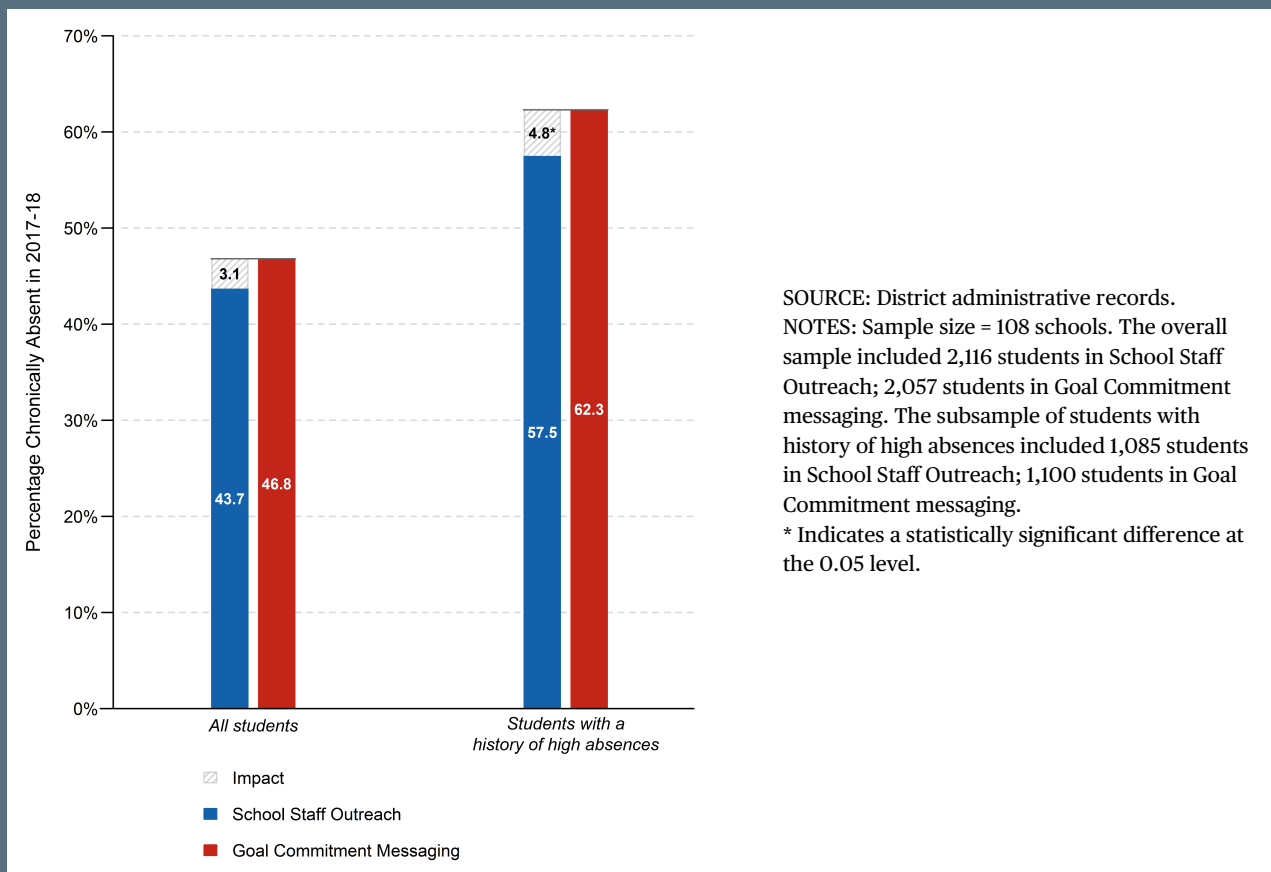
There were no differences among the four versions of adaptive text messaging - None stood out as much better than the others. As shown in Exhibit 2, each version of the full-year adaptive text messaging strategy reduced chronic absence when compared to the no-messaging group. But even though the versions differed in how they combined the types of fall and spring messages, they did not measurably differ in how much they reduced absences when compared to each other.

Messages focused on the benefits of attending school were no better or worse than messages focused on the consequences of missing school. As discussed earlier, experts in motivation often debate whether it is more effective to emphasize benefits or consequences to elicit desired behaviors. Research specifically focused on

informational messages is mixed; some studies suggest that positive framing is more effective, while others find negative framing works better. But no studies have examined framing of attendance information. This study did so and found that both benefits-framed and consequences-framed messages were similarly effective in reducing chronic absence in the fall compared to no messaging. (See the blue and red bars in Exhibit 3, which show that differences were not statistically different from zero.)

School staff outreach improved attendance more than goal commitment messaging for students with a prior history of high absences but not for students overall. As noted earlier, the text messaging strategy acknowledged that some parents might need more information or a greater “push” about attendance than the basic messages provided. School Staff Outreach added direct, personalized communication from school staff to parents and thus took more staff time and effort than did Goal Commitment messaging. Goal Commitment, though automated, added two additional components: a weekly request for parents to commit to a goal of perfect attendance and the offer of options to get more tailored tips and resources. Because families with students who were frequently absent in the fall were randomly assigned to one of the two intensified messaging approaches, the study could test whether one approach was better than the other for these families and their students. The results showed that chronic absence rates were lower for students from families assigned to School Staff Outreach than for those assigned to Goal Commitment messaging (3.1 percentage points lower for all students, and 4.8 percentage points lower for students with a prior history of high absences). However, the difference was only statistically significant for the high absence group (Exhibit 5).

Exhibit 5. Percentage of students who were chronically absent in spring 2018, by intensified messaging group



THE ADAPTIVE MESSAGING STRATEGY DID NOT AFFECT READING OR MATH ACHIEVEMENT FOR STUDENTS IN GRADES 3 THROUGH 5

Past research has linked chronic absence with lower levels of student achievement, under the theory that absence reduces students’ opportunity to learn. The study examined whether the text messaging improved academic achievement for students in Grades 3 through 5. Academic achievement was measured by state reading and math scores, which were available through district records for students in these grades.

Results showed that the attendance text messaging did not affect reading or math achievement for students overall or for those with a prior history of high absences (Exhibits 6 and 7). The difference in average performance between each messaging group and the no-messaging group (represented by each bar in the chart) is just below zero for students overall and just above zero for students with a prior history of high absences. However, none of these differences are statistically different from zero.²³

Exhibit 6. Difference in reading achievement between each messaging group and the no-messaging group

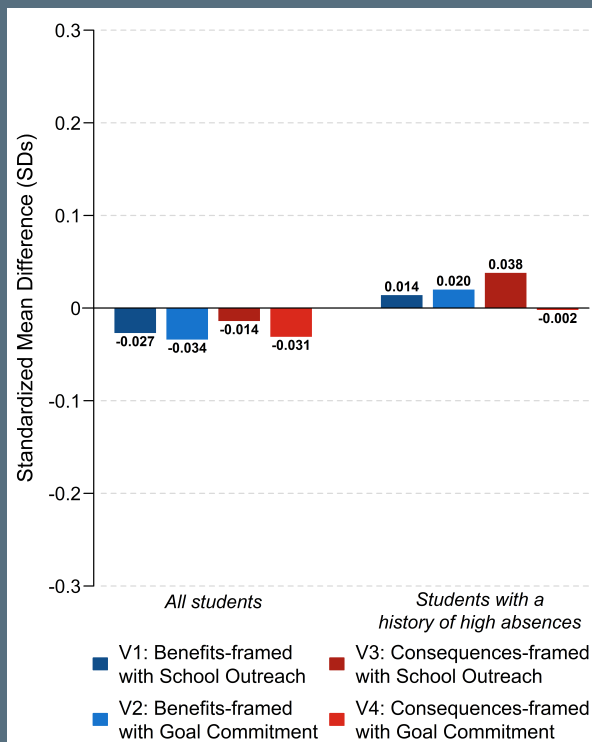
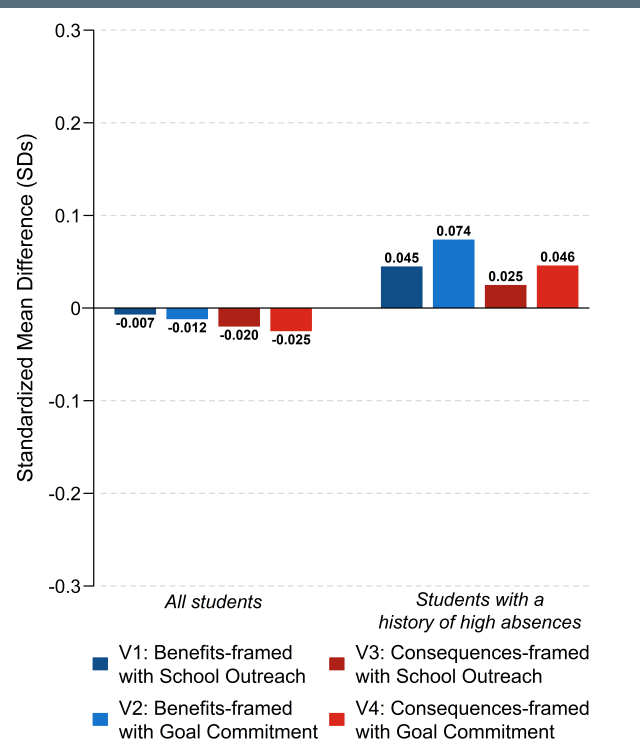


Exhibit 7. Difference in math achievement between each messaging group and the no-messaging group



SOURCE: District administrative records.

NOTES: Sample size = 108 schools. The overall sample for reading achievement included 2,394 students in V1, 2,365 students in V2, 2,438 students in V3, 2,439 students in V4, and 2,787 students in the no-messaging group. The overall sample for mathematics achievement included 2,391 students in V1, 2,360 students in V2, 2,434 students in V3, 2,435 students in V4, and 2,782 students in the no-messaging group.

For reading achievement, the subsample of students with a history of high absences included 501 students in V1, 488 students in V2, 569 students in V3, 576 students in V4, and 706 students in the no-messaging group. For mathematics achievement, the subsample of students with a history of high absences included 500 students in V1, 486 students in V2, 568 students in V3, 574 students in V4, and 702 students in the no-messaging group.

None of the differences between each messaging group and the no-messaging group were statistically significant at the 0.05 level, after correcting for multiple comparisons.

TEXTING PARENTS ABOUT ATTENDANCE IS FEASIBLE TO DO

Districts considering using texting to communicate with parents about attendance may be concerned about feasibility, parent acceptance of attendance-related texts, and costs. This study showed that texting parents daily about student attendance on a large scale was feasible, not off-putting for parents, and low cost.

Nearly 800,000 attendance-related text messages were sent out as part of the study. The number of texts sent to families depended on the type of messaging group they were in, the number of children in Grades K through 5 they had, and the number of absences their child(ren) had.²⁴ Families assigned to basic messaging only throughout the year were sent, on average, 1.3 messages per week. In contrast, families assigned to Goal Commitment messaging - which generally entailed more texts than the School Staff Outreach approach - were sent an average of 3.5 message per week during the spring.

Texting can reach most parents most of the time. The study messages were sent out via a text messaging provider with a technology platform that linked to district data. The district data were transferred directly from the district to the provider's platform on a daily basis and included attendance for each child and parent contact information. The weekly reminder messages were prescheduled, while the same-day notification messages triggered by daily attendance data were automatically sent so long as the daily data transfer from the districts was successful. This required districts to run queries in their student information systems to securely transfer the data to the provider. The districts in the study were able to do this daily throughout the year following an initial set-up period with the provider, except for one district where the provider and study team continued to provide support to troubleshoot challenges and ensure that the queries resulted in correct, complete, and timely data transfers.²⁵

Across the year, nearly 100 percent of the messages were correctly sent to the intended parents, and the messages were recorded by the texting platform as "delivered" to at least one parent 74 percent of the time. The top reason for message delivery failure was nonworking mobile numbers on any given day.²⁶ Approximately 15 percent of students did not have a parent or guardian with a working mobile phone number at the start of the 2017-2018 school year. However, this rate fluctuated daily throughout the school year.

Most parents accepted text messaging as a way to inform them about their child's attendance. Districts may worry that parents will dislike receiving attendance texts. Overall, about 12 percent of students in the study had parents who unsubscribed from messaging at some point during the school year.²⁷ Among students from families who only had basic messaging throughout the year, 10 percent had parents who unsubscribed at some point. Unsubscribing was more common among those who received any form of intensified messaging, and varied by type of intensified messaging. Unsubscribe rates were highest for those receiving Goal Commitment messaging, which generally involved the highest volume of texts; 20 percent of students in this group had parents unsubscribe from the attendance texts. In the groups with School Staff Outreach, 14 percent of students had parents unsubscribe. (See Appendix C for more information.)

Parent response to the interactive components of intensified messaging was modest. About 30 percent of students had a parent who responded to a School Staff Outreach text message. However, this may be an underestimate because parents may have called or gone to school in person, and this would not have been captured by the text messaging platform. About 30 percent of students from families in Goal Commitment messaging had a parent who committed to at least one perfect attendance week. Those who committed at least once committed for 4 weeks out of about 22 weeks, on average.²⁸ Just 10 percent of students had a parent who requested additional tips as part of their Goal Commitment messaging.

Texting is a low-cost way to reduce chronic absence. The study estimated costs for labor, equipment, and facilities for the text messaging vendor and the district, school, and study team staff who supported implementation. The cost of text messaging included costs for creating message content, developing the texting platform module for school staff (so they did not need to use their personal phones when conducting school staff outreach), setting up the automated texting platform, and sending messages. Using this information, the study team estimated the cost for each of the messaging strategies and their combinations.

The total development cost, which included creating message content and developing the texting platform for school staff, was approximately \$200,000. This cost would not be incurred by future adopters, so it is excluded from the estimate of the cost to implement the text messaging strategies.

The estimated total cost for each study district to implement the versions of the adaptive messaging strategy over a full school year was \$56,165 for basic messaging (either benefits- or consequences-framed) with School Staff Outreach and \$45,500 for basic messaging with Goal Commitment (Exhibit 8). The per-student cost for these messaging strategies ranged from \$6.90 to \$8.53. As expected, costs were higher for versions that included School Staff Outreach than for versions that included Goal Commitment messaging.²⁹ Overall, the costs to implement the versions of the adaptive messaging strategy resemble those cited in other studies in which attendance information was provided to parents through postcards and letters. The per-student costs for these paper-based mailings have ranged from \$5.68 to \$6.60.³⁰ By comparison, costs were much higher for other types of strategies that have demonstrated positive effects on attendance: for example, about \$150 per student for the Early Truancy Prevention Project and about \$1,955 per student for Check & Connect.³¹

Exhibit 8. Text messaging costs

Adaptive messaging strategy	Total cost	Cost per student
Benefits-framed basic messaging with School Staff Outreach	\$56,165	\$8.47
Benefits-framed basic messaging with Goal Commitment	\$45,500	\$6.90
Consequences-framed basic messaging with School Staff Outreach	\$56,165	\$8.53
Consequences-framed basic messaging with Goal Commitment	\$45,500	\$6.93

SOURCE: Study records.

NOTES: The cost per student was calculated by dividing the cost of each version of the adaptive messaging strategy by the total number of students assigned to that version. For example, 6,631 students were assigned to benefits-framed basic messaging with School Staff Outreach; thus, the per-student cost is $\$56,165 / 6,631 = \8.47 .

LESSONS LEARNED AND LOOKING FORWARD

This study shows that it is possible to text parents about attendance on a large scale at relatively low cost (\$6.90 to \$8.53 per student per year). Texting can reduce the chronic absence rate in elementary schools by as much as 18 percent in one year. Although the study provides some direction and ideas for districts, it does leave a few important questions unanswered.

How important was it that the strategy was adaptive? The study's findings suggest that the four versions of the adaptive messaging strategy were similarly effective when compared to no messaging. However, it remains unclear whether any of the versions would have outperformed a simpler strategy that just used "basic messaging" for the entire year and did not "adapt" by adding intensified messaging for families with students who were frequently absent in the fall. Given that the adaptive strategy was both more complex and more costly to implement - especially the versions that used school staff to interact with parents directly (School Staff Outreach) - it is important to understand if any added benefits outweigh the higher costs; and if so, how to best target the intensified messaging. This study did find some evidence suggesting that intensified messaging had an added benefit for students with a prior history of high absences, but not for students overall. The study also found that School Staff Outreach was more effective than having parents commit to perfect attendance weeks (Goal Commitment messaging) for students with a prior history of high absences. Some form of appropriately targeted adaptive strategy using School Staff Outreach could thus potentially be cost effective relative to a "one-size-fits-all" strategy, but future research is needed to conclusively resolve this question.

What are the long-term effects of texting? This study was conducted during one school year. A longer study is needed to see whether texting sustains a positive impact on attendance over longer periods, and whether parents continue to pay attention to attendance texts over time. During this study, parents were more likely to unsubscribe from the Goal Commitment texts, which were sent about twice as frequently as School Staff Outreach texts. This finding may signal that unsubscribe rates would increase across time as messages accumulate, but this might not be the case if the rate and overall number of texts sent remained reasonable. In addition, texting is a light-touch strategy that reduced chronic absence, but these reductions did not lead to higher academic achievement. It is possible that improved learning, facilitated by an increase in instructional time, takes longer and could be observed after multiple years of messaging.

For which districts is texting most effective? It is unknown whether text messaging would be cost-effective for all types of districts and schools. For example, the participating districts already were raising awareness about attendance through many other initiatives. It is possible texting could actually have greater impacts on attendance in districts with few other attendance initiatives because the texts would stand out more to parents. It is also possibly more cost-effective for districts with many attendance initiatives to use text messaging in place of other higher-cost strategies. The participating sites were relatively large urban districts that had the infrastructure to send texts about attendance to thousands of families, including procedures for collecting daily attendance data and existing parent notification systems. While one district in particular experienced some challenges with their infrastructure, the effects of text messaging were similar across the four districts. This finding suggests that messaging strategies could reduce chronic absence even in districts without the infrastructure to send texts out perfectly every day of the year. Nevertheless, it is unclear whether text messaging about attendance would be cost-effective in smaller non-urban districts, in districts with few other attendance initiatives, or in districts with very low capacity, no existing infrastructure for texting, and no external support.

This study was the first of its kind to examine an adaptive approach to communicating with parents about elementary school students' attendance. School attendance and chronic absence may be reconceptualized and monitored in new ways as districts continue to grapple with the COVID-19 pandemic. Still, texting could potentially be an effective means for districts to communicate with parents about attendance and participation in school activities - whether in-person, virtually, or blended. Shedding light on remaining questions about the approach through targeted future studies will help districts maximize the potential of texting to combat chronic absence.

ENDNOTES

- ¹ The 2015-2016 Office of Civil Rights data collection (<https://www2.ed.gov/about/offices/list/ocr/data.html>).
- ² Applied Survey Research, 2011; Ehrlich et al., 2014; Ready, 2010.
- ³ Hernandez, 2011; Jung, Therriault, & Prencipe, 2012.
- ⁴ Allensworth & Easton, 2005, 2007; Baker, Sigmon, & Nugent, 2001; Balfanz & Byrnes, 2013; Chang & Romero, 2008; Ehrlich et al. 2014; Ginsburg, Jordan, & Chang, 2014; Gottfried, 2015; Henderson, Hill, & Norton, 2014; Henry & Thornberry, 2010; Neild & Balfanz, 2006.
- ⁵ Guryan et al., 2017; Bauer, Liu, Schanzenbach, & Shambaugh, 2018; Cook, Dodge, Gifford, & Schulting, 2017.
- ⁶ Rogers & Feller, 2018; Balu, Porter, & Gunton, 2016; Rogers et al., 2017.
- ⁷ Abroms, Whittaker, Free, Van Alstyne & Schinderler-Ruwisch 2015; Chang, Choi, Kim, & Son, 2014.
- ⁸ In 2018, more than 95 percent of the U.S. adult population owned cell phones, and more than 77 percent owned smart phones (<http://www.pewinternet.org/fact-sheet/mobile/>). In 2017, one out of every five adults whose annual household income fell below \$30,000 was a smartphone-only Internet users (<http://www.pewresearch.org/fact-tank/2017/06/28/10-facts-about-smartphones/>).
- ⁹ Ninety-five percent of business text messages are read within 5 minutes of being sent (<https://www.textrequest.com/blog/complete-overview-business-texting/>).
- ¹⁰ The logic model recognizes that even intensified text messaging cannot alone address some important causes of absenteeism, such as serious illness, homelessness, or substance abuse.
- ¹¹ Text messages were originally written in English, but were also professionally translated into nine languages and then proofread and checked for clarity by study team staff who were native speakers of the languages. Parents automatically received messages in the home language that was indicated in the district's student information system.
- ¹² Some evidence suggests that framing in terms of potential loss is more effective than framing in terms of potential gain (Castleman, 2015), especially for health-related information. However, in education contexts, behavior modification and management approaches have tended to emphasize positive reinforcement and emphasis of rewards rather than consequences. For example, Positive Behavioral Interventions & Supports (PBIS) emphasizes teaching, prompting, and acknowledging positive target behavior, although it also helps schools develop appropriate systems for delivering negative consequences for problem behavior. The effect of framing has not been previously tested in the context of student attendance communications. Importantly, the consequences framing in this study focused on future possible negative outcomes of chronic absence, not punishment for truancy.
- ¹³ While the typical threshold for identifying students as chronically absent is 10 percent, the study erred on the side of casting a wider net for identifying "at risk" students by using an 8 percent threshold.
- ¹⁴ Commitment devices have mixed support (Perry, Chhatralia, Damesick, Hobden, & Volpe, 2015), but potential for broad and specific application to help people achieve goals (Castleman, 2015). For example, goal-setting interventions delivered via technology (e.g., texts, apps, live chat) have been shown to be effective for encouraging physical activity (Middelweerd, Mollee, van der Wal, Brug, & te Velde, 2014), smoking cessation (Lorenatto, West, Bruguera, Brose, & Michie, 2016), and reduction in alcohol use (Kaminer, McCauley Ohannessian, McKay, Burke, & Flannery, 2018).

¹⁵ To maximize participation in the study, districts approved the use of an opt-out approach. Instead of requiring parents to sign up for the study (opt-in), they were automatically included in it unless they opted out. Parents were informed about the study through text messages and paper forms over the first four to six weeks of school. Parents of 9.4 percent of students eligible for the study opted out during this initial period.

¹⁶ Families, rather than individual students, were randomly assigned to the messaging groups so that parents did not receive different types of messages for their children. To identify families eligible for intensified messaging, the study team used attendance data for the child in the family with the highest number of absences during the fall.

¹⁷ Almirall, Nahum-Shani, Sherwood, & Murphy, 2014; Collins, Nahum-Shami, & Almirall, 2014; Murphy & Almirall, 2009; Nahum-Shani et al., 2012.

¹⁸ For the analysis, one child per family was randomly selected for inclusion in the sample. Doing so simplified the analytic models used to assess the impact of the messaging because it allowed the study to avoid including a “family level” in the analytic models. Including a family level would have complicated estimation because most families in the study had only one child in the relevant grades.

¹⁹ The study team also conducted multiple sensitivity and subgroup analyses. The main subgroup of interest was students with a history of high absences. These students come from families with at least one child who met one or both of the following conditions: (1) chronically absent (missed at least 10 percent of school days) in the year prior to the study (school year 2016-17); (2) chronically absent between the start of school and September 15 in the school year when the study took place (school year 2017-18). The study included 6,194 students with a history of high absences and 16,939 students who did not have a history of high absences. The study also examined subgroups such as students with a history of high absence whose parents had working cell phone numbers at baseline (5,193 students) and students whose home language was English (18,691 students). The study team also conducted analyses excluding one district that had implementation challenges (16,569 students). More detail about the study’s sensitivity and subgroup analyses and results is in Appendix E.

²⁰ Number of days absent was included as an outcome because it is commonly used as an outcome in research about absenteeism. It also allowed the study to explore where the effect of the text messaging took place in the distribution of number of days absent during the study year. For example, the adaptive text messaging strategy could have improved attendance only for students with the highest absences, or for students who were closest to the chronic absence threshold. More detail about these analyses is in Appendix C and E.

²¹ Before random assignment took place, parents of 2,789 students had opted out and were not randomly assigned. They therefore do not count as attrition. Of the 26,834 students from families who were randomly assigned, 3,710 were excluded from the analyses and counted as attrition because they opted out of the study after random assignment, were no longer in the district by the end of the school year, and/or were missing demographic data. This resulted in an overall attrition rate of 13.8 percent. The differential attrition was highest—4.1 percent—between the control condition and students from families who were assigned to benefits-framed basic messaging with Goal Commitment. This level of overall and differential attrition is acceptable according to the What Works Clearinghouse cautious standards for attrition. Students in the analysis sample had similar characteristics as students from families in the full sample that were randomly assigned at the start of the study (see Appendix B).

²² This estimate of the effect of adding intensified messages to basic messaging (formally called “regression discontinuity”) applies to those families with at least one child whose fall absence rates were near the 8 percent threshold. It does not necessarily capture the effect of adding intensified messages for those families whose

child(ren) had fall absence rates substantially higher or lower than 8 percent. While a regression discontinuity analysis can accurately estimate causal effects, it is distinct from and generally has more limitations than the formal experimental analyses under the SMART design. See Appendix C for further details.

²³ Text messaging is a light-touch, low-cost intervention, and so even small effects on attendance may be meaningful, as would be the even smaller effects on achievement expected to result from the attendance effects. Unfortunately, this study is unable to detect any of these potentially small but meaningful effects on achievement. A very large sample of students is necessary, which was not possible in part because achievement data were only available for students in Grades 3 through 5.

²⁴ The text messages were child specific. For example, if two siblings were both absent the same day, parents would receive two absence notifications, one for each child.

²⁵ Data transfers needed to be complete by 7:30 pm local time because 8 pm was the latest messages could be sent to avoid interrupting or bothering parents too late in the evening.

²⁶ A number might work one day but not another if, for example, a parent had an overdue phone bill or changed phone numbers. The platform continued to *send* messages to every number even if the messages were not successfully *delivered*. If a parent's phone became functional again, or if a parent changed phone numbers and updated the number in the student information system, then the messages that were continuing to be *sent* would resume being *delivered* as well.

²⁷ Unsubscribing from texts meant that parents no longer were sent attendance-related text messages but did not mean that students were withdrawn from the study or excluded from analyses.

²⁸ On average, the districts had about 24 instructional weeks during the spring semester, but each district had 2 to 3 half-weeks, which affected the Goal Commitment messaging.

²⁹ The cost of basic messaging only throughout the year was \$5.88 per student. See Appendix D for more information about the cost analyses, including cost-effectiveness estimates that factor in the impact of each of the four versions of the adaptive messaging strategy on attendance.

³⁰ Robinson et al., 2018; Rogers & Feller, 2018.

³¹ Cook, Dodge, Gifford, & Schulting, 2017; <https://evidencebasedprograms.org/programs/check-and-connect/>

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DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

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