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For Supplementary Materials, please see <https://osf.io/kv6bz>

Abstract

Attendance in kindergarten and elementary school robustly predicts student outcomes. Despite this well-documented association, there is little experimental research on how to reduce absenteeism in the early grades. This paper presents results from a randomized field experiment in ten school districts evaluating the impact of a low-cost, parent-focused intervention on student attendance in grades K-5. The intervention targeted commonly held parental misbeliefs undervaluing the importance of regular K-5 attendance as well as the number of school days their child had missed. The intervention decreased chronic absenteeism by 15%. This study presents the first experimental evidence on how to improve student attendance in grades K-5 at scale, and has implications for increasing parental involvement in education.

Amidst the ever-changing educational political landscapes and policy initiatives, the belief that regular school attendance plays a critical role in students' success remains constant. Recent reform efforts have, in fact, incited national initiatives focused on reducing student absenteeism at scale (*Every Student, Every Day: A Community Toolkit to Address and Eliminate Chronic Absenteeism*, 2015). To some extent, educators and policymakers have based these initiatives on the intuitive appeal of good school attendance, but research suggests that their instincts are well founded. Students with better attendance records tend to score better on standardized tests (Nichols, 2003), and are less likely to be held back (Neild & Balfanz, 2006) or drop out of school (Balfanz & Byrnes, 2013; Bryk & Thum, 1989; Rumberger & Thomas, 2000). Moreover, chronic absenteeism predicts high school dropout over and above test scores, suspensions, and grade retention (Byrnes & Reyna, 2012).

While the term “chronically absent student” brings to mind a teenager cutting school, propensity to be chronically absent actually begins to emerge early in kindergarten and is as prevalent in early grades as it is in middle and high school (Balfanz & Byrnes, 2012). Multiple studies report that before fourth grade, one in ten students in the United States is considered chronically absent, which entails missing more than 10% of school days in a year for either excused or unexcused reasons (Chang & Romero, 2008; Romero & Lee, 2007; Therriault, Heppen, O’Cummings, Fryer, & Johnson, 2010).

The early emergence of chronic absenteeism is especially concerning because research demonstrates that attendance in kindergarten and elementary school robustly predicts student outcomes. Chronic absenteeism in kindergarten is associated with lower academic performance in first grade (Chang & Romero, 2008). This holds true for students who arrive at kindergarten academically ready to learn, but are then chronically absent: they score well below good

attenders on third grade reading and math tests (Applied Survey Research, 2011). Poor elementary school attendance negatively affects student outcomes, including academic achievement, regardless of income, ethnicity, and gender (Chang & Romero, 2008; Gottfried, 2010).

Nevertheless, regular daily attendance appears to be even more critical for at-risk students, such as English language learners and those from socioeconomically disadvantaged households, who are in danger of falling behind academically (Balfanz & Byrnes, 2006, 2012). Schools with high rates of chronically absent students tend to have greater achievement gaps (Balfanz & Byrnes, 2012). Furthermore, students who drop out of school before graduating were absent by fifth grade twice as often as high school graduates (Barrington & Hendricks, 1989) and can be identified retrospectively as early as third grade based on attendance patterns and other academic indicators (Lehr, Sinclair, & Christenson, 2004).

Despite the well-documented association between attendance in kindergarten and elementary school and positive student outcomes, there is little experimental research on how to reduce student absenteeism. What's more, many of the factors that contribute to poor student attendance remain largely outside the control of schools, such as transportation (Balfanz & Byrnes, 2013), illness (Ehrlich et al., 2014), unwillingness to attend (Balfanz & Byrnes, 2013), and household burdens (Chang & Romero, 2008). Parents and guardians¹, on the other hand, tend to exert more control over factors that affect attendance. Particularly in early grades, parents have influence over school routines that affect attendance, such as transportation to and from school, communications with the central office, and planning vacations. Thus, school-based attendance improvement efforts would benefit from engaging parents of kindergarten and elementary-aged students. A first step towards leveraging parental support in the quest to

¹ Henceforth referred to as "parents," but we acknowledge the wide range of caretakers in a child's life.

improve student attendance involves ensuring parents recognize the value of attending school regularly in the early grades. Children of parents who believe attendance is important are more likely to attend school more (Ehrlich et al., 2014).

Targeting parental beliefs about the importance of regular K-5 attendance may also provide a cost-effective solution for reducing student absenteeism. As school budgets attempt to make efficient use of public tax dollars, dedicating financial and human resources toward improving student attendance efforts may be a luxury many school districts cannot afford. There is a great need for research on effective, low-cost, and light-touch interventions that schools can employ to reduce student absenteeism.

This paper presents results from a large-scale randomized field experiment evaluating the impact of a low-cost, parent-focused intervention on student attendance in kindergarten and elementary school. The light-touch intervention mobilized parents to improve their children's attendance by targeting parental beliefs about the value of regular school attendance in the early grades.

Parental Beliefs about Kindergarten & Elementary Education and about their Child's Attendance Record

While it is true that almost all parents want their children to succeed academically (Henderson & Mapp, 2002) parents' beliefs about the value of schooling and attendance may influence their motivation to engage in their child's education (Hoover-Dempsey & Sandler, 1997). Kohn (1989) posited that parental beliefs – which derive from personal experiences, implicit theories of childhood development, and notions conveyed by proximal individuals and groups (Okagaki & Sternberg, 1993) – affect parenting roles, and therefore student outcomes. Therefore, parents differ in their beliefs regarding their role in their child's education (Hammer, Rodriguez, Lawrence, & Miccio, 2007). It follows that parents who underestimate the rigor and

learning occurring in K-5 classrooms may be less motivated to exert additional effort to help their child attend school more often. For instance, parents who perceive kindergarten as an extension of nursery school or daycare may fail to appreciate the learning opportunities their child forgoes when missing a day of school. It is easy to imagine how a parent, especially one who has had underwhelming elementary educational experiences or who lives in states that do not mandate kindergarten attendance, could undervalue the daily attendance in the early grades.

A useful theoretical framework for understanding the role of perceived value in education is the expectancy-value model (e.g., Atkinson, 1957; Eccles et al., 1983). The expectancy-value theory posits that the utility value of a task, or whether a task is perceived as instrumental towards a future goal, influences a person's motivation to engage with the task (Eccles & Wigfield, 2002). Prior experimental research suggests simply providing information about the value of a topic can promote its perceived utility value (e.g., Shechter, Durik, Miyamoto, & Harackiewicz, 2011). For example, an intervention that targeted parental beliefs about the value of math and science courses increased parents' beliefs about the utility of STEM courses, and increased students' enrollment in STEM courses (Harackiewicz, Rozek, Hulleman, & Hyde, 2012). In the present context, parents' beliefs about the utility value of attending school regularly in the early grades (i.e., the extent to which they believe attending school in grades K-5 is useful and relevant for their child's future) may affect their behaviors and involvement in their child's early education.

Despite the intuitive appeal of the idea that parental beliefs impact parenting behaviors, and therefore student outcomes, there is no causal research examining the effect of parental beliefs about student attendance on attendance outcomes. A qualitative study indicated that a majority of parents believed attendance in early grades is not as important as attendance in later

grades (Ehrlich et al., 2014). The study found a link between parental beliefs and student attendance: parents who had strong beliefs about the importance of regular attendance in early grades also had children with better attendance. In particular, parents who believed that regular attendance in early grades is important had children with absence rates 43% lower than children whose parents did not believe that regular attendance in early grades is important (7.5% vs. 13.2% absence rates, respectively) (Ehrlich et al., 2014).

The prior research suggests that parental beliefs about the value of the daily attendance in kindergarten and elementary grades may be a barrier to mobilizing parents to improve their child's attendance. Therefore, a key opportunity to improve attendance in kindergarten and elementary school lies in educating parents on the importance of attending school daily in the early grades. Parental beliefs may be shifted to value regular K-5 attendance when communications emphasize that students in grades as early as kindergarten experience rigorous, standard-based schooling that forms the foundation for future learning (Duardo, 2013; Ferguson, 2016).

In addition to many parents' beliefs that students' K-5 attendance is less important than attendance in middle and high school, parents often hold misbeliefs about how many days of school their child has been absent. Parents, like humans more generally, fall victim to the Lake Wobegon effect (Harrison & Shaffer, 1994; Maxwell & Lopus, 1994), believing their child's school attendance is better than that of their classmates.

Specifically, parents tend to underestimate both their child's *total* absences and *relative* absences compared to their child's classmates. A recent survey (Rogers & Feller, under review) asked parents of high-absence students to report how many days of school they thought their child had missed that year, and how their child's absences compared to others in the same grade

and class (i.e., their child's classmates). Parents of high-absence students tended to mistakenly believe that their students had missed fewer days of school than the average student.

Additionally, parents of high-absence students underestimated their child's total absences (9.6 estimated vs. 17.8 actual). These results shed light on another barrier to improving student attendance: even if parents value daily attendance in the early grades, they will not be motivated to help their child attend school more if they do not perceive that their child's attendance is substandard.

Reducing Student Absenteeism at Scale by Mobilizing Parents

As it stands, we know absenteeism robustly predicts many consequential educational outcomes, but much less about how to effectively improve attendance. Furthermore, there is a dearth of experimental evidence on low-cost programs that meaningfully reduce student absenteeism at scale. An evaluation of the Check & Connect program, which aims to improve student engagement and attendance, saw increases in attendance for both middle school students (Sinclair, Christenson, Evelo, & Hurley, 1998) and elementary school students (Lehr et al., 2004). More recently, New York City evaluated the impact of a task force's three-year effort to reduce chronic absenteeism and found that assigning students mentors resulted in almost two additional weeks of attendance (Balfanz & Byrnes, 2013). These programs provide evidence for best practices for improving attendance, yet are difficult to scale due to logistical (e.g., providing mentors for individual students) and financial constraints. The aforementioned literature evaluating various attendance interventions also do not explicitly target parents and their beliefs about the value of attending school as a means to reduce absenteeism.

Thus, there is a great need for low-cost interventions that effectively improve attendance and increasing parents' beliefs about the utility value of regular school attendance may be a cost-

effective approach for doing so. Numerous field experiments examining the impact of interventions on student outcomes imply that low-cost and scalable interventions are feasible (Gehlbach et al., 2015; Kraft & Rogers, 2015; Rogers & Feller, under review). We aim to contribute to the thin body of experimental evidence for reducing student absences at scale, especially for students in early grades (i.e., kindergarten through 5th grade). The present study is the first to target parental beliefs about attendance and schooling in the early years as a way to reduce student absences.

Current Study

The current study examined the impact of an intervention that attempted to improve student attendance at scale in grades K-5 by targeting commonly held parental misbeliefs undervaluing the importance of regular K-5 attendance as well as the number of school days their child has missed. The intervention was conducted across ten school districts (enrolling 26,338 K-5 students and 42,853 students in total) and consisted of delivering personalized information to parents of high-absence students through a series of mail-based communications. Specifically, this study explored whether sending parents mailers that: 1) emphasize the utility value of regular school attendance in the early grades, and 2) accurately report how many days their child has been absent has an impact on student absences (compared to a control group).

Methods

Participants

The sample consisted of 10,967 households across ten school districts in a diverse county in California. Our sample was limited to all first through fifth grade students who were in the bottom 60th percentile of attendance of participating districts countywide during the prior school year, and all kindergarten students (who had no prior school year data). We excluded students

with extreme absences during the prior year (more than two standard deviations above the mean of their school and grade as it may have been due to extenuating circumstances, e.g., a serious illness), students with inconsistent records of absences (two different sources of absence data with more than a three-day discrepancy), and students with very small school by grade combinations (for randomization purposes). In households with two or more qualifying K-5 students attending the same district (18.3%), we randomly selected one student to receive treatment.

For a breakdown of participating students’ demographics, see Table 1. We did not receive outcome data for 4% of the eligible students, so the final analytic sample consists of 10,505 students. Students for whom we do not have outcome data were balanced equally across conditions ($p > .98$). See the Supplementary Online Materials (SOM) for details.

Table 1. Descriptive Statistics for Variables by Condition.

Variables		Condition			Total
		Control	No Insert	Insert	
		%	%	%	%
Grade	K	30.63	30.6	30.75	30.66
	1	14.18	14.18	14.43	14.25
	2	14.72	14.51	14.49	14.59
	3	13.45	13.49	13.29	13.41
	4	14.02	14.21	13.94	14.05
	5	13.01	13.00	13.11	13.04
Spanish speaking household		17.64	17.27	18.25	17.71
English Language Learner		31.02	32.54	31.91	31.74
Socioeconomically disadvantaged		18.66	18.08	18.31	18.38
White ethnicity*		37.17	37.26	37.12	37.18

*Data available only for students with outcome data.

Procedure

The research team sent informed consent mailings to 17,159 households, reaching a total of 22,648 K-5 students (all students received consent forms, not just those in the bottom 60th percentile of attendance of participating districts countywide during the prior school year).

Parents were offered the opportunity to opt out of the study at any point during the project by contacting the research team via phone, email, or mail. About 2.54% of K-5 households opted out of the study.

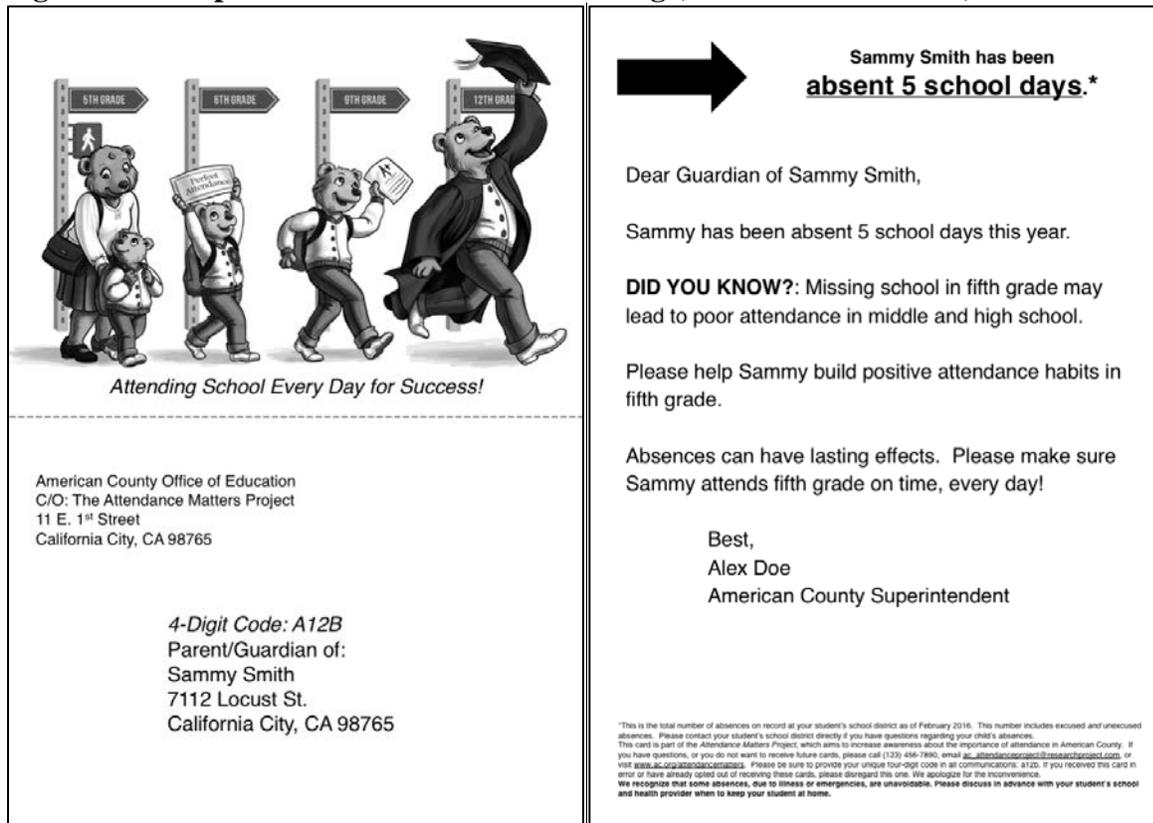
Participating households were then randomly assigned to either a control group (40%), or one of two treatment groups (60%). We first performed a stratified randomization by school, grade, and prior year absences. After the first mailing, we performed a second randomization of only the treatment group (stratified by the same variables), assigning half to the “Mailing Only” treatment condition and the other half to “Mailing + Supporter” treatment condition. We checked to ensure the treatment and control groups were balanced across covariates. See the SOM for details.

Households assigned to the control group (N = 4,388) received no additional communications beyond what is typically administered by schools and districts. We sent six rounds of treatment over the course of the school year to treatment households, sending on average 5.15 mailings to each household (after accounting for opt-outs, bounce backs, etc.). See Figure 1 for an example of the treatment. The “Mailing Only” treatment group (N = 3,307) received mailings that emphasized the importance of regular school attendance during the earlier grades and the utility value of early years schooling, and reported the total number of days the student had been absent to-date that year. For instance, the first treatment explicitly linked attendance in early grades with student learning, and provided one example of the English Language Arts Common Core State Standards pertaining to the grade level of the student. See Table 2 for an overview of the treatment topics.

In addition to receiving the same treatment as the “Mailing Only” condition, communications to the “Mailing + Supporter” treatment group (N = 3,272) included a

supplementary insert that encouraged parents to reach out to their “attendance supporters” (e.g., relatives, friends, and other community/school members who support parents with attendance-related issues).² Because the addition of these inserts did not significantly affect the results (i.e., there was no marginal impact of adding an insert on student attendance), we do not discuss the theoretical rationale for their inclusion.

Figure 1. Example of the K-5 attendance mailing (exterior and interior).



² The “Mailing + Supporter” treatment group did not start receiving attendance supporter-focused inserts until mailing #2. The two treatment conditions received identical mailings in mailing #1.

Table 2. Overview of six mailings sent to grades K-5 households.

Mailing	Date Received	Messaging
1	Nov 16-20, 2015	Attendance in early grades affects student learning (English Language Arts Common Core State Standards).
2	Feb 2-5, 2016	Absences in earlier grades can build long-lasting habits that result in absences in later grades.
3	Mar 1-7, 2016	Absences result in missed learning opportunities that cannot be replaced.
4	Mar 23-25, 2016	Attendance is linked to literacy skill development.
5	Apr 25-27, 2016	Attendance in early grades affects student learning (Math Common Core State Standards).
6	May 11-13, 2016	Strong attendance is associated with higher likelihood of high school graduation.

Households that were flagged as Spanish-speaking were assigned to receive the treatment in Spanish (N = 1, 136). All other households were assigned to receive the treatment in English (N = 5, 166). Per county data, the majority of the households in the district (63.9%) with English Language Learners indicated that Spanish was their primary home language. The first treatment mailing was sent in mid-November and continued through mid-May of the following year. The production and distribution of the treatment mailings cost about \$5.68 per student per year.

At the end of the school year, the research team conducted a 15-minute phone survey of eligible households (both treatment and control) to learn whether the intervention impacted parental beliefs. The phone survey reached 1,710 participating households, 1,599 (93%) of which were eligible to participate in the survey (i.e., the respondent was the student's parent or guardian). 432 respondents, or 27% of the eligible participants completed the entire phone survey.

Measures

The primary outcome for this study was the total number of absences a student accumulated during the school year. We also examined the total number of absences a student accumulated from the date of the first mailing through the end of the school year. In both cases,

the total number of absences included both excused and unexcused absences because we did not receive excused absence flags from all school districts. Prior research suggests that the results are consistent whether examining excused and unexcused absences separately or together (Rogers & Feller, under review). We also examined whether the treatment impacts the percentage of students who qualify as chronically absent (missing 18 or more days of school).

In the end-of-school year phone survey, parents responded to questions about the number of school days their child has been absent, as well as a series of 11 statements on their beliefs about the value of education and attendance. To evaluate the former belief, we asked, “There are 180 school days each year. On how many of those days do you think [student first name] was absent from school, for both unexcused and excused reasons?” To assess the latter belief, parents were asked to what extent they agree with statements about the utility value of early grade attendance, such as the following: “Each additional absence has a big effect on [student first name]’s math ability.” Table 5 presents the relevant items. Each response was coded on a four-point scale, from strongly disagree (1) to strongly agree (4).

Analysis

We registered an analysis plan (Rogers, 2016) before receiving outcome data from the school districts and pre-specified four hypotheses:

Hypothesis 1: Students who received treatment mailings (“Mailing Only” and “Mailing + Supporter” together) will have improved attendance as compared to students in the control group.

Hypothesis 2: Students in the “Mailing Only” treatment group will have improved attendance as compared to students in the control group.

Hypothesis 3: Students in the “Mailing +Supporter” treatment group will have improved attendance as compared to students in the control group.

Hypothesis 4: Students in the “Mailing +Supporter” treatment group will have improved attendance as compared to students in the “Mailing Only” treatment group.

To assess these hypotheses, we first employed Fisher Randomization Tests (FRT) to obtain exact p -values to determine whether there was a statistically significant treatment impact on student absences (Athey & Imbens, 2016). Second, we fit linear regression models to estimate the Average Treatment Effect (ATE) of random assignment to the treatment condition on student absences. To examine the ATE on chronic absenteeism, we used logit regression models. Our final models adjusted for student-level demographic indicators, student’s previous year absences³ (when available), and the student’s school and grade level. For specific subgroup analyses, we report OLS point estimates of absolute absence counts for ease of interpretation, but overall our results were robust to different model specifications (e.g., negative binomial regression models) and transformations (i.e., log transformed absences). The SOM provides details on all of the sensitivity checks.

We also explored the extent to which the treatment impacted parental beliefs about the importance of schooling in the early grades and whether the treatment corrected parents’ (possibly incorrect) beliefs about how many days their child was absent. We conducted a factor analysis to create latent variables that summarize parental beliefs toward education and attendance, and then evaluated the ATE on parental beliefs.

³ Because we do not have last year’s absence data for kindergarten students, we created a categorical variable to control for grade 1-5 students’ prior year absences (two quantiles) and kindergarten received its own dummy indicator.

Results

Student Absences & Chronic Absenteeism

Table 3 presents the results for the impact of the pooled treatment groups (Hypothesis 1). We find that students of parents who were assigned to either treatment condition (the “Mailing Only” and “Mailing + Supporter” groups) were absent significantly less than students of parents who did not receive mailings (the control group). Students in households assigned to receive attendance mailings were absent for 0.53 fewer days over the course of the entire school year, on average, than students in households that did not receive attendance mailings ($SE = 0.11$, $FRT\ p < .001$). This translates to a 7.7% reduction in absences compared to students in the control condition. Students in the treatment groups were absent an average of 6.37 days compared to 6.9 days in the control group (all means regression-adjusted).

This also corresponds with a 14.9% reduction in chronic absenteeism: 5.45% of students in the control group were absent at least ten percent of school days, compared to only 4.64% of students in the treatment conditions ($SE = 0.9$, $p = .056$).

Table 3. ATE on student absences of parent being assigned to receive a treatment mailing (“Mailing Only” and “Mailing + Supporter” pooled vs. Control)

	Absences		Chronic Absenteeism	
	1	2	3	4
Treatment pooled	-0.567 ^{***} (0.119)	-0.531 ^{***} (0.113)	-0.183 [*] (0.091)	-0.178 ⁺ (0.093)
<i>N</i>	10,504	10,504	10,504	10,473
Control Mean	6.924	6.902	-2.849	-2.854
Covariates	No	Yes	No	Yes

⁺ $p < 0.1$; ^{*} $p < 0.05$; ^{**} $p < 0.01$; ^{***} $p < 0.001$

Standard errors in parentheses.

Covariates include indicators for socioeconomic disadvantage (SED), English Language Learner (ELL), previous year’s absence quantiles (when available), school and grade.

Column 1 & 2 coefficients are point estimates from OLS regression models. The associated p-values are from FRT.

Column 3 & 4 coefficients (the estimated log-odds) and associated p-values are from logit regression models.

Column 4 has fewer participants because a handful of small schools perfectly predicted the outcome variable and were therefore dropped in the regression.

When only accounting for absences accumulated from the date of the first mailing through the end of the school year, students in the treatment conditions were absent 0.54 fewer days, which translates to a 10.4% reduction in absences compared to the control group ($SE = 0.09$, $FRT p < .001$).

Table 4 and Figures 2 and 3 illustrate the differences between each of the three conditions (Hypotheses 2-4). Both the “Mailing Only” and “Mailing + Supporter” treatments significantly reduce absences compared to the control group (-0.5 and -0.56 days, respectively, $FRT ps < .001$), and there is no difference on total absences between the two treatment groups ($\beta = -0.061$, $SE = 0.143$, $FRT p = .914$). See the SOM for more details on the analyses between the two treatment conditions.

Table 4. ATE on student absences of parent being assigned either the “Mailing Only” treatment group or the “Mailing + Supporter” treatment group, as compared to control

	Absences		Chronic Absenteeism	
	1	2	3	4
Mailing Only	-0.535 (0.140) ^{***}	-0.501 (0.134) ^{***}	-0.065 (0.105)	-0.057 (0.108)
Mailing + Supporter	-0.599 (0.141) ^{***}	-0.562 (0.134) ^{***}	-0.316 (0.113) ^{**}	-0.314 (0.116) ^{**}
<i>N</i>	10,504	10,504	10,504	10,473
Control Mean	6.924	6.902	-2.849	-2.845
Covariates	No	Yes	No	Yes

⁺ $p < 0.1$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Standard errors in parentheses.

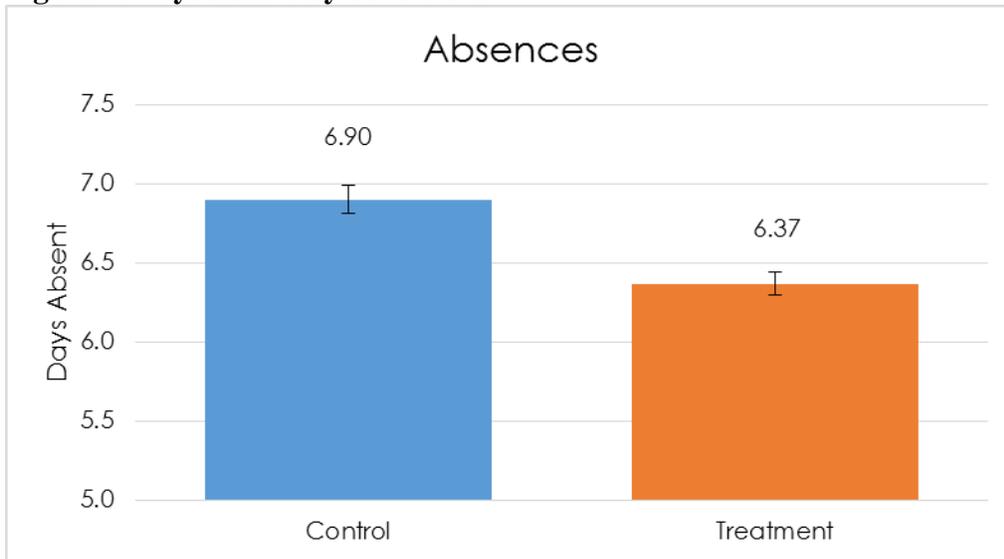
Covariates include indicators for socioeconomic disadvantage (SED), English Language Learner (ELL), previous year’s absence quantiles (when available), school and grade.

Column 1 & 2 coefficients are point estimates from OLS regression models. The associated p-values are from FRT.

Column 3 & 4 coefficients (the estimated log-odds) and associated p-values are from logit regression models.

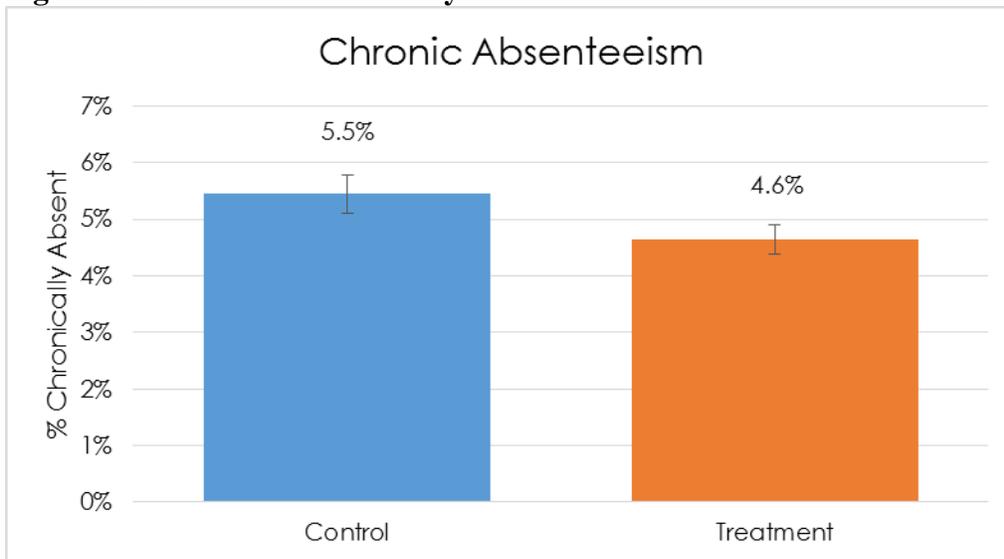
Column 4 has fewer participants because a handful of small schools perfectly predicted the outcome variable and were therefore dropped in the regression

Figure 2. Days absent by condition.



Note: Bars represent +/- 1 standard error (SE).

Figure 3. Chronic absenteeism by condition.



Note: Bars represent +/- 1 standard error (SE).

Heterogeneity in the Treatment Effect

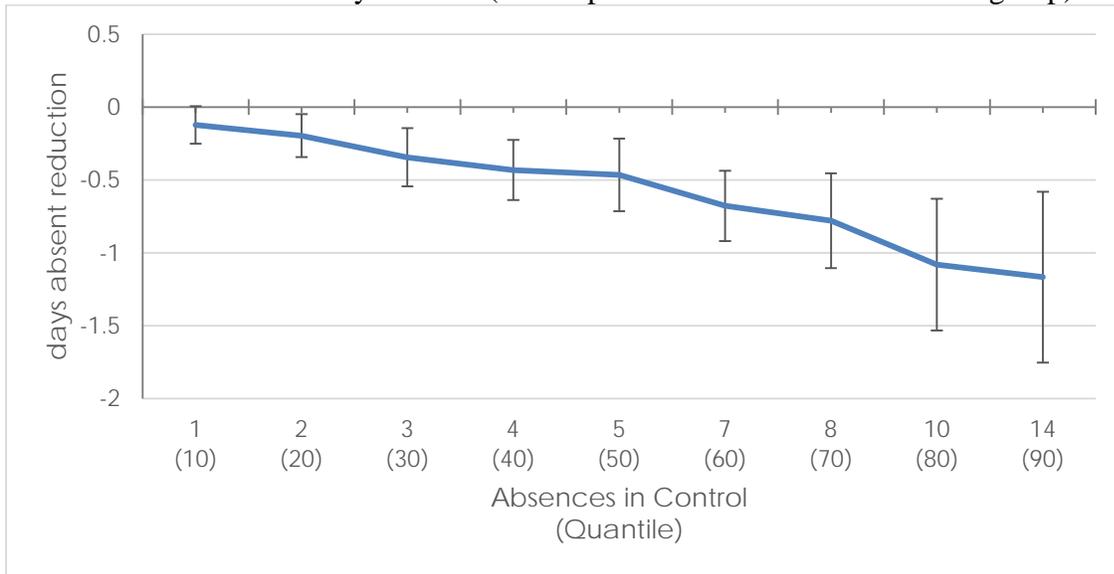
We also conducted exploratory analyses to determine if there was heterogeneity in the treatment effect. We used a quantile regression analysis⁴ to explore treatment effect variation by the total number of absences a student accumulates during the school year. The results suggest

⁴ We used the jittering method to address the fact that we have a count dependent variable.

that the mailings appear to be more effective for students who had the poorest attendance, a pattern consistent with that found in Rogers and Feller (under review). Figure 4 illustrates this pattern, showing that the treatment effect is significantly lower when students only miss one day of school overall (Students in 1st decile: ATE = -0.12 days) as compared to when students miss ten days of school overall (Students in 8th decile: ATE = -1.08 days).

Figure 4. Quantile Regression on Student Absences.

Treatment Reduction in Days Absent (as compared to students in the control group)



Note: Bars represent the 95% confidence interval.

Furthermore, the exploratory analysis showed that the treatment effect was marginally significantly larger for students who are identified as English Language Learners (ELLs). The mailings reduced absences by 0.84 days, on average, for ELL students while the mailings only reduced absences for native English-speaking students by an average of 0.39 days ($SE = 0.24$, $p = .065$). We find this impact despite the fact that ELL students tend to have significantly fewer absences than English-speaking students, in general (6.09 days absent vs. 6.82 days absent, respectively, $t = 5.91$, $p < .001$).

The mailings also appeared to have a significantly larger effect for students from households that are socioeconomically disadvantaged. The mailings reduced absences by 1.02

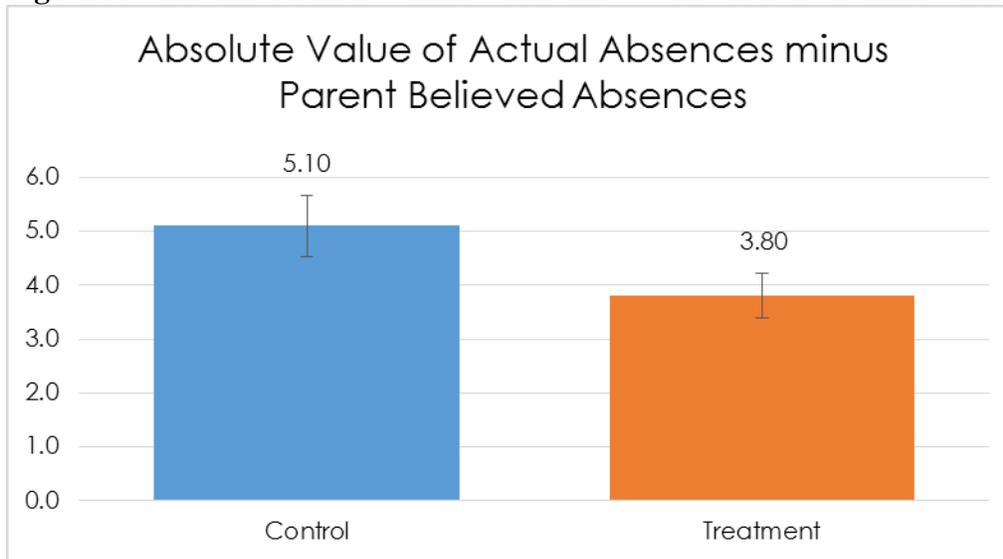
days, on average, for socioeconomically disadvantaged students, as compared to an average reduction of only 0.42 days for students who are not socioeconomically disadvantaged ($SE = 0.29, p = .041$). In general, socioeconomically disadvantaged students have significantly more absences than students who are not socioeconomically disadvantaged (7.41 days absent vs. 6.4 days absent, respectively, $t = -6.73, p < .001$). The SOM provides details on the sensitivity checks.

We found no evidence for treatment effect variation by grade-level, suggesting the intervention was equally effective for students from grades kindergarten through 5th grade. Additionally, we found no evidence of treatment effect variation by race, gender, language of mailings, or previous year absence count.

Parental Beliefs

The phone survey provided some insight into how the intervention motivated parents to reduce their children's absences. First, we assessed if the mailings improved parents' accuracy about the number of school days their child had missed. Parents in the control condition were off by an average of 5.1 days in their estimation of their child's absences during the school year. Comparatively, parents who received mailings were more accurate in their appraisals, and were off by only 3.8 days in their estimation. As illustrated in Figure 5, the mailings increased parent accuracy regarding the number of days of school their child had missed by approximately one day ($SE = 0.69, p = .06$).

Figure 5. Absolute Value of Actual Absences Minus Parent Believed Absences



Note: Bars represent +/- 1 standard error (SE).

Second, we explored whether the mailings impacted parental beliefs about the value of schooling in the early grades. The factor analysis produced three factors with eigenvalues greater than one (2.96, 1.36, and 1.2, respectively), but we limit our analysis to the first two factors for substantive reasons. That is, the third factor does not represent a coherent concept. Cronbach's alpha for the first and second factors is 0.73 and 0.63, respectively, while Cronbach's alpha for the third factor is only 0.32. The first factor includes agreement with items such as "Each additional absence has a big effect on [student first name]'s reading ability" and "What [student first name] learns in [grade] is critical for [him/her] to succeed in high school," representing parental beliefs that schooling in the early grades is valuable and regular attendance is important. The second factor represents parental beliefs that attendance in the early grades is not important, including agreement with items such as "Missing a few days of school each month in [grade] is not a big deal." Table 5 shows which items load on each factor.

After calculating the factors scores, we found that there is a significant ATE on the first factor ($\beta = 0.64$, $SE = 0.27$, $p = .019$), but not the second factor. In other words, the mailings

made parents more likely to agree with statements about the value of schooling in the early grades and the importance of regular attendance. We did not find evidence that the treatment made parents disagree with statements that de-emphasize the value of attendance in the early grades.

Table 5. Relevant Phone Survey Items & Factor Loadings.

Factor 1: Parental beliefs that schooling in the early grades is valuable and regular attendance is important	Factor Loadings
Each additional absence has a big effect on [STUDENT FIRST NAME]’s math ability.	+0.81
Each additional absence has a big effect on [STUDENT FIRST NAME]’s reading ability.	+0.80
In order to be on track for [GRADE+1], it is important for [STUDENT FIRST NAME] to be in school every single day.	+0.70
Missing a few days of school each month in [GRADE] can lead to poor attendance in middle school and high school.	+0.48
What [STUDENT FIRST NAME] learns in [GRADE] is critical for [him/her] to succeed in high school.	+0.32
What [STUDENT FIRST NAME] was taught this year [GRADE] is based on rigorous standards set by the state of California.	+0.31
Missing a few days of school each month in [GRADE] is not a big deal. (negative)	-0.32
Factor 2: Parental beliefs that attendance in the early grades is not important	Factor Loadings
Absences during elementary school will not affect whether or not [STUDENT FIRST NAME] graduates from high school.	+0.69
It’s okay for [STUDENT FIRST NAME] to be absent for a few days each month, as long as they are excused absences.	+0.69
Missing a few days of school each month in [GRADE] is not a big deal.	+0.67
Missing a few days of school each month in [GRADE] can lead to poor attendance in middle school and high school.	-0.47
Questions not loading on first two factors	
[STUDENT FIRST NAME] and I have a warm and loving relationship.	
On some days, [STUDENT FIRST NAME] and I disagree about whether [he/she] should go to school.	

Discussion

Recent policy initiatives focus attention on the importance of improving student attendance (*Every Student, Every Day: A Community Toolkit to Address and Eliminate Chronic Absenteeism*, 2015). While student absenteeism is a concern across all levels of K-12 schooling, absences in grades K-5 may compound to result in continued chronic absenteeism in later years (Ehrlich et al., 2014), learning setbacks (Finn, 1993), and widening of the achievement gap (Balfanz & Byrnes, 2006). The present study increased attendance in grades K-5 using a light-

touch, scalable intervention that involved sending personalized and automated communications to parents. Using readily-available administrative data, these communications specifically emphasized the utility value of daily attendance in the early grades and provided parents with accurate information on how many school days their child had missed.

This study builds on the body of research that supports an asset-based view of families (Epstein & Sheldon, 2002; Valencia, 1997) and successfully targeted parental beliefs to reduce student absenteeism across ten districts. A study exploring the impact of absences due to snow days estimated that each additional absence reduces student math achievement by 0.05 standard deviations (Goodman, 2014), which has major implications when considering that chronically absent students miss more than 18 days per year. The present intervention resulted in students attending 3,486 more days of school over the course of the year (0.53 days * 6,579 students in the treatment conditions), and appeared to be most effective for the most at-risk students. The treatment effect was larger for students for whom English is a second language and who come from households that are socioeconomically disadvantaged. Most importantly, the mailings decreased chronic absenteeism by 15%.

Beyond the positive outcomes associated with better attendance at the student-level, this intervention may be viewed favorably by practitioners because schools have additional incentives to improve their students' attendance rates. For one thing, schools with higher daily rates of student attendance achieve higher average standardized test scores (Roby, 2004), which serves as a key performance indicator for schools (*Every Student Succeeds Act*, 2015). Additionally, many states distribute funding on a per-student per-day basis, making improving student attendance a financial concern for schools (Ely & Fermanich, 2013).

Despite the general consensus that improving attendance is a worthwhile objective for students and schools alike, successful evidence-based interventions may not be widely adopted by schools due to logistical and financial constraints. The present intervention, which was designed to minimize implementation barriers, can be economically implemented by schools because it leverages pre-existing administrative data (i.e., household addresses and student attendance records) and an affordable delivery method (i.e., postal mail). Overall, the intervention cost about \$10.69 per incremental school day generated. Other interventions that employ mentors and social workers can cost over \$120 per incremental school day (see Rogers & Feller, under review). Furthermore, the intervention mobilizes the efforts of a costless resource for schools and students: parents.

Almost all parents want their children to be successful, but schools need to empower and inform parents if they can be expected to effectively intervene upon their child's education. This study demonstrates that targeting parental beliefs is a logical intervention point for mobilizing parental involvement in kindergarten and elementary school. In particular, this intervention suggests schools might target parental beliefs by emphasizing the value of regular attendance in the early grades and providing periodic updates on students' attendance records.

Past research suggests that parents do not necessarily believe attendance in early grades as important as attendance in later grades (e.g., Ehrlich et al., 2014). This is not particularly surprising, given that chronic absenteeism is often billed as leading to students dropping out of high school (e.g., *Every Student, Every Day: A Community Toolkit to Address and Eliminate Chronic Absenteeism*, 2015). But the threat of future dropout may not be particularly motivating for parents of K-5 students, most of whom still *assume* that their child will graduate from high school despite the fact that “failure in the early grades virtually ensures failure in later schooling”

(Slavin, 1999, p. 105). This intervention appeared to work in part because it impacted parental beliefs about the utility value of attending school in the early grades. Therefore, focusing on the standards students must meet by the end of their current grade and the threat of lost learning time may be more effective at motivating parental involvement than the threat of dropout in grades K-5.

In addition to focusing on the proximal utility value of early school attendance, parent-focused interventions may be bolstered by providing information that encourages behavior change (Hattie & Timperley, 2007). The treatment partly corrected parents' incorrect beliefs regarding the number of days their child had been absent, increasing parental accuracy by approximately one day. Given that parents consistently underestimate their child's absences, which may prevent them from reducing their child's absences, schools can do much more to communicate accurate information about students' attendance records.

Limitations and Future Research

While the intervention improved student attendance and reduced chronic absenteeism, there are three notable limitations and directions for future research. First, this light-touch, low-cost intervention should not replace more intensive attendance-focused efforts, such as attendance officers, social workers, and mentors. We acknowledge that many factors contributing to poor attendance, such as poverty and family instability, cannot be solved by a mail-based intervention. Instead, schools might employ this intervention as a first step towards reducing chronic absenteeism, and then target the more costly, intensive attendance-focused efforts on the students who need it most.

Second, this study was unable to determine the marginal impact of adding an insert that encouraged parents to reach out to others they could enlist to help improve their child's

attendance (the “Mailing + Supporter” condition). The two treatment conditions had a comparable, positive impact on student attendance. More research is needed to determine whether encouraging parents to elicit help to improve their children’s attendance is an effective parental involvement strategy.

Third, while the present intervention concentrates on parents of kindergarten and elementary students, it may be that belief-focused interventions aimed at parents may results in absence reduction across all grades. Given that we saw no treatment variation by grade level, an appropriate next step may be extending the intervention to target parents of students in middle and high school, as well.

Conclusion

Up to this point, the experimental evidence on how to improve student attendance in grades K-5 has been extremely limited. Our study begins to address this critical void in the field by examining whether communications that target parental beliefs can mobilize parents to improve their child’s attendance. Given the positive results, future educational intervention work should consider adopting an asset-based view of parental involvement as early as possible.

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