

Robinson, C. D., Lee, M. G., Dearing, E., & Rogers, T. (2018). Reducing Student Absenteeism in the Early Grades by Targeting Parental Beliefs. *American Educational Research Journal*. DOI: 10.3102/0002831218772274

Reducing Student Absenteeism in the Early Grades by Targeting Parental Beliefs

Carly D. Robinson

Harvard Graduate School of Education, Harvard University

Monica G. Lee

Center for Education Policy Analysis, Stanford University

Eric Dearing, PhD

Lynch School of Education, Boston College

Todd Rogers, PhD

Harvard Kennedy School, Harvard University

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.

Keywords:

Attendance, Parents, Beliefs, Intervention

Introduction

Amidst the ever-changing educational political landscape 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 often 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, including 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 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 have better attendance (Ehrlich et al., 2014).

Targeting parental beliefs about the importance of regular K-5 attendance could 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 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 students with average or below-average 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.

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 had underwhelming elementary educational experiences or who lives in a state that does not mandate kindergarten attendance, could undervalue daily attendance in the early grades.

Students from low-income families may be particularly likely to have parents who undervalue daily attendance. As compared to more affluent parents, low-income parents tend to feel excluded from a school system that may not necessarily reflect or acknowledge their beliefs, socioeconomic challenges, or cultural backgrounds (Hoover-Dempsey & Sandler, 1997). When parents harbor feelings of distrust towards school, they may be even more susceptible to misbeliefs regarding the value of schooling.

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). Notably, despite the intuitive appeal of the idea that parental beliefs impact parenting behaviors, and therefore student outcomes, no causal research explicitly examines whether changing parental beliefs actually changes parenting behaviors. That is, researchers tend to infer changes in parenting behaviors by assessing parental beliefs and student outcomes. For example, parents who received the STEM intervention reported higher perceived utility value of STEM courses and their children reported engaging in more conversations with their parents about STEM courses, so it is reasonable to suggest that parents' beliefs may have impacted their parenting behaviors. In the present context, we similarly explore whether 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) affect their child's attendance.

To date, there is no experimental research examining the effect of parental beliefs about student attendance on attendance outcomes. A qualitative study that interviewed a diverse range of parents from a large urban school district 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, children of parents who believed that regular attendance in early grades is important had absence rates 43% lower than that of 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 daily attendance in kindergarten and elementary grades may be a barrier to mobilizing parents to improve their

child's attendance. Therefore, a potential opportunity to improve attendance in kindergarten and elementary school might lie 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 misperceptions that students' early grade attendance is less important than attendance in middle and high school, parents often hold misbeliefs about how many days of school their child has missed. 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, 2018) asked parents of high-absence students in a large urban school district 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 child 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 absences, on average). These results shed light on another potential barrier to improving student attendance: even if parents value daily attendance in the early grades, they may 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 for students with learning and emotional/behavioral disabilities by providing students with dedicated mentors, saw increases in attendance for middle school students but not for elementary school students (Guryan et al., 2017; Sinclair, Christenson, Evelo, & Hurley, 1998). Specifically, the program decreased absences for students in grades 5-7 by three days, but there were no statistically significant effects of participating for students in grades 1-4. In another effort, New York City evaluated the impact of a task force's three-year program to reduce chronic absenteeism and found that assigning students with histories of extreme chronic absenteeism to mentors resulted in almost two additional weeks of attendance (Balfanz & Byrnes, 2013). This translated to a 1.5 percentage point reduction in chronic absenteeism in participating schools, which is equivalent to an effect size of .14 and considered meaningful when applied to a large population (Balfanz & Byrnes, 2013).

These programs provide evidence for best practices for improving attendance for the most at-risk students, yet are difficult to scale due to logistical (e.g., providing mentors for individual students) and financial constraints. Because of these constraints, students at the threshold of being considered chronically absent or those who are not traditionally flagged as at-risk tend to fall through the cracks. The aforementioned literature evaluating various attendance interventions also does not explicitly target parental 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 for a wide range of students and targeting parents' beliefs about school attendance in the early grades may be a cost-effective lever. The field of behavioral science provides a foundation for understanding how inexpensive and scalable interventions that target parents' false beliefs may result in improved student attendance.

Broadly, behavioral science illuminates how cognitive, social, and informational decision contexts influence individuals' behaviors (Rogers & Frey, 2015). Behavioral interventions aim to change behavior in predictable ways by targeting internal processes, such as intuitions, emotions, and automatic decision-making (Thaler & Sunstein, 2008). These processes can be activated with simple cues, so behavioral strategies can be effective yet cheap and administered through channels that can reach large numbers of people (e.g., mail) (Benartzi et al., 2017; Richburg-Hayes, Anzelone, Dechausay, & Landers, 2017). Educational researchers are increasingly leveraging behavioral insights to encourage desirable behaviors that improve student success, as demonstrated by the numerous field experiments examining the impact of behavioral interventions on student outcomes, including course completion and grades, attendance, college-going, and so forth (e.g., Gehlbach et al., 2016; Kraft & Rogers, 2015; Robinson, Pons, Duckworth, & Rogers, 2018; Rogers & Feller, 2018). These studies establish that low-cost and scalable behavioral interventions in education are feasible and can positively impact student outcomes.

One behavioral strategy that research has shown to be particularly effective at motivating behavior change involves correcting mistaken beliefs (Rogers & Frey, 2015). Beliefs can restrain people from carrying out a behavior, or they can facilitate people performing a behavior (Lewin, 1951). People's mistaken beliefs can stem from biased perceptions (Prentice & Miller, 1993) or

lack of knowledge, which in turn can interfere with enacting beneficial behaviors (Rogers & Frey, 2015).

We designed an intervention that attempted to enduringly change parents' mistaken beliefs about their child's attendance that may restrain parents from engaging in attendance-promoting behaviors (e.g., that attendance in the early grades is not important, perceiving their child missed fewer school days than he or she actually missed). To change inaccurate beliefs, one must "unfreeze" prior beliefs, "move" (change, remove, or create) beliefs, and then "refreeze" the new beliefs (Lewin, 1951). One way to enact this unfreezing-moving-refreezing process to enduringly change a belief is by re-framing existing beliefs (Vosniadou & Brewer, 1987) or through exposure to new information (Gerber, Huber, Doherty, Dowling, & Hill, 2013; Piaget, 1985).

By exposing parents to new information and re-framing their beliefs about the importance of attending school in the early grades and their child's attendance record, 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 fifth 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) across urban, suburban, and rural settings on

the West Coast. The intervention consisted of delivering personalized information to parents of medium- and 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). The study also tested the marginal impact of adding an insert to the mailing that encouraged parents to reach out to others they could enlist to help improve their child's attendance.

We tested the impact of sending parents mailers on attendance by randomly assigning K-5 households to one of three conditions: the "Mailing Only" treatment condition, the "Mailing + Supporter" treatment condition, and an untreated control group. Households in the "Mailing Only" and "Mailing + Supporter" treatment conditions received identical mailings that targeted parental beliefs about the utility value of attendance in the early grades and the total number of school days their child had missed that year. Households in the "Mailing + Supporter" treatment condition also received an additional insert that urged parents to ask their social network for help getting their child to and from school.²

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

- Hypothesis 1: Students who received either treatment mailing ("Mailing Only" or "Mailing + Supporter") 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.

We did not specify a priori hypotheses for which subgroups of students the intervention would be more effective. Therefore, our analyses exploring differential impact of the intervention on attendance by student subgroups should be interpreted as exploratory. We planned to explore subgroup differences based on demographic characteristics such as race, gender, socioeconomic status (proxied by an indicator for socioeconomic disadvantaged households), English Language Learner (ELL) status, and language spoken in the home (proxied by language of mailings), in addition to attendance characteristics such as current year absence count, and previous year absence count.

Methods

Participants

The sample consisted of 10,967 households across ten school districts in a diverse county in California. Our sample included all kindergarten students and all first through fifth grade students who were in the bottom 60th percentile of attendance of participating districts countywide during the prior school year. Because kindergarten students had no prior school year data, our sample includes all kindergarten students who registered before the start of the school year. 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, such as 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 (16.6%), we randomly selected one student to be assigned to an experimental condition. The non-treated siblings were not included in the analytic sample.

We did not receive outcome data for 4% of the eligible students and we excluded one student who was marked absent every day of the year, so the final analytic sample consists of 10,504 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 S1).

Intervention Development

We designed the intervention based on three key research findings that we supplemented by conducting parent focus groups in the spring prior to the study's fall launch. The County Office of Education recruited parents of highly absent students in early grades from three of the participating districts. The conclusions from these focus groups mirrored those found in the literature, but also highlighted more specific parental perceptions about attendance that we incorporated to strengthen the intervention design.

First, because parents of young students value attending school less than parents of older students (Ehrlich et al., 2014), we provided parents with different sources of information about the utility value of schooling in the early grades. In the focus groups, parents indicated that they perceived the consequences of an absence to be singular and short-term (e.g., missing a lesson, failing a test), as opposed to being cumulative and affecting long-term student learning outcomes (e.g., not achieving end-of-year benchmarks). Based on these perceptions, we wanted to “unfreeze” existing parental beliefs undervaluing attendance in the early grades. So, we

personalized the communications to the child's school and grade and emphasized the connection between good attendance in their child's grade and specific, grade-based learning outcomes. This information was based on state curriculum standards, as well as other research-based findings about the impact of poor attendance (e.g., Balfanz & Byrnes, 2012). For instance, the first treatment mailer explicitly linked attendance in early grades with student learning and cited one example of the English Language Arts Common Core State Standards pertaining to the grade level of the student.

Second, we know that parents of high-absence students consistently underestimate the number of school days their child has missed (Rogers & Feller, 2018). After "unfreezing" parental beliefs surrounding the utility value of attendance in the early grades, we wanted to "move" their beliefs such that they changed their behavior. To do so, we adapted aspects of an intervention that provided parents with accurate information on their child's attendance record and subsequently reduced student absenteeism. Notably, contrary to research on social norms on other topics, this study also found that providing information on their child's attendance relative to other students had no marginal effect (Rogers & Feller, 2018), leading us to drop the relative absence comparison. Parents in the focus groups also differentiated between excused and unexcused absences, which may contribute to parents' inaccurate beliefs surrounding the number of school days their child missed. Parents perceived excused absences (i.e., those that are accompanied by a parent phone call) to be more acceptable, despite the fact that school districts do not consider an absence excused unless there is written record (e.g., a doctor's note). Our communications emphasized that excused and unexcused absences both "count" and result in lost learning time. See Table 1 for an overview and mailing timeline of the treatment topics.

In addition, the wording of each treatment mailing content was positively framed, with the purpose of changing parent misbeliefs about the importance of attendance and the notion that parents can support their child’s good attendance record, rather than with the intent to blame parents for their child’s absences.

And finally, many families lack access to reliable transportation to school, backup plans for school transit, or a network of supporters who can provide for these practical needs when necessary. All of these factors can contribute to student absences, particularly for low-income families or families with two working parents (Black, Seder, & Kekahio, 2014). The inclusion of the “Mailing + Supporter” treatment condition was based on this last research finding. Utilizing an insert within the mailing, we explored the notion that encouraging parents to find a third-party adult supporter who can support strong student attendance may reduce absences. The insert itself had no marginal effect on student attendance, so we limit our discussion of its inclusion in favor of focusing on the combined “Mailing Only” and “Mailing + Supporter” treatment conditions.

Table 1. Overview of Six Mailings Sent to K-5th Grade 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.

Procedure

The research team coordinated creating, designing, and mailing the intervention materials, while the individual districts managed the data exports. Both the research team and

district administrators were responsible for responding to parent questions throughout the intervention period. 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. The study was approved to waive active consent and employed a passive/opt-out consent procedure. Specifically, 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.

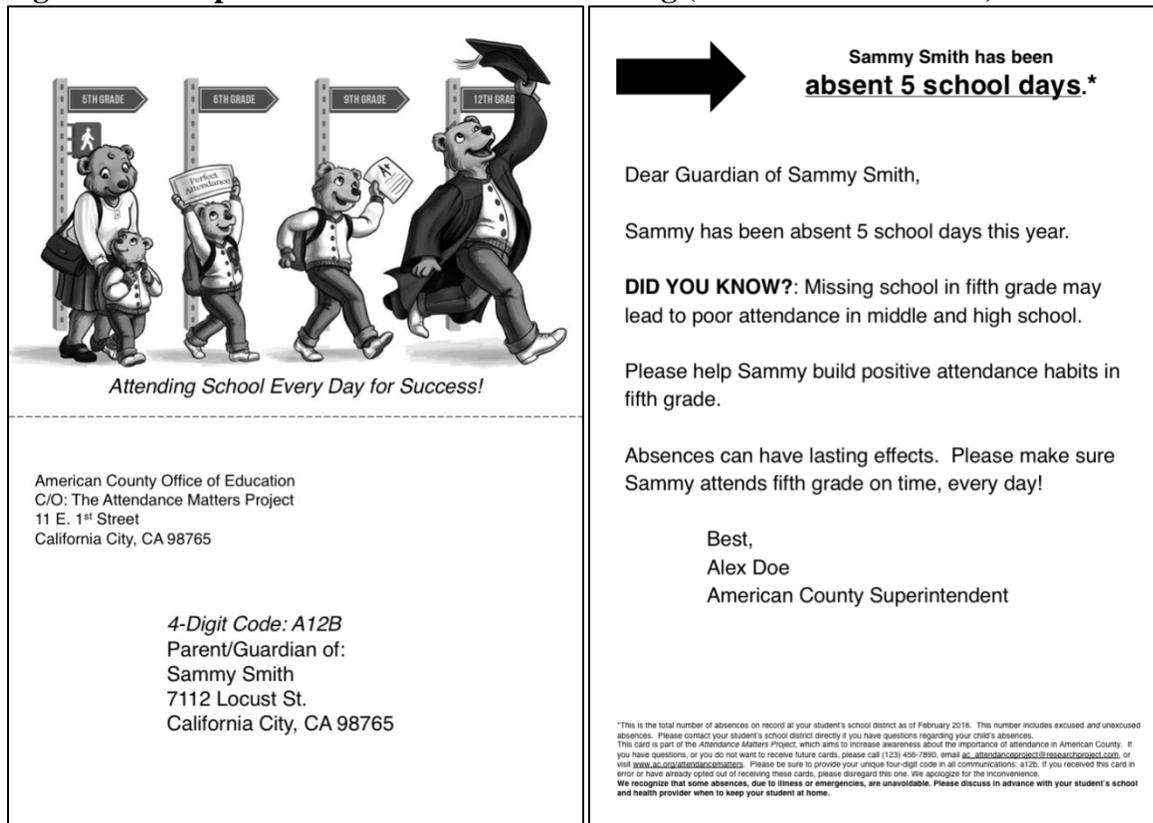
Households assigned to the control group ($n = 4,202$) received no additional communications beyond what is typically administered by schools and districts. We sent six rounds of treatment over the course of the school year to treatment households, sending on average 5.15 mailings to each household (after accounting for opt-outs and undeliverable mail). See Figure 1 for an example of the treatment. The “Mailing Only” treatment group ($n = 3,166$) 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.

In addition to receiving the same treatment as the “Mailing Only” condition, communications to the “Mailing + Supporter” treatment group ($n = 3,136$) included a

Running Head: REDUCING ABSENTEEISM IN THE EARLY GRADES

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). The “Mailing + Supporter” treatment group did not start receiving attendance supporter-focused inserts until mailing #2. That is, the two treatment conditions received identical materials for mailing #1.

Figure 1. Example of the K-5 Attendance Mailing (Exterior and Interior).



We sent the intervention materials in either English or Spanish. Households that were flagged as Spanish-speaking were assigned to receive the treatment in Spanish ($n = 1,168$). Otherwise, households were assigned to receive the treatment in English ($n = 5,410$). Per county data, the majority of the non-English speaking households in the district indicated that Spanish was their primary home language (63.9%). The first treatment mailing was sent in mid-

November and the mailings 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 to learn whether the intervention impacted parental beliefs. The phone survey reached 1,710 participating households, 1,599 (93.5%) of which were eligible to participate in the survey (i.e., the respondent was the student's parent or guardian). 474 respondents, or 30% of the eligible participants completed the entire phone survey. Of these respondents, we received outcome data for all but three students whose parents completed the 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, 2018). We also examined whether the treatment impacts the percentage of students who qualify as chronically absent (missing 18 or more days of school).

We collected demographic variables from the school districts to use as covariates in the analysis, as well as to explore subgroup differences. These demographic variables included the student's race, gender, the primary language spoken at home, an indicator for whether the student is an ELL, and an indicator for whether the student comes from a socioeconomically disadvantaged household. The state of California flags students as socioeconomically

disadvantaged if at least one of the following indicators is present: migrant, homeless, foster care, eligible for Free or Reduced Priced Meals, or if both parents' highest education level is "Not a High School Graduate." The districts also provided the number of absences the student had in the prior year.

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?" This item was adapted from a similar parent survey administered by Rogers & Feller (2018). 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." These items were adapted from prior studies assessing parental beliefs about attendance (Ehrlich et al., 2014) and utility value interventions (Harackiewicz et al., 2012). Table 7 presents the relevant items. Each response was coded on a four-point scale, from strongly disagree (1) to strongly agree (4). We conducted an exploratory factor analysis and provide further information on reliability of the parental belief measure in the Results section.

Analytic Plan

We checked for balance across conditions in the analytic sample using a multinomial logistic regression with condition assignment as dependent variable and baseline variables as independent variables.

To assess our 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 (Tables S2-S6).

We also explored the extent to which the treatment impacted parental beliefs about the utility value 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.

Results

Baseline Equivalence & Descriptive Statistics

We checked to ensure the treatment and control groups were balanced across covariates (i.e., student's race, gender, the primary language spoken at home, an indicator for whether the student is an ELL, an indicator for whether the student comes from a socioeconomically disadvantaged household, and prior year absences). For a breakdown of participating students' demographics, see Table 2. The covariates in the model did not jointly predict treatment assignment, LR $\chi^2(40, n = 10,504) = 10.76, p > .99$. We found that the percentage of English-Language Learner (ELL) students in the "Mailing Only" treatment group was significantly

higher than the control group ($B = 0.15, SE = 0.06, p = .021$). The *Cohen's d* (.035) suggests that this difference was not substantial, and we already planned to control for whether a student is an ELL in our regression models. In this paper, all reported effect sizes are standardized estimates from the unadjusted means.

Over the entire school year, students were absent an average of 6.6 days. Table 3 illustrates the average number of school days students in the intervention missed by grade level. On average, kindergarten students missed the most days of school (7.3 days) while third and fifth grade students missed the fewest days of school (5.9 days).

Table 2. Descriptive Statistics for Variables by Condition.

Variables		Condition			Total
		Control	No Insert	Insert	
		%	%	%	%
Grade	K	30.63	30.58	30.75	30.65
	1	14.18	14.19	14.43	14.25
	2	14.72	14.52	14.49	14.59
	3	13.45	13.49	13.29	13.41
	4	14.02	14.22	13.94	14.05
	5	13.01	13.01	13.11	13.04
Spanish speaking household		17.64	17.27	18.25	17.71
English Language Learner		31.02	32.55	31.91	31.74
Socioeconomically disadvantaged		18.66	18.09	18.31	18.38
White ethnicity*		37.17	37.26	37.12	37.19
Previous year absences (mean days)**		8.24	8.26	8.27	8.26

*Data available only for students with outcome data.

**The majority of kindergarten students are missing data for prior year absences; thus, these statistics only include grades 1-5.

Table 3. Average End-of-Year Absences by Grade Level.

Grade	<i>n</i>	Mean days absent
K	3,122	7.3
1	1,515	6.9
2	1,550	6.2
3	1,418	5.9
4	1,506	6.4
5	1,393	5.9
Total	10,504	6.6

Student Absences & Chronic Absenteeism

Table 4 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 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 ($SE = 0.11$, $FRT\ p < .001$; $Cohen’s\ d = .10$). This translates to a 7.7% reduction in absences. 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 ($SE = 0.9$, $p = .056$). Figure 2 illustrates the treatment effect on average days absent and chronic absenteeism by condition.

Table 4. Average Treatment Effect (ATE) on Student Absences (Pooled Treatments “Mailing Only” and “Mailing + Supporter” 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	-2.853
Covariates	No	Yes	No	Yes

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

Standard errors in parentheses.

Stratification variables were previous year’s absence quantiles (when available), school and grade.

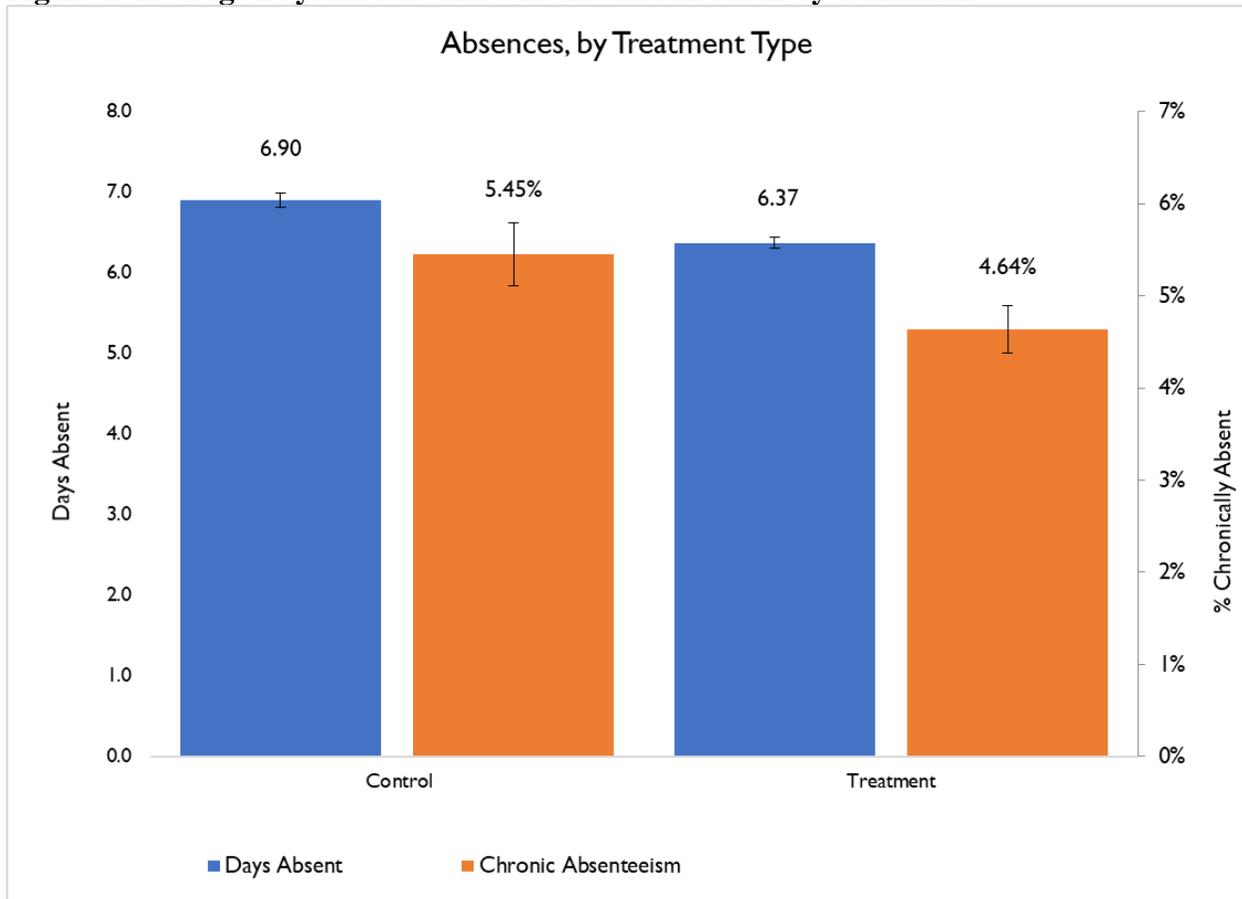
Covariates include indicators for socioeconomic disadvantage (SED), English Language Learner (ELL), and language of the letters.

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. Average Days Absent and Chronic Absenteeism by Condition.



Average days absent by condition (left axis) and chronic absenteeism rates (right axis) by condition. Covariate-adjusted means and standard errors (SEs). Error bars represent +/- 1 SE.

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 ($SE = 0.09$, $FRT p < .001$; $Cohen's d = .12$).

Table 5 illustrates 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 ($B = -0.061$, $SE = 0.143$, $FRT p =$

.923). When we estimated the treatment effect on chronic absenteeism separately, we found that the large reduction in chronic absenteeism is driven by students in the “Mailing + Supporter” treatment condition. The “Mailing Only” condition alone did not have a statically significant impact on chronic absenteeism, but the “Mailing + Supporter” condition reduced chronic absenteeism from 5.45% to 4.09%, or a 24.9% reduction ($B = -0.314, SE= 0.116, p = .007$). When directly evaluating the two treatment conditions, we found that the “Mailing + Supporter” condition appeared to reduce chronic absenteeism by 1.1 percentage points compared to the “Mailing Only” condition ($B = -0.257, SE= 0.124, p = .038$). Examining the impact on chronic absenteeism between the two treatment arms was an exploratory analysis (i.e., an analysis that was not part of our study pre-registration) and accordingly should be viewed as hypothesis-generating or suggestive (see Gehlbach & Robinson, 2017). See the SOM for more details on the analyses between the two treatment conditions (Table S7).

Table 5. Average Treatment Effect (ATE) on Student Absences by Treatment Condition (by Treatment Arms “Mailing Only” or “Mailing + Supporter” vs. 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	-2.853
Covariates	No	Yes	No	Yes

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

Standard errors in parentheses.

Stratification variables were previous year’s absence quantiles (when available), school and grade.

Covariates include indicators for socioeconomic disadvantage (SED), English Language Learner (ELL), and language of the letters.

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.

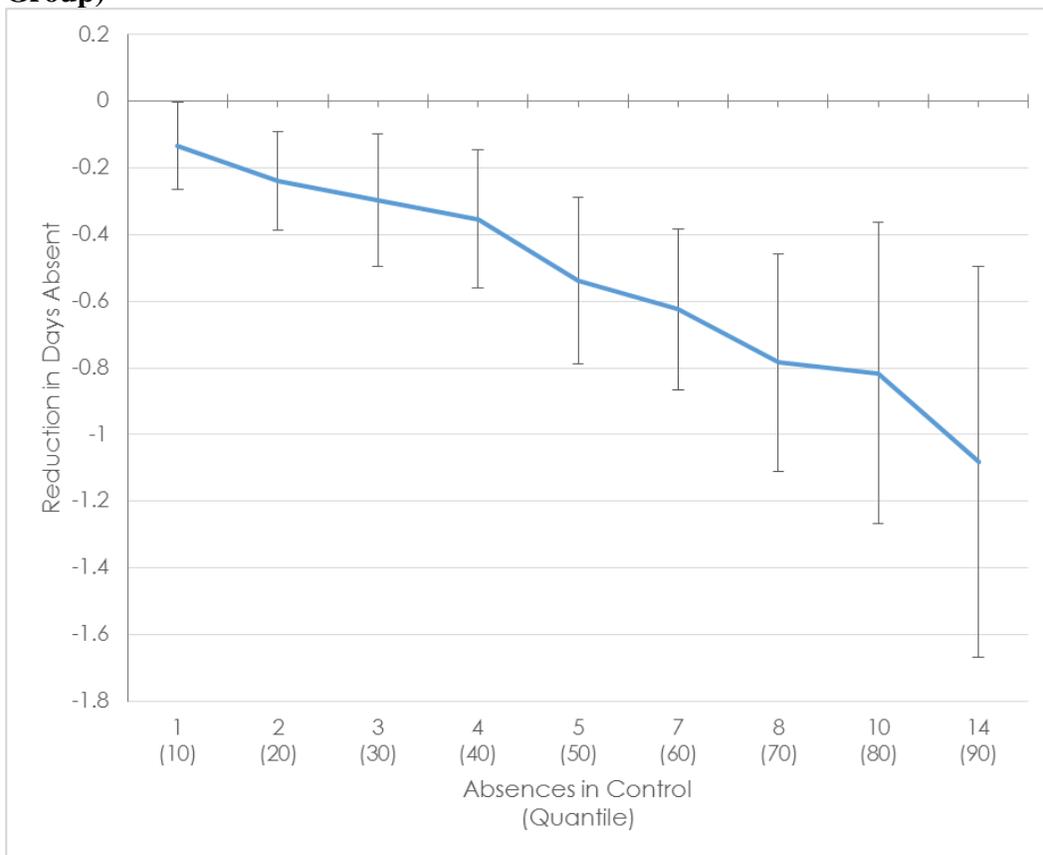
Column 4 has fewer participants because a handful of small schools perfectly predicted the outcome variable and were therefore dropped in the regression

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 analysis to explore treatment effect variation by

the total number of absences a student accumulated during the school year. We employed the jittering method to address the fact that we have a count dependent variable. The results suggest that the mailings appear to be more effective for students who had the poorest attendance, a pattern consistent with that found by Rogers & Feller (2018). Figure 3 illustrates this pattern, showing that the treatment effect is lower when students only miss one day of school overall (Students in 1st decile: ATE = -0.13 days) as compared to when students miss ten days of school overall (Students in 8th decile: ATE = -0.82 days).

Figure 3. Treatment Reduction in Days Absent (As Compared to Students in the Control Group)



Quantile regression estimates. Error bars represent the 95% confidence interval.

Furthermore, the exploratory analysis showed that the treatment effect was larger for students who were identified as ELLs. The mailings reduced absences by 0.83 days, on average,

for ELL students while the mailings only reduced absences for native English-speaking students by an average of 0.39 days ($SE = 0.24, p = .067$; *Cohen's d* = .15). 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, $t(10,502) = 5.91, p < .001$).

The mailings also appeared to have a 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 were not socioeconomically disadvantaged ($SE = 0.29, p = .041$; *Cohen's d* = .12). Overall, socioeconomically disadvantaged students missed more days of school than students who were not socioeconomically disadvantaged (7.41 days absent vs. 6.4 days absent, respectively, $t(10,502) = -6.73, p < .001$). The SOM provides details on the sensitivity checks (Table S8).

We found no evidence of directional variation in the effect of treatment across grade-levels. Additionally, we found no evidence of treatment effect variation by race, gender, language of mailings, or previous year absence count.

Phone Survey & Parental Beliefs

The phone survey provided some insight into how the intervention motivated parents to reduce their children's absences. Households were equally likely to complete the phone survey across the control and treatment conditions. Of the 471 parents who completed the phone survey and for whom we had outcome data, 192 were assigned to the control condition (40.76%), 132 were assigned to the "Mailing Only" condition (28.03%), and 147 were assigned to the "Mailing + Supporter" condition (31.21%), mirroring the original condition assignment.

However, Table 6 demonstrates that households who completed the phone survey differed on key demographic indicators than the larger analytic sample. Phone survey respondents were six percentage points less likely to come from a Spanish-speaking household or from a socioeconomically disadvantaged household ($ps < .001$), and were five percentage points more likely to be White ($p = .034$). There were no differences in phone survey completion based on grade, ELL status, or prior year absences.

Table 6. Descriptive Statistics for Phone Survey Respondents.

N		Did not complete	Completed phone	p-value
		phone survey	survey	
		10,481	474	
Variables		%	%	
Grade	K	30.4	34.0	0.30
	1	14.4	11.8	
	2	14.5	16.0	
	3	13.5	12.4	
	4	14.1	14.3	
	5	13.1	11.4	
Spanish speaking household		18.0	12.2	0.001
English language learner		31.8	31.4	0.87
Socioeconomically disadvantaged		18.7	12.7	<0.001
White		37.0	41.8	0.034
Prior year absences, median (days)		7	7	0.17 ^a

^a p -value from a Wilcoxon rank-sum test. Other p -values in this table are from Pearson’s chi-squared tests.

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. The mailings increased parent accuracy regarding the number of days of school their child had missed by approximately one day ($B = -1.30, SE = 0.68, p = .06, n = 625^4$). When including covariates, we see a similar effect but with a p -value that is slightly greater than conventional levels of significance ($B = -1.05, SE = 0.72, p = .14, n = 625$).

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. After dropping items that did not load on either factor (factor loadings less than 0.3) or reduced scale reliability below $\alpha = .6$, we found that Cronbach's α for the first and second factors is .71 and .63, respectively, while Cronbach's α for the third factor is only .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 "In order to be on track for [the next grade], it is important for [student first name] to be in school every single day," 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 7 shows which items load on each factor.

After calculating the factors scores, we found that there is a marginally significant ATE on the first factor ($B = 0.20$, $SE = 0.11$, $p = .09$, $n = 385$), but not the second factor. In other words, receiving 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. The first factor and the second factor had a moderate, negative correlation with one another, $r = -.43$.

Table 7. 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.	+0.81
Missing a few days of school each month in [GRADE] can lead to poor attendance in middle school and high school.	+0.44
In order to be on track for [CURRENT GRADE+1], it is important for [STUDENT FIRST NAME] to be in school every day	+0.72
What [STUDENT FIRST NAME] was taught this year [GRADE] is based on rigorous standards set by the state of California.	+0.31
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.	+0.70
It’s okay for [STUDENT FIRST NAME] to be absent for a few days each month, as long as they are excused absences.	+0.68
Missing a few days of school each month in [GRADE] is not a big deal.	+0.65
Missing a few days of school each month in [GRADE] can lead to poor attendance in middle school and high school.	-0.43

*We only show Factor Loading that are above 0.3 and, when included, do not drop the Cronbach’s α below 0.6.

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 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 district 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 leveraging families to improve student outcomes (Epstein & Sheldon, 2002; Valencia, 1997) and successfully targeted parental beliefs to reduce student absenteeism across ten districts. 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 more 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 serve 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. While the effect size of this intervention was modest, effect sizes should be calibrated with respect to the magnitude of the intervention (Cumming, 2014). In this case, the effect size compares favorably to the next best intervention (0.12 vs. 0.14 in the NYC mentors program), which was deemed "educationally meaningful" when applied to a large population of students. What's more, the present intervention was designed to minimize implementation barriers, and can be economically carried out 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 (Balfanz & Byrnes, 2013; Sinclair et al., 1998). The evaluation of the Check & Connect program, the only randomized controlled trial evaluating the impact of mentors on student attendance, resulted in improved attendance for a subgroup of students (3.4 fewer absences for middle school students) and cost over \$1,500 per student per year (Guryan et al., 2017). 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. Parents, like all humans, hold mistaken beliefs that could restrain them from carrying out a beneficial behavior – getting their child to school every day (Lewin, 1951). This intervention suggests schools might change parents' inaccurate beliefs by emphasizing the value of regular attendance in the early grades (re-framing beliefs) and providing periodic updates on students' attendance records (providing new, accurate, and timely information).

This intervention was successful in part because it impacted parental beliefs about the utility value of attending school in the early grades. Past research suggests that parents do not necessarily believe attendance in early grades to be 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). 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 risk 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 proactively 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 several 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 them 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). Based on prior research that student absenteeism can be due to parents' logistical struggles to drop out and pick up and their child at school, we hypothesized that encouraging parents to reach out to their social network to help

their child get to school would improve attendance relative to when parents just received the belief-focused mailing. We found that the two treatment conditions had a comparable, positive impact on student attendance (each improving student attendance by about half a day).

Interestingly, the “Mailing + Supporter” treatment condition appeared to drive the reduction in chronic absenteeism. At this point it is unclear why receiving the insert in addition to the mailing would result in a comparable reduction in student absences to receiving just the mailing alone, but meaningfully reduce chronic absenteeism. 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, there were a few shortcomings in our attempts to measure parental beliefs via a parental phone survey at the end of the school year. First, only 21% of our total sample completed the phone survey (response rate based on AAPOR, 2016). While households were equally likely to respond to the survey across treatment and control conditions, parents in socioeconomically disadvantaged and Spanish-speaking households were six percentage points less likely to respond to the survey in general. On one hand, the treatment impact on parental beliefs may be muted because the treatment effect was larger for ELL and socioeconomically disadvantaged students. On the other hand, we cannot rule out the possibility that the treatment may have affected student attendance through other belief pathways that were not assessed. Future research should attempt to learn more about how attendance-related interventions affect these traditionally marginalized households.

Relatedly, the low response rate to the phone survey left us underpowered to test which parental belief more effectively mediated the treatment effect. That is, we cannot answer the question as to whether the treatment reduced absences because it increased parental beliefs

regarding the utility value of attendance in the early grades, or because parents came to have more accurate beliefs regarding the number of school days their child missed, or a combination of the two. This leaves open three possible reasons for the efficacy of the intervention. First, one belief pathway might be more effective than the other at mobilizing parents to improve their child's attendance. Second, one of the beliefs may undermine the other, effectively muting the effect (e.g., perhaps the multiple messaging distracts from the more persuasive belief). Lastly, reducing absenteeism may require targeting the two parental beliefs in tandem. While we hypothesize that these two strategies are more effective together than apart, more research is needed to disentangle the two belief pathways and how the intervention worked.

Finally, 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 directional 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. By correcting misbeliefs surrounding the utility value of schooling and providing parents with accurate and timely information on their child's academic performance, schools can engage parents as valuable partners in the quest to improve student outcomes. Given the positive results, future educational intervention work should consider

parental beliefs as a lever to marshal parents' involvement in their child's education as early as possible.

Notes

1. Henceforth referred to as "parents," but we acknowledge the wide range of caretakers in a child's life.
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 only discuss the theoretical rationale for their inclusion in the Methods section.
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.
4. Sample size differs across components of the phone survey analysis due to early survey termination, refusal to answer certain questions, and responses of 'I don't know.' For each component of the analysis, we use the largest sample applicable.

References

- American Association for Public Opinion Research (AAPOR). (2016) *Standard Definitions*. 9th edition. http://www.aapor.org/AAPOR_Main/media/publications/Standard-Definitions20169theditionfinal.pdf
- Applied Survey Research. (2011). *Attendance in early elementary grades: Associations with student characteristics, school readiness, and third grade outcomes*. Retrieved from <http://www.attendanceworks.org/author/author-applied-survey-research/>
- Athey, S., & Imbens, G. (2016). The econometrics of randomized experiments. *arXiv preprint arXiv:1607.00698*.
- Atkinson, J. W. (1957). Motivational determinants of risk-taking behavior. *Psychological Review*, 64(6p1), 359.
- Balfanz, R., & Byrnes, V. (2006). Closing the mathematics achievement gap in high-poverty middle schools: Enablers and constraints. *Journal of education for students placed at risk*, 11(2), 143-159.
- Balfanz, R., & Byrnes, V. (2012). *Chronic Absenteeism: Summarizing What We Know From Nationally Available Data*. Retrieved from Baltimore, MD:
- Balfanz, R., & Byrnes, V. (2013). Meeting the challenge of combating chronic absenteeism: Impact of the NYC Mayor's Interagency Task Force on chronic absenteeism and school attendance and its implications for other cities. *Everyone Graduates Center, Johns Hopkins University School of Education*.
- Barrington, B. L., & Hendricks, B. (1989). Differentiating characteristics of high school graduates, dropouts, and nongraduates. *The Journal of Educational Research*, 82(6), 309-319.
- Benartzi, S., Beshears, J., Milkman, K. L., Sunstein, C. R., Thaler, R. H., Shankar, M., . . . Galing, S. (2017). Should Governments Invest More in Nudging? *Psychological Science*, 28(8), 1041-1055. doi:doi:10.1177/0956797617702501
- Black, A. T., Seder, R. C., & Kekahio, W. (2014). Review of Research on Student Nonenrollment and Chronic Absenteeism: A Report for the Pacific Region. REL 2015-054. *Regional Educational Laboratory Pacific*.
- Bryk, A. S., & Thum, Y. M. (1989). The effects of high school organization on dropping out: An exploratory investigation. *American Educational Research Journal*, 26(3), 353-383.
- Byrnes, V., & Reyna, R. (2012). Summary of state level analysis of early warning indicators. *Everyone Graduates Center, Baltimore, MD*.
- Chang, H. N., & Romero, M. (2008). Present, Engaged, and Accounted for: The Critical Importance of Addressing Chronic Absence in the Early Grades. Report. *National Center for Children in Poverty*.
- Cumming, G. (2014). The new statistics: why and how. *Psychol Sci*, 25(1), 7-29. doi:10.1177/0956797613504966
- Duardo, D. L. (2013). Solutions to Chronic Absenteeism: An Evaluation of a Kindergarten Attendance Improvement Program in LAUSD.
- Eccles, J. S., Adler, T., Futterman, R., Goff, S., Kaczala, C., Meece, J., & Midgley, C. (1983). Achievement and achievement motivation. *Expectancies, values and academic behaviors* San Francisco, CA: WH Freeman.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual review of psychology*, 53(1), 109-132.

- Ehrlich, S. B., Gwynne, J. A., Stitzel Pareja, A., Allensworth, E. M., Moore, P., Jagesic, S., & Sorice, E. (2014). *Preschool Attendance in Chicago Public Schools: Relationships with Learning Outcomes and Reasons for Absences*: ERIC.
- Ely, T. L., & Fermanich, M. L. (2013). Learning to count: School finance formula count methods and attendance-related student outcomes. *Journal of Education Finance*, 38(4), 343-369.
- Epstein, J. L., & Sheldon, S. B. (2002). Present and accounted for: Improving student attendance through family and community involvement. *The Journal of Educational Research*, 95(5), 308-318.
- Every Student Succeeds Act*. (2015). Retrieved from <https://www2.ed.gov/documents/essa-act-of-1965.pdf>.
- Every Student, Every Day: A Community Toolkit to Address and Eliminate Chronic Absenteeism*. (2015). Retrieved from Washington, D.C.:
- Ferguson, R. F. (2016). *Aiming Higher Together: Strategizing Better Educational Outcomes for Boys and Young Men of Color*. Retrieved from https://www.urban.org/research/publication/aiming-higher-together-strategizing-better-educational-outcomes-boys-and-young-men-color/view/full_report
- Finn, J. D. (1993). *School Engagement & Students at Risk*. Retrieved from Washington, D.C.:
- Gehlbach, H., Brinkworth, M. E., King, A., Hsu, L., McIntyre, J., & Rogers, T. T. (2016). Creating birds of similar feathers: Leveraging similarity to improve teacher-student relationships and academic achievement.
- Gehlbach, H., & Robinson, C. D. (2017). Mitigating Illusory Results through Preregistration in Education. *Journal of Research on Educational Effectiveness*, 1-20. doi:10.1080/19345747.2017.1387950
- Gerber, A. S., Huber, G. A., Doherty, D., Dowling, C. M., & Hill, S. J. (2013). Do perceptions of ballot secrecy influence turnout? Results from a field experiment. *American Journal of Political Science*, 57(3), 537-551.
- Gottfried, M. A. (2010). Evaluating the relationship between student attendance and achievement in urban elementary and middle schools an instrumental variables approach. *American Educational Research Journal*, 47(2), 434-465.
- Guryan, J., Christenson, S., Claessens, A., Engel, M., Lai, I., Ludwig, J., & Turner, M. (2017). *The effect of mentoring on school attendance and academic outcomes: A randomized evaluation of the Check & Connect Program*. Retrieved from Evanston, IL: <http://www.ipr.northwestern.edu/publications/docs/workingpapers/2016/WP-16-18.pdf>
- Hammer, C. S., Rodriguez, B. L., Lawrence, F. R., & Miccio, A. W. (2007). Puerto Rican mothers' beliefs and home literacy practices. *Language, speech, and hearing services in schools*, 38(3), 216-224.
- Harackiewicz, J. M., Rozek, C. S., Hulleman, C. S., & Hyde, J. S. (2012). Helping parents to motivate adolescents in mathematics and science: an experimental test of a utility-value intervention. *Psychological Science*, 23(8), 899-906. doi:10.1177/0956797611435530
- Harrison, D. A., & Shaffer, M. A. (1994). Comparative examinations of self-reports and perceived absenteeism norms: Wading through Lake Wobegon. *Journal of Applied Psychology*, 79(2), 240.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of Educational Research*, 77(1), 81-112.

- Henderson, A. T., & Mapp, K. L. (2002). A New Wave of Evidence: The Impact of School, Family, and Community Connections on Student Achievement. Annual Synthesis 2002. *National Center for Family and Community Connections with Schools*.
- Hoover-Dempsey, K. V., & Sandler, H. M. (1997). Why do parents become involved in their children's education? *Review of Educational Research*, 67(1), 3-42.
- Kohn, M. (1989). *Class and conformity: A study in values*: University of Chicago Press.
- Kraft, M. A., & Rogers, T. (2015). The underutilized potential of teacher-to-parent communication: Evidence from a field experiment. *Economics of Education Review*, 47, 49-63.
- Lehr, C. A., Sinclair, M. F., & Christenson, S. L. (2004). Addressing student engagement and truancy prevention during the elementary school years: A replication study of the check & connect model. *Journal of education for students placed at risk*, 9(3), 279-301.
- Lewin, K. (1951). *Field theory in social science*. New York, NY: Harper & Row.
- Maxwell, N. L., & Lopus, J. S. (1994). The Lake Wobegon effect in student self-reported data. *The American Economic Review*, 84(2), 201-205.
- Neild, R. C., & Balfanz, R. (2006). An extreme degree of difficulty: The educational demographics of urban neighborhood high schools. *Journal of education for students placed at risk*, 11(2), 123-141.
- Nichols, J. D. (2003). Prediction indicators for students failing the state of Indiana high school graduation exam. *Preventing School Failure: Alternative Education for Children and Youth*, 47(3), 112-120.
- Okagaki, L., & Sternberg, R. J. (1993). Parental beliefs and children's school performance. *Child Development*, 64(1), 36-56.
- Piaget, J. (1985). *The equilibration of cognitive structures*. Chicago: University of Chicago.
- Prentice, D. A., & Miller, D. T. (1993). Pluralistic ignorance and alcohol use on campus: some consequences of misperceiving the social norm. *Journal of Personality and Social Psychology*, 64(2), 243.
- Richburg-Hayes, L., Anzelone, C., Dechausay, N., & Landers, P. (2017). *Nudging Change in Human Services: Final Report of the Behavioral Interventions to Advance Self-Sufficiency (BIAS) Project*. Retrieved from Washington, D.C.:
- Robinson, C. D., Pons, G. A., Duckworth, A. L., & Rogers, T. (2018). Some Middle School Students Want Behavior Commitment Devices (but Take-Up Does Not Affect Their Behavior). *Frontiers in Psychology*, 9(206). doi:10.3389/fpsyg.2018.00206
- Roby, D. E. (2004). Research on school attendance and student achievement: A study of Ohio schools. *Educational Research Quarterly*, 28(1), 3.
- Rogers, T. (2016). Attendance mailings K-5 Analysis Plan. osf.io/gb9w8
- Rogers, T., & Feller, A. (2018). Reducing student absences at scale by targeting parents' misbeliefs. *Nature Human Behaviour*.
- Rogers, T., & Frey, E. (2015). Changing behavior beyond the here and now. *The Wiley Blackwell Handbook of Judgment and Decision Making*, 723-748.
- Romero, M., & Lee, Y.-S. (2007). *A national portrait of chronic absenteeism in the early grades*. Retrieved from New York:
- Rumberger, R. W., & Thomas, S. L. (2000). The distribution of dropout and turnover rates among urban and suburban high schools. *Sociology of Education*, 39-67.

- Shechter, O. G., Durik, A. M., Miyamoto, Y., & Harackiewicz, J. M. (2011). The role of utility value in achievement behavior: The importance of culture. *Personality and Social Psychology Bulletin*, 37(3), 303-317.
- Sinclair, M. F., Christenson, S. L., Evelo, D. L., & Hurley, C. M. (1998). Dropout prevention for youth with disabilities: Efficacy of a sustained school engagement procedure. *Exceptional Children*, 65(1), 7.
- Slavin, R. E. (1999). Comprehensive approaches to cooperative learning. *Theory into practice*, 38(2), 74-79.
- Thaler, R. H., & Sunstein, C. R. (2008). *Nudge : improving decisions about health, wealth, and happiness*. New Haven.
- Therriault, S. B., Heppen, J., O’Cummings, M., Fryer, L., & Johnson, A. (2010). Early warning system implementation guide. Retrieved from the National High School Center Website: <http://www.betterhighschools.org/documents/NHSCEWSImplementationGuide.pdf>.
- Valencia, R. R. (1997). *The evolution of deficit thinking: Educational thought and practice*. London: Falmer Press.
- Vosniadou, S., & Brewer, W. F. (1987). Theories of knowledge restructuring in development. *Review of Educational Research*, 57(1), 51-67.