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The Dynamics of Chronic Absence and Student Achievement

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Abstract: Students with low attendance miss important learning and developmental opportunities and research has shown that they are at heightened risk of negative outcomes. Although there is an extensive body of research on truancy, chronic absenteeism is not generally measured or tracked in school data systems and is therefore not as well understood. This analysis uses linked, longitudinal administrative records to examine chronic absence across years for elementary and secondary school students. We investigate chronic absence patterns over time, ramifications of chronic absence on students' educational outcomes, and effects of continued absence across school years. Results illustrate the cumulative nature of chronic absence and the negative role of

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persistent chronic absence on students' educational outcomes. We discuss implications of these results for state policies and intervention procedures.
Keywords: chronic absence, absenteeism, longitudinal analysis

La dinámica de la ausencia crónica y rendimiento de los estudiantes
Resumen: Los estudiantes con baja presencia pierden importantes oportunidades de aprendizaje y desarrollo, y la investigación muestra que están en mayor riesgo de resultados negativos. A pesar de un amplio cuerpo de investigación sobre "absentismo escolar" ausentismo crónico por lo general no se mide o controla los sistemas de datos en escuelas y está, por tanto, no se entiende bien. Este análisis hace uso de registros administrativos conectados y longitudinales para examinar ausencia crónica en los últimos años a los estudiantes de la escuela primaria y secundaria. Se investigaron los patrones de ausencia crónica con el tiempo, la falta crónica de ramas en los resultados educativos de los alumnos, y la continua ausencia de efectos a lo largo de los años escolares. Los resultados ilustran el carácter acumulativo de la ausencia crónica y el papel negativo de la falta crónica persistente del rendimiento escolar de los estudiantes. Se discuten las implicaciones de estos resultados para las políticas públicas y los procedimientos de intervención.
Palabras clave: ausencia crónica; ausentismo; análisis longitudinal

As dinâmicas de ausência crônica e desempenho do aluno
Resumo: Estudantes com baixa presença perdem aprendizados importantes e oportunidades de desenvolvimento, e pesquisas revelam que eles estão em maior risco de resultados negativos. Apesar de ter um extenso corpo de pesquisa sobre "truancy", absentismo crônico geralmente não é medido ou monitorado em sistemas de dados das escolas e é, portanto, não bem compreendido. Esta análise faz uso de registros administrativos ligados e longitudinais para examinar ausência crônica ao longo dos anos para alunos do ensino fundamental e médio. Investigamos padrões de ausência crônica ao longo do tempo, ramificações de ausência crônica sobre os resultados educacionais dos estudantes, e efeitos de ausência contínua ao longo dos anos escolares. Resultados ilustram a natureza cumulativa de ausência crônica e o papel negativo de ausência crônica persistente sobre resultados educacionais dos estudantes. Discutimos implicações desses resultados para políticas estatais e procedimentos de intervenções.
Palavras-chave: ausência crônica; absentismo; analise longitudinal

Introduction

Chronic absenteeism, when students are repeatedly absent from school for any excused or unexcused reason, has been called a nationwide crisis (Chang, 2016). According to the U.S. Department of Education's Civil Rights Data Collection, over 6.5 million students, corresponding to 13% of the U.S. student population, were absent 15 or more school days in the 2013-14 school year (U.S. Department of Education, 2016). This excessive amount of absenteeism was highest among high school students and in about 500 school districts nationwide, at least 30% of students were reported to be chronically absent.

When students are repeatedly absent from school, they miss important learning and developmental opportunities which can potentially have negative consequences on their future outcomes. As a relatively new designation, chronic absenteeism is still being defined in state and federal educational policy. It differs from truancy, an already existing absenteeism designation, in several ways. First, truancy applies only to unexcused absences, whereas chronic absenteeism can include absences for any reason. Second, all states have codified into the education codes a definition of truancy and a policy response mechanism that can include both students and parents, and even the criminal justice system. There are no comparable systems in any state for handling cases of chronic absence, and in most school districts there is not even a data system in place to track chronically absent students. Decades of research on truancy—most of which focuses on adolescents—shows that truancy is negatively associated with a host of student academic, social, and emotional outcomes (Considine & Zappalà, 2001; Epstein & Sheldon, 2002; Henry & Huizinga, 2007b). The much smaller literature on absenteeism, and specifically chronic absenteeism focuses largely on elementary and middle school students and similarly finds academic consequences for missing school (Applied Survey Research, 2011; Gottfried, 2010, 2014; Ready, 2010)).

Because data on chronic absenteeism are just starting to become available, the emerging literature tends to focus on specific geographic areas and uses point-in-time data to examine the problem and its consequences. This study relies on data from one community, but focuses on longitudinal data collected across two school districts to examine chronic absenteeism over time. This is important because the underlying reasons for chronic absenteeism may not resolve themselves easily in the short term. Issues such as student or family health problems, parents' work schedules, family responsibilities, transportation problems are commonly thought to underlie absenteeism (Chang & Romero, 2008), and these may persist from year to year with accumulating problems for affected students.

This study, designed in conjunction with policy leaders in one San Francisco Bay Area community, focuses on three key questions: (1) How many and what percentage of students are chronically absent in one year and across multiple years? (2) What are the demographic characteristics of these students and how do they differ from students without attendance problems? and (3) What is the relationship between chronic absence and students' academic achievement over time? To answer these questions, we use linked, longitudinal administrative records for public school students across two school districts (an elementary district and the secondary district into which it feeds) and focus on cumulative chronic absence across years using different age cohorts. This allows us to examine not just cross-sectional relationships between chronic absence and students' educational outcomes but also the longer-term influence of longitudinal chronic absence patterns across school years. This study adds to the literature by using longitudinal administrative data rather than cross-sectional administrative data or national survey data, the two main sources of information. In addition, we exploit longitudinal modeling strategies to study the determinants and consequences of chronic absenteeism.

Policy Context

Nationwide, state and local education agencies have begun to pay particular attention to chronic absenteeism. Chronic absenteeism has not been codified into law in most states, but in California, the term chronically absent was codified by the state legislature in 2010 as a student who is absent for any reason (excused or unexcused) for at least 10% of the school year, or approximately 18 days (EC Section 60901(c)). This definition mirrors a generally accepted classification of chronic absence used by attendance advocates (Chang & Romero, 2008). California school districts were required to track and report chronic absenteeism for the first time in the 2014-15 school year.

Truancy is an absence-related legal term which is defined by each state and reflects the number of unexcused absences a student is granted before an intervention takes place. The definition varies across states, for example from 10 unexcused absences granted within a six-month period in Texas (Texas Education Code, §25.094) to zero unexcused absences granted in Arizona (A.R.S. 15-803(c)(2)). In California, the location of this study, a truant is any student who is required to attend school full-time and who has three unexcused absences during the school year, regardless of whether the student misses a full day or a period of 30 minutes or more in a day (EC Section 48260 (a)). The focus on unexcused absences is important because, for many truants, parents are unaware of or have not approved the student's absence, implying a measure of student volition in the absence decision.

In many states, California included, tracking chronic absence is complicated by attendance policies that require reporting of different data. At the time of this study, most California schools were required to report Average Daily Attendance (ADA) to receive state funding. ADA is simply the number of students in attendance on a certain day, which schools often report as a percentage. However, high percentages of ADA can mask chronic absence problems (Chang & Romero, 2008; Nauer, White, & Yerneni, 2008; Romero & Lee, 2007; Sheldon & Epstein, 2004). For example, a school with a 95% ADA may have a different five percent of the students absent each day, or the same set of students repeatedly absent over time. Whereas truancy is tracked systematically by schools and school districts, chronic absence can easily slip under the radar of district and school leaders because until recently there were no mandates for reporting and data systems were not set up to track an individual student's attendance across the school year.

Still, some teachers or principals may know that a student is chronically absent but have no recourse because there are not formalized systems in place to respond to individual cases. In contrast, instances of truancy set off a specified set of responses that could include intervention by a school attendance review board—a group slated to respond specifically to truant students—or even involve the police. Although chronic absence may not require the same sorts of interventions as truancy, addressing the problem in a consistent manner cannot occur without a system in place to specify the course of action.

Literature

The literature on student absences has focused almost exclusively on truancy and the attendance patterns of high school-aged students. Findings indicate that the correlates of truancy are typically negative, and include school outcomes such as high school dropout (Epstein & Sheldon, 2002; Henry, Knight, & Thornberry, 2012) and poor academic performance (Considine & Zappala, 2001; Petrides, Chamorro-Premuzic, Frederickson, & Furnham, 2005). Truancy is also associated with negative non-school outcomes such as substance abuse (Henry & Huizinga, 2007b; Maynard,

Salas-Wright, Vaughn & Peters, 2012) and crime and delinquency (Baltimore City Health Department Office of Epidemiology and Planning, 2009; Hirschfield & Gasper, 2011).

As chronic absenteeism is an emerging area of both policy and scholarly interest, the academic literature on this topic is not nearly as well-developed. Until very recently, most school districts did not collect detailed enough attendance data to even compile a student-level measure of chronic absenteeism. There are a number of studies that focus on absenteeism more broadly rather than specifically on the designation of chronic absenteeism. These are relevant to frame the importance of absenteeism, even if not specifically focused on the marker of chronic absence, which is the topic of many state and national educational policy discussions today. Studies rely on a combination of administrative data and national longitudinal survey data from one particular study that tracks absenteeism – the Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K) – which focuses exclusively on younger students.

Contributors to Absenteeism

The literature has established the important roles that community, school, family, and individual factors play in truancy, but there is little literature on characteristics or predictors of students' chronic absence. Individual-level factors such as a student's self-esteem, academic self-concept, and relationship with peers in the classroom (Corville-Smith, Ryan, Adams, & Dalicandro, 1998), as well as large amounts of time unsupervised after school, poor grades, low educational aspirations, and drug use (Henry, 2007) all affect truancy. Family factors that predict truancy include family conflict, perception of family cohesion, and inconsistent and ineffective discipline at home (Corville-Smith et al., 1998), as well as having a single parent (Jones, Harris, & Finnegan, 2002). School factors include lack of positive relationships with school personnel (Corville-Smith et al., 1998) and inappropriate academic placement (Jones, et al, 2002) Henry and Huizinga (2007a) find that students' academic performance and involvement with delinquent peers is also associated with truancy, as is being bullied (Gastic, 2008). These factors are likely to be interconnected, with academic performance, involvement with delinquent peers, and truancy all related in what may be mutually reinforcing ways.

Contributing factors tied to chronic absence have not been explored in depth. Studies vary substantially in sample location, and as a result, the individual characteristics of chronically absent students also vary. Nationally, students who are African American, Native American, and Pacific Islander have the highest rates of chronic absence, as do students with disabilities (U.S. Department of Education, 2016). One study found the largest increase in chronic absenteeism from the early to the later grades was among Latinos and English learner students (Buehler, Tapogna, & Chang, 2012). Importantly, studies have found that low-income students are among the most likely to be chronically absent (Buehler et al., 2012; Spradlin, Cierniak, Shi, & Chen, 2012). Community factors, such as lack of supports for a positive transition to elementary school, poor communication between schools and families, weak and low-quality community institutions in distressed neighborhoods, and high levels of community violence are also important contributors to chronic absenteeism (Chang & Romero, 2008; Sugrue, Ziel & LaLiberte, 2016).

Because chronic absence can involve students in the youngest grades, it is important to understand absence patterns and the cumulative effects of chronic absence over time. Few studies have addressed the cumulative nature of chronic absence, that is to say, the persistence of chronic absence among students missing excessive amounts of school in any given year. Spencer (2009) examined the absence histories of students who were truant in eighth grade and found that these students exhibited high rates of absenteeism, as well as issues with academic performance, during

the early grades. These high absence rates persisted over time in many cases, though the analysis did not examine outcomes for persistently chronically absent students explicitly.

Consequences of Excessive Absenteeism

Research on the academic consequences of excessive absenteeism has mainly focused on the early grades. For instance, using data from the ECLS-K, studies have observed that missing school during the early grades is negatively associated with students' academic outcomes—as well as social and emotional ones—later in elementary school (Chang & Romero, 2008; Gottfried, 2014). Using a combination of survey and administrative data, another found a similarly negative relationship between very early chronic absenteeism and subsequent elementary academic outcomes (Applied Survey Research, 2011). These studies are especially important contributors to the literature because they highlight the need to focus on early grades, which have not been considered in the truancy literature.

Ready (2010) finds that, among kindergarteners and first graders, low attendance is associated with lower socioeconomic status (SES) and there are confounding results of the two on student achievement. This poses methodological concerns because the same characteristics are associated with both an increased probability of absenteeism and lower rates of academic success. Gottfried (2010, 2011b) has addressed this concern and contributed to methodological advances in the absenteeism literature for early and middle grades by exploiting various quasi-experimental approaches to analyzing longitudinal data for Philadelphia students. These studies similarly conclude that there is a negative relationship between school absences and achievement even after addressing biases associated with unobserved heterogeneity.

There may be a spillover effect on school standardized test achievement associated with chronic absenteeism. Chronic absenteeism in the early grades is associated with lower performance on standardized tests of not only the absent students but also their classroom peers (Gottfried, 2011a, 2015).

Studies conclude that maintaining a focus on the early grades may allow districts to address chronic absenteeism early and perhaps intervene to improve these negative outcomes. Gottfried (2009) suggests that there are important advantages to examining absenteeism among younger students, in particular an ability to more precisely quantify absenteeism because younger students stay in one classroom during the day and the possibility for earlier intervention in at-risk students' educational careers. However, focusing on upper grades is similarly important because of the consequences of absenteeism on high school dropout.

In the upper grades, research on chronic absenteeism is more limited. The literature on high school dropouts looks retroactively at student absences (not chronic absenteeism per se) and has shown that high school dropouts may exhibit high levels of absenteeism in the early grades (Alexander, Entwisle, & Kabbani, 2001; Balfanz, Durham, & Plank, 2008; Neild, Balfanz, & Herzog, 2007). A study conducted using statewide data in Indiana demonstrates a correlation between chronic absenteeism and lower graduation rates for high school students, but these analyses do not control for student characteristics (Spradlin, Cierniak, Shi, & Chen, 2012). Studies that focus on "early warning indicators" for high school students have similarly identified absenteeism as a key factor. Using information about Chicago and Baltimore high school students respectively, Allensworth (2013) and MacIvera & Messel (2013) find that freshman year attendance is an important factor in determining both course success and high school graduation. In one of the only studies to focus specifically on chronic absenteeism across all age groups, Balfanz and Byrnes (2012) document the importance of looking at all grade levels to understand the consequences of this new policy designation.

With this relatively small literature about students who fall into this recently developed definition of chronically absent, we know little about how this designation affects their current and future academic trajectories, particularly at the middle and high school levels. This study adds to the literature in several important ways. First, we explore the role of persistence across years in chronic absenteeism—rather than focusing on each year separately—to examine predictors of persistent chronic absence as well as relationships between persistent chronic absence and achievement. We use linked, longitudinal data in several cohorts that follow elementary, middle, and high school students over three years focusing on the cumulative nature of chronic absence and the role of persistent chronic absence on student outcomes. We use growth modeling to illustrate changes in achievement over time, which provides a more nuanced look at the longitudinal effects of chronic absence. Although absence in general and truancy have been well-studied, few longitudinal studies of chronic absenteeism that use rigorous methodology exist in the literature at time when chronic absence is getting much attention from policy makers.

Data and Methods

This analysis uses data from two school districts—a K-8 elementary district and the high school district into which it feeds. We matched student records longitudinally for those matriculating from the elementary district to the high school district. Matching data on students as they moved from elementary to middle to high school allows us to examine longitudinal chronic absence and achievement patterns in a way that would not otherwise be possible when students move between districts.

The analysis focuses on the three academic years from 2008-09 to 2010-11, following students, where feasible, from the elementary to the high school district (students from the elementary district comprise approximately one-third of the high school district population).[1] There are a total of 21 schools in the two districts (16 in the elementary district and five in the high school district). We divided students into four cohorts grouped by grade levels for analysis (Table 1). The kindergarten cohort includes students who were in kindergarten or first grade in 2008-09 (n=1,580); these students are included in analyses of attendance patterns but not achievement analyses because the students in these grades do not take standardized achievement tests in California. The elementary cohort includes students who began the three-year trajectory in grades 2, 3, and 4 (n=2,283). The elementary to middle school cohort includes students who began 2008-09 in grades 5 and 6 (n=1,394). Finally, the middle to high school cohort, which is the group that spans the transition between the elementary and high school district, includes students who began in grades 7 and 8 (n=1,166). We could not include students who started the three-year period at grade 9 or later because detailed school attendance data that allow us to identify students who were chronically absent were only available from the high school district for 2009-10 and 2010-11.

[1] Students who went to a high school outside the district could not be tracked. Also, those who enter or leave the district mid-year or who are not present in the district for three years were not included in the analysis.

Table 1
Grade-Level Cohort Structure

Cohort Name	2008-09	2009-10	2010-11
Kindergarten	Kindergarten	1st Grade	2nd Grade
	1st Grade	2nd Grade	3rd Grade
Elementary	2nd Grade	3rd Grade	4th Grade
	3rd Grade	4th Grade	5th Grade
	4th Grade	5th Grade	6th Grade
Elementary to Middle School	5th Grade	6th Grade	7th Grade
	6th Grade	7th Grade	8th Grade
Middle to High School	7th Grade	8th Grade	9th Grade
	8th Grade	9th Grade	10th Grade

We include students who were enrolled in a district school all three years for at least 170 of the 180 instructional days during the school year.[2] Across all students included in the analysis (n=6,423), 69% were Latino, 23% were white, and 8% were of other ethnicities. Also, 46% were English learners in the baseline year of 2008-09 and 55% participated in the federal Free or Reduced Price Lunch (FRPL) program. To understand sample bias, we examined the characteristics of students who were excluded from the cohorts because they either transferred in or out of the partner districts during the three-year study period (n=1,695). We found that they had similar demographic characteristics, but were more mobile, with a higher rate of school or district transition before the baseline year (47% versus 26%). They also had a higher incidence of tardiness (11% versus 5%) and, in high school, had higher incidences of suspension (13% versus 7%).

The community from which we draw the data has a relatively high concentration of low-income students and English learners, most of whom are Latino and speak Spanish at home. The findings are therefore not broadly generalizable. However, they are important because they reflect the experiences of students who are at high risk of academic failure and for whom chronic absenteeism could be a critical issue.

Measures

Administrative data are rich in that they include a universe of students, but limited in the scope of available measures. We include in the study all relevant demographic controls as well as attendance and academic outcomes as described.

Student characteristics. School administrative data provide information on student demographic characteristics from each academic year from 2008-09 to 2010-11, including: gender; ethnicity (Latino, white, and other ethnicities); FRPL participation; English language proficiency; parent education levels, which we coded into three dichotomous indicators for not having completed a high school diploma, having a high school degree or some college, and having a college degree or higher; special education status; instances of suspensions; school attended; and grade level

[2] Student enrollment is independent of attendance; only enrolled students can be counted as absent. We use 170 of 180 days as the cutoff because that level of enrollment indicates full-year enrollment for a student.

in school. Using the school attended, we created a variable to serve as a proxy for student mobility, which captured whether students were new to the district or if they had switched schools during the summer before the first cohort year.

School attendance. The data include daily attendance information for all students, indicating whether a student was present, tardy, or absent each day. Detailed daily attendance for the high school district was available for 2009-10 and 2010-11, but for the elementary district was available for the entire analysis period. We calculated the number of total absences and tardies for each year for each student. For the high school district, data were available for each class period and were aggregated to construct full day absence flags necessary for measuring chronic absence. Consistent with California state education codes, students with at least 18 full day absences (10% of instructional days) were identified as chronically absent. We also created a persistently tardy flag for students who were tardy at least three days in the baseline year. Days in which a student was suspended do not count toward absences.

Achievement. To study achievement, we used math and English language arts (ELA) scores from the California Standards Test (CST). Until the 2013-14 school year, this test was administered annually to students starting in second grade. Students receive scaled scores on these tests that range from 150 to 600. Because these scaled scores are not designed to be comparable across grades or years, we calculate standardized z-scores normalized against the state mean and standard deviation of scores on each test in each year.

Empirical Methods

To understand predictors of chronic absence, we used multinomial logistic regression models. The outcome variable for these models is years of chronic absence in the last two years of the three-year study period, which can take a value of 0, 1, or 2 years. We constructed separate models for each of the four cohorts, and each model includes controls for gender, ethnicity, parent education, FRPL participation, English learner status, special education, a flag for having changed schools in the baseline year, a flag for having been suspended in the baseline year, a flag for persistent tardiness in the baseline year, and a flag for chronic absence in the baseline year. These models, therefore, tell us the extent to which baseline characteristics in the first year predict ongoing chronic absence in subsequent years. We conducted the analyses by cohort because, as will be shown in subsequent sections, the rates of chronic absence differ by age group. In addition, it is possible that in years when students are most likely transitioning from one school to another (i.e., from elementary to middle or middle to high school), their attendance rates might be more likely to change.

Our second set of models to understand how chronic absence predicts change in student achievement over time used individual growth models, a form of hierarchical linear models (HLM). Using the methods outlined in Raudenbush and Bryk (2002) and Singer (1998), we constructed a student-year data set with three records per student and a time variable coded 0 to 2. These models included time as level 1 of the multi-level model, and each record included the achievement score for that year, allowing us to model the annual growth in achievement scores over the three years of the study. Student-level predictors were in the model at level 2, and all level 2 predictors were interacted with time at level 1. These interactions give estimates for the annual change in achievement attributable to each predictor, whereas the uninteracted terms give the effect of each predictor on the intercept, which is the outcome in the baseline year (time = 0). Additionally, we included a third level in the models for school paths—the combination of schools that students attended in the first and last years of the study period—because school paths predicted a significant

portion of the variance in both intercepts and time slopes for achievement (between 13% and 20%). We used school paths instead of schools because many students transitioned between elementary, middle, and high school during the study period. Across the three years and two districts, we found 48 different combinations of schools attended, with these school paths largely being linked to neighborhoods and school feeder patterns.[3]

We begin constructing models by fitting unconditional models of achievement with no predictors but specification of students as the level-two classification, which provides the amount of variance explainable at the student level and the residual (time period) level as well as the Akaike Information Criteria (AIC). We then add level-two predictors individually and assess the improvement in fit of the model by examining change in the AIC with each addition. The final model predicting achievement (*Y*) for student *j* and time *i* at school path *k*, including controls for student ethnicity, gender, FRPL participation, special education, English language proficiency level, parent education level, and years of chronic absence (coded as dichotomous flags for one year of chronic absence and two or three years of chronic absence) as the featured predictors is as follows:

$$\text{Level 1:} \quad Y_{ijk} = \pi_{0jk} + \pi_{1jk}(\text{TIME}) + e_{ijk}$$

$$\begin{aligned}\text{Level 2:} \quad \pi_{0jk} = {} & \beta_{00} + \beta_{01}(\text{FEMALE}) + \beta_{02}(\text{CAUCASIAN}) + \beta_{03}(\text{OTHER} \\ & \text{ETHNICITY}) + \beta_{04}(\text{FREE/REDUCED MEALS}) + \beta_{05}(\text{ENGLISH} \\ & \text{LEARNER}) + \beta_{06}(\text{SPECIAL EDUCATION}) + \beta_{07}(\text{PARENT} \\ & \text{COLLEGE GRAD}) + \beta_{08}(\text{PARENT HIGH SCHOOL GRAD}) + \beta_{09} \\ & (\text{1YR CHRONIC ABSENCE}) + \beta_{10}(\text{2-3YRS CHRONIC ABSENCE}) + \\ & r_{0jk}\end{aligned}$$

$$\begin{aligned}\pi_{1jk} = {} & \beta_{10} + \beta_{11}(\text{FEMALE*TIME}) + \beta_{12}(\text{CAUCASIAN*TIME}) + \beta_{13} \\ & (\text{OTHER ETHNICITY*TIME}) + \beta_{14}(\text{FREE/REDUCED} \\ & \text{MEALS*TIME}) + \beta_{15}(\text{ENGLISH LEARNER*TIME}) + \beta_{16}(\text{SPECIAL} \\ & \text{EDUCATION*TIME}) + \beta_{17}(\text{PARENT COLLEGE*TIME}) + \beta_{18} \\ & (\text{PARENT HIGH SCHOOL GRAD*TIME}) + \beta_{19}(\text{1YR CHRONIC}\end{aligned}$$

[3] Although other modeling options were available to account for both neighborhood and school effects, such as a cross-classified model with schools and neighborhoods being time-variant level-1 predictors, we avoided these more complex model structures heeding the guidance provided in Raudenbush and Bryk (2002) to maintain model parsimony given that we did not have a large enough dataset and imbalanced numbers of observations across schools to support a cross-classified model.

ABSENCE *TIME) + β_{20} (2-3YRS CHRONIC ABSENCE *TIME) +

r_{1jk}

Level 3: $\beta_{00} = \beta_{000} + \gamma_{000}$(SCHOOL PATH) + μ_{00}

$\beta_{10} = \beta_{100} + \gamma_{100}$(SCHOOL PATH) + μ_{10}

All models were estimated in SAS version 9.3 using PROC MIXED using the method outlined by Singer (1998).

Results

Persistence of Chronic Absence

Figure 1 presents rates of chronic absence by grade level. During the 2010-2011 school year, overall 8% of students in both districts were chronically absent. The highest rates of chronic absence were seen in the youngest and oldest grades, with a chronic absence rate of 12% among kindergarteners, followed by 11% of twelfth graders. The lowest rates were seen among fourth, fifth, and sixth graders (6%). We find similar patterns and rates of chronic absence in the other analysis years.[4]

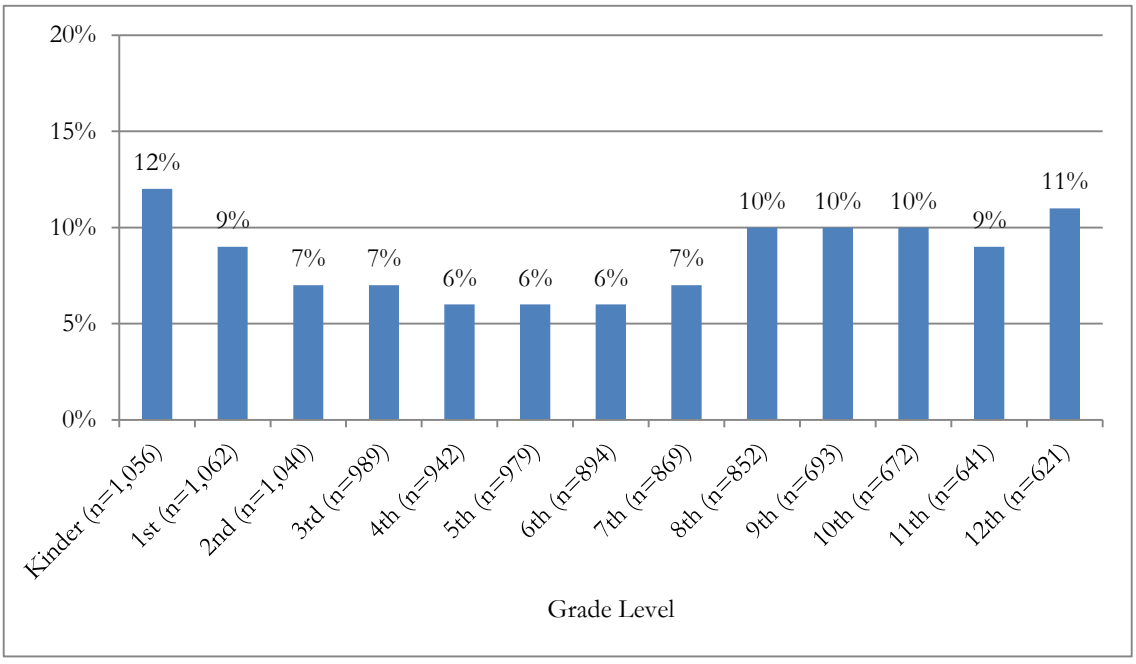

Figure 1. Percentage of students chronically absent by grade level, school year 2011-2012

[4] In 2009-10 and 2010-11, rates of chronic absence in kindergarten rates were 12% and 15% respectively, dropped through the middle grades to a low of 5% and 6% in fifth grade, and rose again to as high as 10% and 12% by high school.

These overall percentages mask the persistence of chronic absence for individual students over time. Although a small proportion of the entire student population, a substantial percentage of chronically absent students experience chronic absence in more than one year. Table 2 shows the percentage of students in each cohort who were chronically absent in the second and third cohort years by their chronic absence status in year one. In the kindergarten cohort, among students who were not chronically absent in the base year, less than 4% went on to be chronically absent in the second year and less than 2% were chronically absent in both years 2 and 3. In contrast, among students in the same cohort who were chronically absent in the base year, 44.7% went on to be chronically absent in the second year and 25.8% were chronically absent in both years two and three.

Table 2
Percent of Students Chronically Absent in Years Two and Three by Chronic Absence Status in Year One for Kindergarten, Elementary, Elementary to Middle, and Middle to High School Cohorts

	Chronic Absence in Year 2	Chronic Absence in Year 3	Chronic Absence Both Years
Kindergarten Cohort			
Not Chronically Absent in Year 1 (*n*=1,448)	3.45	3.73	1.45
Chronically Absent in Year 1 (*n*=132)	11.70	32.58	25.76
Elementary Cohort			
Not Chronically Absent in Year 1 (*n*=2,172)	4.42	3.78	1.38
Chronically Absent in Year 1 (*n*=111)	56.76	46.85	36.04
Elementary to Middle School Cohort			
Not Chronically Absent in Year 1 (*n*=1,332)	5.18	5.48	2.10
Chronically Absent in Year 1 (*n*=62)	58.06	61.29	50.00
Middle to High School Cohort			
Not Chronically Absent in Year 1 (*n*=1,075)	5.49	5.86	2.05
Chronically Absent in Year 1 (*n*=91)	56.04	41.76	28.57

This pattern is similar across the other three cohorts, though with slightly higher percentages of repeatedly chronically absent students compared to the kindergarten cohort. The persistence of

chronic absence across cohort years indicates the importance of examining students' attendance patterns longitudinally in order to understand the full effects of chronic absenteeism within and across years. It is also important to note that the majority of students in the analysis never experienced chronic absence during the analysis period (between 84% and 89% of each cohort). Between 7% and 9% of students experienced one year of chronic absence and between 5% and 7% of students were chronically absent for two or more years.

Characteristics Associated with Chronic Absence

Table 3 describes students' baseline demographic characteristics in each cohort by the number of years of chronic absence they experienced during the three-year period. These characteristics vary considerably, both across the number of years of chronic absence, as well as across the four cohorts shown in the table. Using two-tailed *t*-tests to examine differences in student characteristics by absence status, we find that in the kindergarten cohort, parents' education level is strongly associated with students' chronic absence status.

Table 3
Demographic Characteristics in Year One by Cohort and Chronic Absence Status

	Kindergarten Cohort			Elementary Cohort		
	0 Years Chron Absent	1 Year Chron Absent	2 or 3 Years Chron Absent	0 Years Chron Absent	1 Year Chron Absent	2 or 3 Years Chron Absent
Female	48.5	47.6	58.4	50.4	47.4	52.4
Ethnicity						
Latino	71.1	76.2	79.8	68.9	71.4	76.2
White	22.8	14.3*	13.5*	22.5	22.1	17.1
Other	6.1	9.5	6.7	8.6	6.5	6.7
Parent(s) Education						
Not a High School Graduate	36.7	39.7	36.0	34.2	33.8	31.4
High School Graduate	34.1	39.7	48.3**	36.8	40.9	41.9
College Graduate	27.6	17.5**	14.6**	26.2	22.7	23.8
Educational Services						
Special Education	6.6	8.7	13.5	10.5	15.6	19.0*
English Language Learner	62.4	65.1	74.2*	50.6	49.4	51.4
School Characteristics						
Free/Reduced Price Lunch	53.1	62.7*	65.2*	55.2	61.0	64.8
Suspended	2.3	3.2	1.1	3.1	5.2	2.9
School or District Transition	57.7	55.6	70.8*	11.3	5.2**	12.4
Three or More Days Tardy	4.3	10.3*	25.8***	3.9	9.1*	20.0***

Table 3 (Cont'd)
Demographic Characteristics in Year One by Cohort and Chronic Absence Status

	Elementary to Middle School Cohort			Middle to High School Cohort		
	0 Years Chron Absent	1 Year Chron Absent	2 or 3 Years Chron Absent	0 Years Chron Absent	1 Year Chron Absent	2 or 3 Years Chron Absent
Base Year CST Scores						
Mean ELA z score	-	-	-	0.05	-0.18**	-0.22*
Mean Math z score	-	-	-	0.11	-0.17**	-0.32***
Number of Students	1,365	126	89	2,024	154	105
% of Cohort	86.4	8.0	5.6	88.7	6.7	4.6
Female	51.7	49.5	52.1	48.9	49.1	57.6
Ethnicity						
Latino	65.0	69.5	64.8	65.8	76.4*	60.0
White	25.1	25.7	29.6	26.3	18.9	29.4
Other	9.9	4.8*	5.6	7.8	4.7	10.6
Parent(s) Education						
Not a High School Graduate	32.7	37.1	40.8	33.5	44.3*	29.4
High School Graduate	38.3	42.9	42.3	37.7	34.0	44.7
College Graduate	26.8	14.3***	16.9	23.8	13.2**	17.6
Educational Services						
Special Education	13.7	17.1	22.5	11.8	16.0	15.3
English Language Learner	29.5	36.2	40.8*	27.6	39.6**	37.6*
School Characteristics						
Free/Reduced Price Lunch	53.3	61.9	63.4	52.4	68.9**	61.2
Suspended	8.7	18.1*	25.4**	11.5	31.1***	20.0
School or District Transition	28.1	33.3	47.9***	6.4	6.6	4.7
Three or More Days Tardy	3.0	5.7	19.7***	4.7	10.4	22.4***
Base Year CST Scores						
Mean ELA z score	0.10	-0.25**	-0.28**	0.12	-0.19**	-0.21**
Mean Math z score	0.12	-0.16**	-0.35***	0.41	-0.01***	-0.15***
Number of Students	1,218	105	71	975	106	85
Percent of Cohort	87.4	7.5	5.1	83.6	9.1	7.3

Notes: CST is the California Standards Test; ELA is English Language Arts. Statistical significance denotes contrasts with students who were not chronically absent during the analysis period. *p<0.05; **p<0.01; ***p<0.001

Kindergarten cohort students with multiple years of chronic absence were significantly more likely to have a parent who was a high school graduate and less likely to be a college graduate, compared to those with no chronic absence. This same consistent pattern is not as apparent in the older cohorts, though some differences do exist. In the kindergarten, elementary to middle, and middle to high school cohorts, students with multiple years of chronic absence were significantly more likely to be English learners, and for the oldest cohort, this was also true among students with just one year of chronic absence. Chronically absent students in the youngest and oldest cohorts were more likely to receive FRPL, and those in the kindergarten and elementary to middle school cohorts were significantly more likely to have made a school or district transition. As one might expect, chronically absent students in all age groups were significantly more likely to have three or more tardies.

The bottom of Table 3 shows differences in CST math and English Language Arts (ELA) scores for students experiencing chronic absence for the three oldest cohorts, which are the only grade cohorts that take these tests. In the elementary cohort, students with one or multiple years of chronic absence have average CST z-scores of 0.18 and 0.22 standard deviations below the mean in ELA, respectively. In math, elementary students with one year of chronic absence during the period scored 0.17 standard deviations below the mean, and students with multiple years of chronic absence scored on average 0.32 below. This pattern and magnitude is similar in the other cohorts, with the exception of smaller differentials for math z-scores in the middle to high school cohort. In all cohorts and for both math and ELA, students who did not experience chronic absence during the period had average scores above the mean. All differences in achievement between chronically absent students and students with satisfactory attendance were statistically significant. This finding is important because it suggests that there is an achievement gap for students experiencing chronic absence. However, chronically absent students have other characteristics that may also put them at-risk academically, and we control for these other factors in models presented in Table 5 to test the relative important of absence.

To determine the key factors associated with chronic absence, we construct predictive models of chronic absence in years two and three, controlling for students' year one characteristics. Table 4 presents the results of the multinomial logit regressions for all four grade cohorts, showing coefficients, standard errors and marginal effects. We control for chronic absence in the baseline year and follow students to see if they have zero, one or two subsequent years in which they are chronically absent. The reference category is having zero subsequent years chronically absent.

Table 4
Predictors of Chronic Absence Frequency in Years Two and Three, Zero Years of Chronic Absence Reference Category

	Kindergarten Cohort (*n*=1,580)					
	1 Year Chronically Absent			2 Years Chronically Absent		
	β	SE	Marg Effect	β	SE	Marg Effect
Female	0.102	0.232	0.008	-0.065	0.314	-0.004
White	-0.232	0.466	-0.017	0.033	0.622	0.003
Other	0.903*	0.434	0.065	0.249	0.749	0.009
Parent(s) No HS Diploma	-0.079	0.279	-0.009	0.678	0.389	0.036
Parent(s) College Graduate	0.034	0.372	0.002	0.022	0.542	0.001
Free/Reduced Price Lunch	0.507	0.290	0.036	0.320	0.379	0.015
English Language Learner	-0.249	0.348	-0.016	-0.623	0.485	-0.032
Suspended	-0.014	0.683	0.061	-13.735	594.604	-0.726
Special Education	0.161	0.391	0.011	0.207	0.522	0.010
School or District Transition	0.132	0.358	0.006	0.885	0.453	0.046
Three or More Days Tardy	1.169***	0.323	0.080	1.343**	0.419	0.066
Base Year Chronic Absence	2.439***	0.270	0.163	3.599***	0.332	0.179
	Elementary Cohort (*n*=2,283)					
Female	-0.003	0.179	0.001	-0.278	0.289	-0.012
White	-0.355	0.317	-0.024	0.728	0.518	0.033
Other	-0.377	0.370	-0.022	-0.510	0.707	-0.021
Parent(s) No HS Diploma	-0.282	0.216	-0.018	0.171	0.354	0.008
Parent(s) College Graduate	-0.043	0.272	-0.005	0.619	0.433	0.027
Free/Reduced Price Lunch	0.400	0.230	0.020	1.536***	0.439	0.066
English Language Learner	-0.257	0.220	-0.016	-0.178	0.370	-0.007
Suspended	0.091	0.453	0.010	-1.243	1.092	-0.055
Special Education	0.433	0.249	0.026	0.302	0.398	0.012
School or District Transition	-0.640	0.364	-0.042	0.610	0.413	0.029
Three or More Days Tardy	0.251	0.344	0.015	0.329	0.442	0.014
Base Year Chronic Absence	2.751***	0.268	0.158	4.496***	0.331	0.189

Table 4 (Cont'd)
Predictors of Chronic Absence Frequency in Years Two and Three, Zero Years of Chronic Absence Reference Category

	Elementary to Middle School Cohort (*n*=1,394)					
	1 Year Chronically Absent			2 Years Chronically Absent		
	β	SE	Marg Effect	β	SE	Marg Effect
Female	0.238	0.222	0.015	0.490	0.332	0.034
White	1.044**	0.352	0.068	1.214*	0.521	0.081
Other	0.135	0.486	0.009	0.104	0.743	0.007
Parent(s) No HS Diploma	0.323	0.271	0.021	0.479	0.390	0.032
Parent(s) College Graduate	-0.549	0.340	-0.036	-0.593	0.533	-0.039
Free/Reduced Price Lunch	0.410	0.300	0.025	0.940*	0.447	0.065
English Language Learner	0.133	0.271	0.010	-0.249	0.393	-0.018
Suspended	0.577	0.309	0.039	0.268	0.439	0.016
Special Education	0.108	0.297	0.007	0.136	0.422	0.009
School or District Transition	0.292	0.275	0.016	1.175**	0.415	0.082
Three or More Days Tardy	0.863*	0.421	0.053	1.814***	0.496	0.124
Base Year Chronic Absence	2.157***	0.402	0.133	4.425***	0.401	0.303
	Middle to High School Cohort (*n*=1,166)					
Female	0.169	0.221	0.011	0.393	0.339	0.032
White	0.267	0.371	0.018	0.665	0.572	0.054
Other	0.262	0.514	0.018	0.599	0.727	0.048
Parent(s) No HS Diploma	0.151	0.260	0.014	-0.167	0.413	-0.015
Parent(s) College Graduate	-0.501	0.371	-0.039	-0.383	0.515	-0.028
Free/Reduced Price Lunch	0.384	0.308	0.030	0.297	0.468	0.022
English Language Learner	0.095	0.267	0.001	1.008*	0.435	0.084
Suspended	1.248***	0.254	0.100	0.490	0.447	0.031
Special Education	0.187	0.308	0.020	-0.665	0.555	-0.058
School or District Transition	-0.258	0.471	-0.022	0.146	0.665	0.014
Three or More Days Tardy	0.514	0.379	0.034	1.240**	0.450	0.100
Base Year Chronic Absence	2.852***	0.297	0.212	3.632***	0.369	0.283

Notes: Reference categories for categorical variables include Latino and having parents who are high school graduates. *p<0.05; **p<0.01; ***p<0.001

The results indicate that attendance history is the most important contributor to current-year chronic absence, more important than any of the demographic factors that are typically associated with students who are academically at-risk. In all cohorts, the largest, statistically significant predictor of chronic absence in one or both of the follow-up years was being chronically absent in the base year. For instance, the average marginal effect for base year chronic absence on probability of being chronically absent in one of the two subsequent years for the kindergarten cohort is .163, indicating that the probability of being chronically absent in one of the subsequent years is 16.3 percentage

points higher for those who were chronically absent in the base year, controlling for all the other characteristics in the model. The largest effects were observed for students in the oldest two cohorts, where being chronically absent in the base year is associated with 28 to 30 percentage point higher probability of chronic absence in the two subsequent years, controlling for other factors.

In addition to chronic absence in the base year, in the kindergarten cohort, having three or more tardies was significantly linked with chronic absence in either one or both of the following two years (marginal effects of .080 and .066, respectively). Students in this cohort who were of ethnicities other than white or Latino also had a significant association with being chronically absent in one of the last two analysis years relative to Latinos (marginal effect of .065). In the elementary cohort, the only significant predictor of chronic absence, aside from chronic absence in the base year, was participation in FPRL, which was positively associated with chronic absence in both of the remaining two years of the period (marginal effect of .066). In the elementary to middle school cohort, as in the kindergarten cohort, having three or more tardies was significantly linked with chronic absence in either one or both of the following two years (marginal effects of .053 and .124, respectively). Being white, relative to Latino, was also significantly linked with chronic absence in either one or both of the last two cohort years (marginal effects of .068 and .081, respectively). Participating in FPRL and having made a school or district transition in the year prior to the analysis was associated with chronic absence in multiple years only (marginal effects of .065 and .082, respectively). In the middle to high school cohort, having been suspended was the only significant predictor of being chronically absent in one of the remaining analysis years (marginal effect of .100), aside from chronic absence in the base year. Being an English language learner and tardy three or more days was also associated with being chronically absent for both years in the middle to high school cohort (marginal effects of .084 and .100, respectively).

For comparison, we also ran linear probability models (not shown) that examine the determinants of base year chronic absence, not controlling for prior chronic absence in each cohort. There are no consistent patterns in the determinants of chronic absence, except that in all four cohorts, having three or more tardies is positively and significantly associated with increased rates of chronic absence (as is also the case in the multi-year models). In addition, in the kindergarten and elementary cohorts, having more highly educated parents is associated with lower rates of chronic absence and being in Special Education is associated with higher rates. In the elementary-to-middle school cohort, having been suspended is associated with increased rates of chronic absence. And in the middle-to-high school cohort, being White (relative to Latino) is also associated with increased rates of chronic absence. Some of these same effects are present in the multi-year models shown in Table 4—for example being tardy remains a strong predictor of chronic absenteeism, even after controlling for base year chronic absenteeism.

Relationship between Chronic Absence and Achievement

We next focus on the question of the relationship between chronic absence and students' academic performance. Table 5 presents the results of the three-year growth models that examine the effect of years of chronic absence (zero, one, or multiple) on students' CST math and ELA z-scores for the three oldest cohorts. The reference category in all regressions is zero years of chronic absence. The results show that, controlling for other background characteristics, there is a baseline year gap in CST z-scores that can be attributed to chronic absence. In the elementary cohort, students with one year of chronic absence had significantly lower initial z-scores in math and ELA than students who did not go on to experience chronic absence during the three years (β=-0.206 and -0.149, respectively). Students in this cohort who experienced multiple years of chronic absence had

initial *z*-scores significantly lower in math (β=-0.275) and lower, though not statistically significant, scores in ELA (β=-0.116).

In the elementary to middle school cohort, students with one or multiple years of chronic absence exhibited lower initial *z*-scores in both math and ELA, though the coefficient was only statistically significant for math scores of students with multiple years of chronic absence (β=-0.272). This was also true for the middle to high school cohort, with math *z*-scores of students experiencing multiple years of chronic absence significantly lower than students who were not chronically absent (β=-0.416). Students in both the elementary to middle and middle to high school cohorts who were chronically absent in one year did not have initial *z*-scores that were significantly different than the mean for students who were never chronically absent during the analysis period on either CST.

Table 5
Effects of Years of Chronic Absence on CST Scores, Zero Years of Chronic Absence Reference Category

	Elementary Cohort (*n*=2,283)			
	Math		ELA	
	β	SE	β	SE
Not interacted				
1 Year Chronic Absence	-0.206**	0.068	-0.149*	0.063
2 or 3 Years Chronic Absence	-0.275**	0.085	-0.116	0.078
Female	-0.120***	0.034	0.087**	0.032
White	0.124*	0.062	0.113	0.058
Other	0.004	0.069	0.067	0.064
Parent(s) No HS Diploma	0.066	0.043	0.031	0.040
Parent(s) College Graduate	0.314***	0.053	0.311***	0.050
Free/Reduced Price Lunch	-0.158**	0.049	-0.165***	0.046
English Language Learner	-0.619***	0.047	-0.748***	0.043
Suspended	-0.189	0.100	-0.238*	0.092
Special Education	-0.590***	0.056	-0.513***	0.052
School or District Transition	-0.064	0.060	-0.104	0.056
Three or More Days Tardy	-0.180*	0.081	-0.218**	0.075
Time	-0.089*	0.039	-0.081**	0.032
Interacted with Time				
1 Year Chronic Absence	-0.052	0.033	-0.056	0.030
2 or 3 Years Chronic Absence	-0.009	0.041	-0.091*	0.038

Table 5 (Cont'd)
Effects of Years of Chronic Absence on CST Scores, Zero Years of Chronic Absence Reference Category

	Elementary to Middle School Cohort (*n*=1,394)			
Not interacted				
1 Year Chronic Absence	-0.050	0.081	-0.116	0.075
2 or 3 Years Chronic Absence	-0.272**	0.101	-0.134	0.094
Female	-0.050	0.043	0.116**	0.040
White	0.310***	0.069	0.202**	0.064
Other	0.144	0.083	0.081	0.076
Parent(s) No HS Diploma	-0.046	0.055	0.036	0.050
Parent(s) College Graduate	0.285***	0.063	0.295***	0.058
Free/Reduced Price Lunch	-0.112	0.058	-0.192***	0.054
English Language Learner	-0.717***	0.055	-0.846***	0.051
Suspended	-0.440***	0.076	-0.335***	0.070
Special Education	-0.363***	0.065	-0.428***	0.061
School or District Transition	0.023	0.077	-0.004	0.070
Three or More Days Tardy	-0.077	0.112	0.050	0.104
Time	0.122*	0.048	0.045	0.039
Interacted with Time				
1 Year Chronic Absence	-0.075	0.041	-0.036	0.035
2 or 3 Years Chronic Absence	-0.038	0.052	-0.085*	0.043
	Middle to High School Cohort (*n*=1,166)			
	Math		ELA	
	β	SE	β	SE
Not interacted				
1 Year Chronic Absence	-0.103	0.084	-0.001	0.072
2 or 3 Years Chronic Absence	-0.416***	0.094	-0.139	0.082
Female	-0.014	0.048	0.159***	0.041
White	0.315***	0.073	0.178**	0.063
Other	0.445***	0.103	0.185*	0.089
Parent(s) No HS Diploma	0.007	0.060	-0.011	0.052
Parent(s) College Graduate	0.407***	0.069	0.257***	0.059
Free/Reduced Price Lunch	-0.029	0.066	-0.151**	0.057
English Language Learner	-0.793***	0.061	-0.897***	0.053
Suspended	-0.303***	0.071	-0.217***	0.061
Special Education	-0.470***	0.079	-0.415***	0.074
School or District Transition	0.108	0.098	-0.039	0.085
Three or More Days Tardy	-0.059	0.098	-0.094	0.085
Time	-0.280***	0.046	0.006	0.029
Interacted with Time	-0.003	0.046	-0.033	0.032
1 Year Chronic Absence	0.073	0.055	-0.037	0.039
2 or 3 Years Chronic Absence	-0.103	0.084	-0.085*	0.043

Notes: Reference categories for categorical variables include Latino and having parents who are high school graduates. CST is the California Standards Test; ELA is English Language Arts. *p<0.05; **p<0.01; ***p<0.001

Although there was a pattern of baseline differences in achievement associated with chronic absence, there were no consistent, statistically significant differences in CST z-score growth trajectories among the various levels of chronic absence. The only statistically significant coefficients for chronic absence status interacted with time were in ELA for students experiencing multiple years of chronic absence in the elementary and elementary to middle school cohorts. In both cases, students with multiple years of chronic absence had significantly lower growth in CST ELA z-scores compared to students who were never chronically absent during the three-year period. Together, these findings indicate that the initial gaps in CST z-scores persist over time in both math and ELA, and in some cohorts, multiple years of chronic absence are associated with a widening of the gap.

Discussion and Implications

Among all grade levels in one San Francisco Bay Area community, kindergarten students had the highest rate of chronic absence, followed by the high school students. Although demographic characteristics were correlated with chronic absence, controlling for these demographics showed that the main factors that predicted chronic absence during the analysis period were prior chronic absence and excessive tardiness. Students who were chronically absent in one year repeated their chronic absence at much higher rates than students with satisfactory attendance. The findings also indicated that there is an initial gap that exists at the beginning of the study period in student CST scores in math and ELA attributable to chronic absence that continues year after year. This longitudinal view of chronic absence, as well as examining the role of persistent chronic absence, fills a gap in the existing literature on chronic absence, demonstrating the likelihood of persistent underlying barriers to school attendance. Interventions should focus on addressing and resolving these underlying barriers which, as mentioned previously, may include factors such as a student's family situation, chronic health issues, or motivation, among other things.

The results also point to the importance of considering students' attendance across multiple years, demonstrating the limits of using school administrative data to explain an occurrence that likely has roots in a student's family situation, health, or motivation, among a myriad of other reasons that are not captured in the available data. Determining which factors affect chronic absenteeism is critical for schools and other youth-serving agencies so that they can identify the types of supports that students and their families may need to improve attendance. Chronic absence in the primary grades may be due to reasons that are substantially different than those in the upper grades. The existing codified truancy interventions are likely not directly applicable to chronic absence because they tend to end in punitive measures, sometimes including misdemeanor charges or fines for students and parents, instead of routinely or consistently offering supports. Especially for elementary students, whose chronic absence almost certainly relates to their parents' or guardians' challenges with getting them to school, truancy intervention systems may be inappropriate for helping to ameliorate underlying problems and perhaps even add to them by imposing penalties.

Aside from assessing underlying factors that cause chronic absence, the literature on chronic absenteeism points to the need for new programs to address chronic absenteeism specifically, including a focus on positive communication with parents about attendance (Chang & Romero, 2008; Sheldon & Epstein, 2004). Taking a comprehensive approach to family, school, and community partnerships has also been shown to improve attendance and reduce the rates of chronic absence in schools, along with the use of positive involvement activities and maintaining a focus on improving attendance over time (Epstein & Sheldon, 2002). There are a number of programs in

place nationwide designed to reduce chronic absenteeism in schools and districts. For example, the Baltimore City Student Attendance Working Group's efforts have resulted in daily attendance tracking in schools, alerts for principals about which students are at risk of becoming chronically absent, and attendance teams to help address the causes of absenteeism with both students and families (Chang, Fernandez, Fothergill, & Hernandez, 2010). The New York City Department of Education developed a tool to track student attendance and alert school staff when students are accumulating absences. The Department also implemented a support structure for principals to utilize community resources and government-funded services to assist students with attendance issues (Nauer et al., 2008). A report from the Center for New York City Affairs indicated that after these interventions were implemented, chronic absence rates in New York City schools declined (Center for New York City Affairs, 2011). The City of Grand Rapids, Michigan, has developed a Youth Master Plan that outlines a set of recommendations for action, including a goal to increase school attendance. The city is working with community organizations to integrate services within schools to ensure regular student attendance (City of Grand Rapids, 2010). However, these programs aimed at reducing chronic absenteeism have not been rigorously evaluated to understand the essential components and their relative effectiveness.

The links between chronic absence and achievement outlined in this article also point to the importance of policy interventions to ensure that chronic absence is among the indicators schools and districts can use to improve students' educational outcomes. There are three levels of policy intervention to be considered. First, where chronic absence has not been codified into state law, states must define chronic absence for their school districts and identify it as an indicator to track. States have already codified truancy, many with low thresholds for the number of unexcused absences that trigger a truancy determination.

Second, schools and school districts should systematically track attendance patterns for individual students. At present, many schools and districts do not have computer systems that are able to collect this information, but it is possible that modifications to the truancy tracking system can be put in place to monitor chronic absence both within and across years.

Even where student-level attendance data exist, most schools and districts are not prepared to use that information to intervene because they have not devised intervention systems.
The third policy recommendation is for states or school districts to enact policies that describe the intervention process, not only for chronically absent students, but also for their parents or guardians who may know about, and even condone, students' absences. This recommendation is critically important because without a prescribed intervention process, it is left to principals and sometimes teachers to decide whether to contact families regarding multiple absences and then to work with them to resolve the underlying barriers preventing the student's full participation in school. These types of informal interventions are insufficient to address chronic absence systematically. The relatively high amount of variation attributable to the school level in our models potentially speaks to the inconsistency in school policies as one explanation of this variation. It may be necessary to build partnerships with other community organizations in order to best offer consistent support to families and students. Schools and school districts are not likely to have the necessary resources to intervene in all cases, but other community organizations could be tapped to help provide support.

Our research indicates that students with attendance issues are likely to experience multiple years of chronic absence, which has a potentially additive negative effect on academic achievement. This study, as well as many others in the field, are limited in that they do not account for omitted variable bias—the same factors that increase a student's probability for being chronically absent are also associated with lower academic performance. Although base year chronic absence appears as the key predictor in students' subsequent chronic absenteeism, it is likely that this is a proxy for

other underlying characteristics that make students chronically absent over time, such as transportation issues, a need to care for younger siblings, or student or parent chronic health conditions siblings that simultaneously would keep students out of school and detract from efforts to fully concentrate on school work. Alternatively, it is also possible that being chronically absent in the base year affects how students feel about school attendance in subsequent years. For instance, if they fall behind after being chronically absent in the base year, they may be less motivated to attend school in subsequent years because they feel they are not caught up with their peers. This would create endogeneity problems between base year chronic absence and chronic absenteeism in subsequent years. Ideally we would be able to examine this possibility using an instrumental variables model, as is done in Gottfried (2010), but with the limited number of fields in the school administrative data we used, no instruments were available for such purposes.

New data systems and interventions that use information collected across school years might be better able to track patterns for individual students in order to shed light on those who are at highest risk and serve the students and families with the highest attendance needs. An additional challenge is the peaks in chronic absence at the two ends of the age distribution, with the youngest and oldest students having the highest rates of absence. This points to the need for a flexible intervention plan that takes into account the age of the student and the needs of the family, in addition to the extent of the absence problem.

Our study—like many others in the absenteeism literature—is limited in that it focuses on just one community. It will be necessary for other researchers to replicate the findings in other areas and with different populations to understand whether persistence in chronic absenteeism over time is a pervasive problem. The study is also limited in that we cannot determine the underlying factors that lead students to be chronically absent in one or multiple years. Although we can speculate that issues such as transportation, parents' work schedules, students' family obligations, student health conditions, school environments, and other issues play a role, additional qualitative research is necessary to document the reasons students of all ages become chronically absent when devising interventions for assisting them to attend school regularly. In the future, studies that track the effects of chronic absence interventions on absence and other family outcomes will be critical for understanding the best ways to intervene with chronically absent students of all ages.

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