Title
Identifying the Determinants of Chronic Absenteeism: A Bioecological Systems Approach

Journal
TEACHERS COLLEGE RECORD, 119(7)

ISSN
0161-4681

Authors
Gottfried, Michael A
Gee, Kevin A

Publication Date
2017

Peer reviewed

Published in Teachers College Record (TCR)

Gottfried, M. A., Gee, K. A. (2017). Identifying the Determinants of Chronic Absenteeism: A Bioecological Systems Approach. *Teachers College Record.* 119(7). https://www.tcrecord.org/Content.asp?ContentId=21802

Identifying the Determinants of Chronic Absenteeism: A Bioecological Systems Approach

Authors:

Michael A. Gottfried, PhD[a]
Gervitz Graduate School of Education
University of California, Santa Barbara
Santa Barbara, CA 93106
Email: mgottfried@education.ucsb.edu
Phone: (323) 387-8039

Kevin A. Gee, EdD
School of Education
University of California, Davis
One Shields Ave.
Davis, CA 95616
Email: kagee@ucdavis.edu
Phone: (530) 752-9334

ACKNOWLEDGMENT
The authors of this study received funding from the Spencer Foundation. This article reflects the work of the authors and not of the granting agency.

a. corresponding author

Abstract

Background/Context: Chronic school absenteeism is a pervasive problem across the U.S.; in early education, it is most rampant in kindergarten and its consequences are particularly detrimental, often leading to poorer academic, behavioral and developmental outcomes later in life. Though prior empirical research has identified a broad range of determinates of chronic absenteeism, there lacks a single, unified theoretically-driven investigation examining how such factors concurrently explain the incidence of chronic absenteeism among our nation's youngest schoolchildren.

Purpose/Research Questions: Our study filled this critical void—we investigated the multiple determinants of chronic absenteeism that were grounded, theoretically and empirically, in Bronfenbrenner's bioecological model of development. Specifically, using data from the Early Childhood Longitudinal Study, Kindergarten Class of 2010-11 (ECLS-K: 2011) and the method of hierarchical generalized linear modeling (HGLM), we analyzed how the co-occurrence of key (1) process, (2) person, and (3) context (micro-, meso-, exo- and macrosystem) factors was associated with kindergarteners' probability of being chronically absent.

Findings/Results: Children with poorer health, higher internalizing behaviors and those who engaged more frequently in learning activities at home had higher odds of chronic absenteeism. Also, children from larger families and of lower socioeconomic status faced increased odds of chronic absenteeism. Conversely, children holding positive attitudes towards school had lowered odds of chronic absenteeism, a finding that remained robust across socioeconomic status groups. Finally, parent-school connections were associated with lowered odds of absenteeism.

Conclusions/Recommendations: Overall, our findings strongly suggested that addressing chronic absenteeism will require comprehensive and multifaceted approaches that recognize these multiple factors.

Identifying the Determinants of Chronic Absenteeism: A Bioecological Systems Approach

Across the U.S., approximately 10 to 15% of students are chronically absent, which is generally defined as missing 10% or more (about 19 days) of the school year (Balfanz & Byrnes, 2012). The negative consequences of chronic absenteeism are pervasive, and particularly detrimental for children's development in early grades, ranging from lowered academic performance (Author, 2010, 2011b, in press; Connolly & Olson, 2012; Gershenson, Jacknowitz, & Brannegan, 2014; Lehr, Sinclair, & Christenson, 2004; Rumberger, 1995) to increased risk for behavioral and developmental outcomes (Author, in press; Ekstrom, Goertz, Pollack, & Rock, 1986; Finn, 1989; Johnson, 2005; Newmann, 1981). In fact, in all of elementary school, chronic absenteeism is highest in kindergarten (Balfanz & Byrnes, 2012).

Prior research has examined factors that correlate with chronic absenteeism, such as educational disengagement (Bealing, 1990; deJung & Duckworth, 1986; Harte, 1994; Lehr et al., 2004; Ken Reid, 1983; Southworth, 1992), family structure (Catsambis & Beveridge, 2001; Fan & Chen, 2001; Jeynes, 2003; McNeal Jr., 1999; Muller, 1993; Sampson & Laub, 1994), peer effects (Author, 2013), and student-teacher interactions (Allen, 2003; Bealing, 1990; Marvul, 2012). However, there is no overarching consensus on which factors have the greatest association with school absences. This is partially attributable to a critical lapse in prior research on chronic absenteeism: The factors of absenteeism have been analyzed in isolation from one another in an atheoretical and disjointed research agenda. Our study fills this critical void —we investigate the multiple influences of chronic absenteeism drawing upon core theoretical concepts underlying Bronfenbrenner's *bioecological model of development* (Brofenbrenner & Morris, 2006). We know of no other research that systematically examined how underlying ecological determinants of chronic absenteeism, which range from individual demographic

characteristics to important child-environment interactions, concurrently influence the incidence of chronic absenteeism.

Accordingly, we adopted a novel approach in our proposed study – to our knowledge, we were the first to examine chronic absenteeism in kindergarten through the theoretical lens of Bronfenbrenner's bioecological model of development. Through this model, we investigated kindergarteners' probability of being chronically absent within a developmental framework that encapsulated: (1) *processes* capturing interactions between children and their environments; (2) *person* characteristics of the child; and (3) *contexts* which involve the proximal and distal environments of the child.

To conduct our analysis, we analyzed data from the Early Childhood Longitudinal Study, Kindergarten Class of 2010-11 (ECLS-K: 2011), the most current, nationally representative sample of kindergarteners in the US. We used hierarchical generalized linear modeling (HGLM) which enabled us to examine select bioecological factors related to chronic absenteeism while simultaneously adjusting our estimates by accounting for the clustering of children within schools. The new knowledge gained from our study is critical for influencing ways that both policymakers and practitioners can target factors that make children most susceptible to excessive absenteeism. Further, our work puts forth evidence that can be leveraged to guide the design of interventions early in schooling, before the ramifications of chronic absenteeism become exacerbated.

Background and Context

Though chronic absenteeism is a phenomenon that occurs throughout schooling, it is most pervasive in kindergarten (Balfanz & Byrnes, 2012; Romero & Lee, 2007). As kindergarten is an extremely critical developmental period which establishes children's foundational skills,

attitudes and dispositions for lifelong success (Duncan et al., 2007; Olson, Sameroff, Kerr, Lopez, & Wellman, 2005; Posner & Rothbart, 2000), educators and early childhood specialists and have expressed concerned about children missing excessive amounts of this formative year of schooling (Author, 2015). In fact, this concern is borne out by evidence demonstrating the overwhelmingly negative consequences of chronic absenteeism in children's early years of school. Prior empirical evidence demonstrates that children with more school absences early on perform more poorly in school (Author, 2009, 2011a, Dryfoos, 1990; Finn, 1993; Lehr, Hansen, Sinclair, 2003; Stouthamer-Loeber & Loeber, 1988); have a larger probability of high school dropout (Rumberger, 1995); face an increased chance of future unemployment (Alexander, Entwisle, & Horsey, 1997; Broadhurst, Paton, & May-Chahal, 2005; Kane, 2006); are eventually more likely to use tobacco, alcohol, and other drugs (Hallfors et al., 2002); and exhibit greater behavioral issues, including social disengagement and alienation (Author, in press; Ekstrom et al., 1986; Finn, 1993; Johnson, 2005; Newmann, 1981). Moreover, these ramifications are exacerbated for children who are from families of lower socioeconomic status (SES) (Balfanz & Legters, 2004; Fine, 1994; Orfield & Kornhaber, 2001).

Unsurprisingly, given this string of negative outcomes attributed to absenteeism, many researchers have attempted to identify what factors are associated with this detrimental behavior. Doing so will provide insight in to how to mitigate its negative academic and developmental consequences. A growing body of prior empirical evidence demonstrates that the correlates of chronic absenteeism are multifaceted, ranging from individual characteristics of children themselves to their immediate environments.

First, at the individual level, educational disengagement and alienation from school are linked to absenteeism (Bealing, 1990; deJung & Duckworth, 1986; Harte, 1994; Lehr et al.,

2004; Ken Reid, 1983). Also at the individual level, poor health is an important predictor of chronic absenteeism (Allen, 2003; Pourat & Nicholson, 2009). Second, Reid (1982) shows that family influences, such as family structure, father's occupation, mother's work status, and free lunch status were all related to absence patterns. As for the first of these factors (family structure), it has been speculated that household size might be linked to different rates of absenteeism, due to availability in parental supervision (Sampson & Laub, 1994). Related, low parental involvement is also linked to higher student absences (Catsambis & Beveridge, 2001; Fan & Chen, 2001; Jeynes, 2003; McNeal Jr., 1999; Muller, 1993). As for the latter three factors (occupation, work status, free lunch status), Ready (2010) finds that family SES is negatively related to absences. Romero & Lee (2007) also find evidence of a negative relationship between SES and absences. Additionally, children of younger mothers tend to have higher rates of absences. Third, in addition to the family, other socio-contextual factors such as peers' academic, demographic, and behavioral characteristics have been linked to absenteeism (Author, 2011, 2013; Rothman, 2001). Also, factors related to schools, such as teacher-pupil relations and program interventions as well as having health personnel, have been highlighted as critical (Allen, 2003; Bealing, 1990; Marvul, 2012).

Despite mounting evidence in the research, there is no general consensus on which factors are most influential in predicting chronic absenteeism. This is partially due to the fact that many of the aforementioned factors have been examined in isolation from one another. That is, there lacks a single, unified theoretically-driven research agenda that examines jointly multiple factors of chronic absenteeism. The issue with a lack of an atheoretical, disjointed research agenda exploring factors of chronic absenteeism is that: (1) no one has extracted the influence of each factor while controlling for the joint influence of other potential factors; (2) there lacks a

foundational explanation as to why we would expect to see the patterns that we do. Therefore, it is difficult to design policy and practice surrounding the prevention of chronic absenteeism.

When viewed holistically, the empirical evidence on the determinants of chronic absenteeism reviewed above suggests not only that there are myriad factors linked to chronic absenteeism, but that these factors can be conceived of in a broader embedded system involving (1) the individual child, (2) his/her surrounding contexts, both proximal (i.e., family and school) and distal (i.e., SES) and the (3) interactions that children have within and across those contexts. Accordingly, we argue that the empirical evidence, when collectively viewed, has implicitly suggested that chronic absenteeism can be conceptualized within a framework that shares salient features of Bronfenbrenner's *bioecological model of development* (Brofenbrenner & Morris, 2006). This model, and prior variants of the model (sometimes referred to as the *ecological model of human development* (Bronfenbrenner, 1993, p. 37)) recognizes that children's development over time is shaped by characteristics of children themselves, the environments in which they are embedded at multiple levels, and the processes that they engage in with these multiple environments (Bronfenbrenner & Morris, 2006; Bronfenbrenner, 1993). Accordingly, we ground our own study by drawing upon key elements of the bioecological model; however, rather than implicitly relying on the model, we explicitly and systematically allow the model to guide and inform our thinking about factors influencing chronic absenteeism. This is a substantial departure from prior absenteeism research.

For the purposes of our study, we focus on three components of the bioecological model: process, person, and context (Bronfenbrenner & Morris, 2006, p. 789). Drawing extensively from the work of Bronfenbrenner and Morris (2006), we define each below and explain how we

conceived of these components for the purposes of our study. Later, in our Method section, we describe the measures we used to operationalize these components.

Process. Processes capture regularly occurring interactions between children, people, and their environments. More specifically, processes occur as the result of "progressively more complex reciprocal interaction between an active, evolving biopsychological human organism and the persons, objects, and symbols in its immediate external environment" (Bronfenbrenner & Morris, 2006, p. 797). Further, as Bronfenbrenner and Morris (2006) argue, for processes to actually be influential they must occur regularly over an extended period of time. They note that patterns of processes can be found in activities such as "reading, learning new skills, problem solving…performing complex tasks and acquiring new knowledge and know-how." (p. 797). We focused on reciprocal "enduring *patterns* of proximal process[es]" (p. 797) that regularly occurred in children's lives including: (a) the degree to which parents engaged with their children at home; (b) the extent to which children engaged in learning activities at home during which they interacted with "objects and symbols" that required "attention, exploration, manipulation, elaboration and imagination"[1] (p. 798); and (c) the degree to which children interacted positively with others in the school environment. These types of proximal processes have been shown to be the cornerstone of the developing child and have the potential to be relevant to absenteeism behavior.

Person. These factors capture particular dispositions of children, their biopsychological attributes, as well as their ascribed characteristics. Specifically, we looked at what Bronfenbrenner and Morris (2006, p. 810-3) describe and define as Person *forces* (p. 810), *resource characteristics* (pp. 812-13) and *demographic characteristics* (p. 816).

Forces are "active behavioral dispositions" (p. 810) that can function to support or impede proximal processes that underlie development. Forces that support proximal process are known as "developmentally generative"; while those that impede are known as "developmentally disruptive" (p. 810). Generative forces that influence the processes we address include: approaches to learning (i.e., eagerness to learn new things, works independently, adapts to changes in routines, etc.), self-control, and the degree to which a child likes school. All of these forces enhance the likelihood that the child is able to engage in proximal processes (i.e., engagement with their learning environment) shaping their attitude towards school and ultimately can influence absenteeism behavior. On the other hand, disruptive forces include, for example, externalizing and internalizing behaviors—both can make it difficult to "engage in proximal processes requiring progressively more complex patterns of interaction over time" (Bronfenbrenner & Morris, 2006, p. 810). Further, these behavioral dispositions can enhance the likelihood that a child will be chronically absent.

Resource characteristics (Bronfenbrenner & Morris, 2006, p. 812) capture "biopsychological liabilities and assets" (p. 812) that are critical in shaping children's development and their capacity to engage in their surroundings. Also, they can be considered "developmental assets in the form of ability knowledge, skills, and experience" (p. 812). As noted earlier, these types of resource characteristics have been shown to be strong predictors of chronic absenteeism. Examples of resources characteristics include a child's disability status, academic ability, and overall health status.

Finally our study focuses on a set of *demographic factors* (p. 814) specified by Bronfenbrenner and Morris (2006) which include age, gender, and race/ethnicity. They note that these factors, "…are so pervasive in affecting future development that their possible influence

routinely needs to be considered in relation to the particular phenomenon under investigation" (p. 814).

Contexts (or systems) (micro- meso-, exo- and macrosystems) involve both proximal and distal environments of the child. The *microsystem* represents "patterns of activities, roles, and interpersonal relationships" within the "immediate environment" (i.e., school, home, etc.) of the child (p. 814). In our study, we focused on the role of two influential microsystems: children's immediate families and their schools. We incorporated aspects of these microsystems into our study in two different ways: (1) via the proximal processes described above that occurred primarily in the microsystems of the home and school; and (2) by including specific attributes of the family microsystem. Finally, we also examined children's prior exposure to the microsystems of their daycare environments.

The *mesosystem* captures the "linkages and processes taking place between two or more settings containing the developing person…" (Bronfenbrenner, 1993, p. 40). We examined the mesosystem comprised of the intersections between the microsystems of the family and school. Thus, in our study, the mesosystem captures the home-school connections, such as the degree to which parents engage with schools. Prior research has shown that establishing linkages between the microsystems of the home and the school, especially via school and family partnership programs, can significantly decrease chronic absenteeism (Sheldon & Epstein, 2004).

Similar to the mesosystem, the *exosystem*, "comprises the linkages and processes taking place between two or more settings" (Bronfenbrenner and Morris, 2006, p. 818). Yet, in contrast to the mesosystem, at least one of the multiple settings does <u>not</u> include the immediate environment surrounding the child. However, the setting that does not include the child *indirectly* influences processes within the child's immediate setting. An example of this is a

parent's work environment away from home (Bronfenbrenner, 1993). The child is not directly part of the parent's work setting, yet, the demands placed on parents in their work environment (i.e., time engaged in work away from the home) may indirectly influence the child via the amount of time parents have to care for their child at home (Weiss, 2005). With respect to absenteeism, if a parent's workplace setting severely constrains the amount of time they can spend at home, this then impedes their ability to be involved in their child's education; given that parental involvement is key predictor of chronic absenteeism (Sheldon & Epstein, 2004) relatively lower levels of involvement and engagement may lead to higher likelihood of absenteeism. There are additional contexts not directly involving the child that have been posited to indirectly influence absenteeism, including broader labor market conditions as well as school district policies on absenteeism (Kearney, 2008).

Finally, the *macrosystem* is comprised of the, "overarching pattern of micro-, meso- and exosystems characteristic of a given culture or subculture…" which includes "belief systems, bodies of knowledge, material resources, customs, life-styles, opportunity structures…and life course options embedded in each of these broader systems" (Bronfenbrenner, 1993, p. 40). In our study, we focus on the macrosystem involving the socioeconomic status of families by comparing how process, person and context factors differentially influence absenteeism behaviors across three distinct socioeconomic status (SES) groups (Tudge, Odero, Hogan, & Etz, 2003).

While prior studies on absenteeism have been motivated by examining multiple factors of absenteeism (see e.g., Kearney, 2008; Chang, 2008; Rothman, 2001), none have considered how process, person and context factors co-occur to jointly influence absenteeism in a theoretically-grounded model. As a result, prior research has provided only a limited understanding of what

factors might be correlated with differences in chronic absenteeism rates. We, however, provide a more extensive and holistic examination of factors of chronic absenteeism by grounding our work within a bioecological framework of development. Accordingly, in our study, we asked: What were the bioecological factors associated with chronic absenteeism among kindergarteners in the US? Our research is unique in that we are the first, to our knowledge, to apply bioecological theory to understand salient predictors of chronic absenteeism using a nationally representative sample of kindergarten children.

Method

Participants

We relied on a comprehensive dataset of kindergarten students in the U.S. Created by the National Center for Education Statistics at the U.S. Department of Education, the Early Childhood Longitudinal Study – Kindergarten Class of 2010-2011 (ECLS-K:2011) represents the most recent data collected on kindergarten students and their families, classrooms, and schools. NCES constructed the dataset in such a way that the students in ECLS-K:2011 represent a diversity of school types, socioeconomic levels, and racial and ethnic backgrounds (for a description of the data collection and sampling procedures of ECLS-K:2011, see Mulligan, Hastedt, & McCarroll, 2012).

The analytic sample contains N=9,350 students. Note that sample sizes have been rounded to the nearest tens, based on the restrictions set up by NCES's policy. The analytic sample is limited to children who had non-missing information on all measures and on school identification number. We compared mean differences for all measures in our analyses based on students who were included and excluded from the sample. For our set of measures, mean

differences did not arise between groups. Thus, this provides us with a degree of confidence that observations were missing at random.

Measures

Table 1 describes and lists the selected predictor variables we included in our analysis. Table 2 presents descriptive statistics for dependent and independent measures in this study. The outcome of interest was chronic absenteeism. In the spring survey, a teacher was asked to report the number of absences of the student in the sample over the course of the school year. In ECLS-K:2011, student absence information was derived only from the teacher's assessment of the student. There were a discrete number of answer choices on the teacher assessment, including: *0*, *1 to 4*, *5 to 7*, *8 to 10*, *11 to 19*, and *20 or more*.

<<insert Table 1 here>>

<<insert Table 2 here>>

Some define a threshold for chronic absenteeism, suggesting that it begins after missing a cumulative of two weeks of school, while others indicate that chronic absenteeism occurs after missing more than 18 days of school (e.g., Author, 2014; Balfanz & Byrnes, 2012). To be the most inclusive of all possible definitions, the chronic absenteeism measure in our study equaled 1 if a student had missed more than two weeks of school (i.e., 11 or more days) and 0 otherwise. Approximately 12% of the sample was chronically absent, which is consistent with prior research (Author, 2014; Balfanz & Byrnes, 2012).

Elements of the Bioecological Model of Development

Using Bronfenbrenner and Morris (2006) as a guide, we systematically identified a set of relevant bioecological factors representing process, person and context that were captured in the ECLS-K:2011 dataset. To further guide our selection of relevant factors, we relied on the extant

empirical and theoretical literature on chronic absenteeism to identify and narrow in on a set of plausible factors most salient to chronic absenteeism. We incorporate many of these factors as independent variables in our analysis. In Table 1, we summarize the constructs we used.

Although it is never possible to incorporate every possible measure representing the different elements of the bioecological model in our present study[2], we argue that our study still holds tremendous value and insight for understanding chronic absenteeism from a bioecological standpoint. As Bronfenbrenner and Morris (2006) note: "Even when the theoretical and operational requirements of the bioecological model are not met in full, the results can still contribute to understanding the forces that shape human development." (p. 813).

Process. As we previously discussed in our Background and Context section, we focused on processes reflecting the several types of "reciprocal interactions" between children and "the persons, objects, and symbols" in their "immediate external environment" (Bronfenbrenner & Morris, 2006, p. 797). To capture these patterns of proximal processes, we focused on three measures: (a) children's learning activities at home; (b) the involvement that parents have with the children at home (parent-child interaction); and (c) the way children interact with others at school (child-child interactions).

The measures of learning at home and parental home involvement were replicated from Votruba-Drzal, Li-Grining, and Maldonado-Carreño (2008). Both scales assessed the child's home environment, activities, and cognitive stimulation. The first scale, which was comprised of 15 dichotomously-scored items, measured the number of learning activities in which children engaged in at home. This scale assessed whether in the past month, the child participated in activities such as visited a book store, took music lessons, or attended tutoring lessons. The second scale, relating to parental involvement, was measured on a 4-point Likert scale. The 10-

item parental involvement scale assessed the frequency that parents engaged the child in various activities, such as playing games, singing songs, reading books, and doing arts and crafts. Finally, we include a child's score on the teacher-rated interpersonal skills scale, which measures the frequency with which a child has been getting along with people, forming and maintaining friendships, helping other children, showing sensitivity to the feelings of others, and expressing feelings, ideas, and opinions in positive ways. This scale was continuous and represented the average of a series of questions pertaining to the frequency of a particular item ranging from 1 (*never*) to 4 (*very often*).

We do acknowledge that these proximal processes are "one-sided" (Bronfenbrenner & Morris, 2006, p. 800) since we do not fully capture the reciprocal nature of the interactions occurring (i.e., the degree to which children responded to their parents' learning activities, or how other children responded to the child's positive behavior).

Person. As addressed earlier we focus on Person forces, resource characteristics, and demographic factors.

As indicated in Table 1, the first set of child-level factors pertain to *Person forces*, or behaviors and dispositions that influence the above proximal processes. Consistent with Bronfenbrenner and Morris (2006), we classify these forces as either (a) developmentally generative or (b) developmentally disruptive. These forces are based on a set of socioemotional scales derived from the teacher's assessment of student behavior in both the fall and spring kindergarten survey waves. NCES based all socioemotional scales on the *Social Skills Rating System* (SSRS) developed by Gresham and Elliot (1990). NCES modified these original scales and created its own *Teacher Social Rating Scales* (SRS) in ECLS-K:2011. Each scale was continuous and represented the average of a series of questions pertaining to the frequency of a

particular item ranging from 1 (*never*) to 4 (*very often*). Though the individual questions that make up these scales are not available, even at the restricted-user level, NCES does report in the user's manual that all the scales have high internal consistency, with the alpha reliability coefficients ranging from 0.79 to 0.89.

For *developmentally generative* Person forces, we focus on a child's (a) approaches to learning; and (b) self-control. Both of these forces are captured via teacher's ratings in the *Teacher Social Rating Scales* (SRS). The approaches to learning scale rates a child's frequency of organization, eagerness to learn new things, independent work ability, adaptability to change, persistence in completing tasks, and ability to pay attention. The self-control scale measures the frequency of the student's ability to control his or her temper, respect others' property, accept peer ideas, and handle peer pressure. NCES constructed these scales so that a higher score on this scale indicates more positive socioemotional skills (i.e., positive regression coefficients represent positive outcomes). Finally, we included a parental survey rating of the frequency with which a student expresses liking school. This measure ranges from 1 to 3 with a 3 representing the greatest frequency of expressing liking school.

For *developmentally disruptive* Person forces, we focus on the problem behaviors scales of the SRS which include externalizing and internalizing problem behaviors in school. As described in the user's manual, NCES created the externalizing problem behaviors scale as measuring the frequency with which a child argues, fights, gets angry, acts impulsively, and disturbs ongoing activities. The internalizing problem behaviors scale rates the presence of anxiety, loneliness, low self-esteem, and sadness. A higher score on these two problem behaviors scales reflects a lower outcome (i.e., negative coefficients represent positive outcomes).

The Person *resource characteristics* we include capture "biopsychological liabilities and assets" of the child. We have included indicators for whether a child is an English Language Learner (ELL) based on the primary language spoken at home and for having a diagnosed disability based on school IEP records. Additional person resource characteristics included math ability at kindergarten entry based on scores scaled using item-response theory (IRT). Finally, to account for children's physical health, we included both body mass index (BMI) and parents' rating of their child's health, ranging from fair to excellent. Based on prior literature, poor health may be a potential liability—children who are less healthy might have greater absences (Allen, 2003; Bloom, Dey, & Freeman, 2006).

Finally, we have included a typical set of demographic factors explicitly mentioned by Bronfenbrenner and Morris (2006), including a child's age at kindergarten entry in months, ethnicity/race, and gender.

Context: microsystem. The measures of proximal process we addressed previously function primarily within the microsystems of the family and school. Further, we included additional characteristics of family structure, including: the number of siblings, an indicator for whether a student's mother was married at his/her birth, and an indicator for whether a student's parents were currently married. We also included family SES, which was measured as an NCES-created SES composite scale found in the ECLS-K:2011 dataset (based on family income, parental education attainment, and parental occupation).

Finally, we included characteristics of the microsystem of a child's childcare environment prior to kindergarten: relative, non-relative, center-based care, Head Start, and multiple types. Additionally, hours of non-parental care was included. A similar set of indicators

(except for Head Start) were included to account for the type of care a student had received outside of kindergarten time (e.g., afterschool care).

Context: exosystem. We included parents' reported working hours as a way to address the exosystem. As noted earlier, the parental workplace—and by extension, the time they spend at work—is not part of a child's immediate environment (it is, however, part of a parent's microsystem), but it may have an indirect effect on the child.

Context: mesosystem. The measures we used to focus on the linkages between the microsystems of family and school include four indicators capturing the extent to which parents reported that they engaged in school-related activities. This include whether parents reported having done the following: (a) attended back-to-school night; (b) a Parent Teacher Association (PTA) or Parent Teacher Organization (PTO) meeting; (c) parent-teacher conference; or (d) had volunteered at school.

Context: macrosystem. Our approach to incorporating the macrosystem was guided by the prior empirical work of Tudge et al. (2003). In their study, Tudge et al. (2003) focused on two groups of families based on their socioeconomic status noting that: "Bronfenbrenner argued that to understand development, the research design must involve 'a contrast between at least two macrosystems…' Thus, one can satisfy the minimum requirement by conducting cross-cultural research as it is typically understood, or by examining groups that are distinguished by race, ethnicity, or social class within a single society." (p. 47). Accordingly, in our research design we stratified our analyses by low, middle and high SES groups. This allowed us to understand how selected process, person and contextual factors underlying chronic absenteeism behaviors functioned across SES.

Data Analytic Method

Hierarchical generalized linear modeling (HGLM). To estimate the relationship between our chronic absenteeism outcome and selected measures representing process, person and context variables, we fitted the following 2-level hierarchical generalized linear model (HGLM)[3] (Raudenbush & Bryk, 2002) model to account for the nesting of children *i* in schools *j*:

Level-1 (Child)

$$logit(p_{ij}) = \beta_{0j} + \sum_{q=1}^{Q} \beta_{qj} x_{qij} \quad (1)$$

Level-2 (School)

$$\beta_{0j} = \gamma_{00} + u_{0j}$$

$$\beta_{qj} = \gamma_{q0}, \text{ for q=1,…,Q} \quad (2)$$

Substituting level-2 into level-1 and rearranging yields:

$$logit(p_{ij}) = \gamma_{00} + \sum_{q=1}^{Q} \gamma_{q0} x_{qij} + u_{0j} \quad (3)$$

where p_{ij} is the probability of chronic absenteeism, x_{qij} represents a set of level-1 variables capturing our selected process, person, and contextual predictors, u_{0j} represent random effects at level-2. We constrained the effects of the level-1 predictors ($\sum_{q=1}^{Q} \beta_{qj}$) to be fixed at level 2, assuming that they are invariant across schools. We let the intercept (γ_{00}) be random across schools. To facilitate the interpretation of our models, we present our coefficient estimates as odds ratios by exponentiating our parameter estimates for the fixed effects in our models (i.e., $e^{\hat{\gamma}_{q0}}$).

Prior to fitting the full model as specified in equation (3), we first fit an unconstrained (no predictor) model as a benchmark to determine the proportion of total variability in our outcome

that was attributable to school-to-school differences (i.e., the intracluster correlation coefficient). Given this approach, the unconditional intracluster correlation coefficient (ICC) for our unconstrained model was $\frac{\tau_{00}}{\tau_{00} + \frac{\pi^2}{3}} = 0.17$. Note that in a logistic HLM model, the level-1 error variance is calculated as $\sigma^2 = \frac{\pi^2}{3}$ under an approach that treats the dichotomous outcome as a latent variable (Snijders & Bosker, 2012). Based on this ICC, approximately 17% of the variation in the chronic absenteeism outcome was due to school-to-school differences. The remaining (83%) was due to between child differences. This indicated that children are somewhat correlated within school thereby justifying our use of HGLM to account for this degree of interdependence. We then fit models augmenting this unconditional model with sets of predictors previously described in our measures section. We used Stata 13 to fit all HGLM models to data using maximum likelihood estimation (MLE) (StataCorp, 2013).

Results

Main Findings

Table 3 presents the odds ratios and standard errors for the model predicting chronic absenteeism. The model accounts for the multilevel structure of the data of students clustered within schools. Note that the coefficients are presented as odds ratios. A coefficient larger than a value of one indicates a higher odds of chronic absenteeism, whereas a coefficient lower than one suggests lower odds. An odds ratio that approximates one would not be associated with any change in odds.

<<insert Table 3 here>>

Process. Given the focal role of processes in shaping development as described above, we first focus on the most salient proximal process in our model that was significantly related to

chronic absenteeism. We found that children with higher levels of home learning activities had higher odds of chronic absenteeism. While this result may seem counterintuitive at first, we theorized that parents providing a larger number of home activities might be more likely to accommodate absences for two reasons. First, some highly-involved parents might have the capacity to stay at home with an absent child, such as having a mother who does not work (Author, 2015). Second, these parents might feel as though that missed in-school time can be supplemented with such a great degree of home learning activities, and hence the opportunity cost of missing school in these families declines. As this study is associative in nature, the correlation between these two measures is not necessarily surprising.

Person. There were several important findings with respect to Person forces. First, as expected, students who displayed greater frequencies of approaches to learning have lower odds of being chronically absent. Positive attitudes towards school, in other words, was associated with lower instances of missing school. Greater instances of other teacher-rated behaviors, however, were associated with differences in school absences. For instance, students with higher frequencies of externalizing behaviors were less likely to be chronically absent. It is plausible that parents rely on schools to provide care for these students with greater instances of these behavior issues. Third, students with higher internalizing behaviors were more likely to be chronically absent. This finding is consistent with the literature that disengaged or anxious students were more likely to be absent from school (Ekstrom et al., 1986). These findings for externalizing and internalizing behaviors, therefore, are not contradictory. Children who act out might be more likely to attend school (perhaps due to parental agency), and those who are more anxious or lonely tend to not attend school. Finally, students who expressed liking school were less likely to be chronically absent. This final finding – based on a parent-rated measure –

corroborates the teacher-rated approaches to learning scale also described in this section. Hence, there is a great amount of consistency across multiple measures in this domain.

Of all person resources measures, only health was significantly related to chronic absenteeism. Compared to students in excellent health (the reference group), students with only good or fair health ratings had higher odds of chronic absenteeism. Students with the lowest health rating were most likely to be chronically absent compared to any other health level. This finding of the importance of health in school attendance is consistent with the literature (Allen, 2003; Bloom et al., 2006). Key to this study, health remained a persistent and highly significant predictor associated with chronic absenteeism, even after accounting for our wide span of factors.

Finally were person demographic characteristics. Only race was statistically-significant person predictors of chronic absenteeism. Asian students and those from other racial/ethnic categories (besides Blacks and Hispanics) were more likely to be chronically absent relative to their White counterparts. However, we interpret these findings for race with caution, given the smaller sample sizes of these demographic groups in the ECLS-K dataset.

Context: microsystem. Both family structure and SES predicted differences in chronic absenteeism. Specifically, students with more siblings tended to have lower odds of chronic absenteeism. In larger families, there might be more accountability when it comes to getting more than one child to school (Author, 2014). Additionally, students from higher SES families had lower odds of chronic absenteeism, as corroborated by the literature (Nauer, Mader, Robinson, & Jacobs, 2014). Childcare experiences was also linked to differences in odds of chronic absenteeism. Across both prekindergarten and kindergarten sets of care variables, those children in center-based care were less likely to be chronically absent in kindergarten. Author

(2015) has suggested a reason for this: center-based care provides families with the necessary impetus to help solidify family logistics on getting children to kindergarten as well as to help students develop the mindset on attending school on a regular, daily basis. Note that the hours of care, while significant, was associated with an odds of almost one-to-one.

Context: exosystem. While the measure of hours of maternal employment was statistically significant, there was little practical significance given that the odds ratios were approximately one-to-one. There was no statistical significance of paternal employment.

Context: mesosystem. While home parental involvement was not statistically-significantly associated with chronic absenteeism, several attributes in the mesosystem were linked to missing school. The direction of the effect of these mesosystem factors was as expected: students whose parents who attended back-to-school nights or PTA/PTO meetings were less likely to be chronically absent. We speculated that parents who were more invested or involved at the school itself would have a greater likelihood of ensuring their children attend school.

The Interactive Role of SES

Within policy and practice dialogue, lower SES is supported as having a major influence on students' chronic absenteeism (Nauer et al., 2014). Children from low-SES backgrounds often face greater health issues (Allen, 2003), fewer family resources (Chang & Romero, 2008), and lower attitudes about going to school (Chang & Romero, 2008). Hence, these challenges that children from lower SES families face are often associated with a higher prevalence of chronic absenteeism (Balfanz & Letgers, 2004; Nauer et al., 2014; Orfield & Kornhaber, 2001). Hence, understanding how SES moderates our model will better inform researchers, policy makers, and

practitioners as to how to make adjustments and guide policy to address specific needs for those students with limited opportunities.

Therefore, we tested whether SES plays a critical moderating role. To do so, we stratified our sample of students into tertiles based on the NCES SES measure: low SES, middle SES, and high SES. We then subsequently refit our model from Table 3 on each subsample, as presented in Table 4. Note that since each model was separately estimated by socioeconomic subgroup, each represents a fully-interacted model. Hence, the findings here essentially represent interaction effects between SES category (low, middle, or high) and all other measures in the model. This way, it becomes possible to develop a more nuanced understanding of how being in a particular SES group might moderate our original findings.

<<insert Table 4 here>>

Table 4 presents odds ratios. For clarity, we omit reporting standard errors in the table. As in Table 3, the only process measure that is statistically significant in Table 4 is home learning activities. Interestingly, the microsystem measure of SES appears to moderate process effects – as shown in Table 4, it was only in highest SES families that students with greater home learning activities were more likely to be chronically absent. This provides even greater support for the speculation based on the findings in Table 3. Here, the effect we detected may be due to parents in higher SES families who might have felt as though they can supplement missed school time with their ability to be involved in the child's learning outside of school – in other words, the opportunity costs of missed school time are lower for highly-involved higher SES families. Or, it might be the case that many of the types of home learning activities of the highest SES households, such as sports, music recitals, or travel, often involve missing school.

We did find that parents and family measures in micro- and mesosystems were also moderated by SES. For instance, we found two key features of the family microcontext that interact to shape absenteeism outcomes: SES and siblings. Only for the middle SES group did the number of siblings influence absenteeism rates. Hence, once our models were stratified by SES, a more refined portrait emerged as to how family structure might play a significant role shaping chronic absenteeism. Similarly, when SES, again a microcontextual factor, was interacted with parent-school factors of the mesosystem, the largest benefits (i.e., smaller odds of chronic absenteeism) emerged for families from the higher SES subgroup. Therefore, students from highest SES families had the lowest odds of chronic absenteeism when their families were involved in school activities. Students from the low SES subgroup did benefit when their parents attended a back-to-school night. However, the odds were not as large, though nonetheless significant.

As addressed previously, the empirical evidence on absenteeism links several person-level measures to absenteeism. Interestingly, there were several person resources factors that were shaped by SES. The role of ELL and disability status emerged as significant factors for students in the lowest SES group. Lowest SES students in these groups were less likely to be chronically absent. One plausible explanation is that the school provides access to services for both ELL students and students with disabilities – services that the families of limited financial means rely on and could not get elsewhere, and hence such families are more likely to ensure that their children get to school to access these services. Alternatively, at school, these children can receive specialized services that families may not be able to receive or afford at home. Note that while there were differences by race/ethnicity, the sample sizes in each category do reduce the confidence in these particular findings. Hence, they are not discussed here.

The findings in this section help to understand how these person-level factors were shaped by SES, and when they were not. Beginning with the latter, irrespective of SES, expression of liking school was linked to lower chronic absenteeism. Similarly, health was not differentiated across SES groups. Together, the lack of interaction effects between SES and these person-level factors serve to highlight the importance of school-going attitudes as well as the importance of strong health, regardless of SES.

Discussion

Grounding our work in Bronfenbrenner's bioecological model of development, we analyzed the relationship between process, person, and context factors and chronic absenteeism for a recent, national cohort of kindergarteners drawn from the Early Childhood Longitudinal Survey (ECLS-K): 2011 using the method of hierarchical generalized linear modeling to account for students nested within schools. The bioecological model was influential to our study because it allowed us to systematically identify salient correlates of chronic absenteeism. Further, our results demonstrated, and as the bioecological model theoretically suggested, children's absenteeism behaviors were not tied to one single attribute or context. Rather, the risk factors for chronic absenteeism simultaneously involved attributes of children, their environments and the interactions they engage in within those environments. The bioecological model was a highly relevant framework with which to investigate absenteeism behaviors as it provided us with a holistic theoretical perspective—one lacking in prior absenteeism research—with which to understand children's absenteeism.

Using the bioecological model to guide our selection of correlates, we found that the probability of chronic absenteeism was associated with a fairly consistent set of factors. We discuss the implications for our most noteworthy findings below.

For instance, children who displayed greater frequencies of approaches to learning (or who expressed liking school) were less likely to be chronically absent whereas those who displayed greater frequencies of internalizing behaviors were more likely to be chronically absent. Prior research shows that students who are disengaged from school or feel alienated or isolated were more chronically absent (Ekstrom et al., 1986; Finn, 1993; Johnson, 2005; Newmann, 1981), and our findings corrobate this. Using these findings to support policy and practice would suggest that efforts to reduce chronic absenteeism vis-a-vis student resource factors might be best targeted specifically at boosting engagement towards learning and positive feelings towards school. There has been prior success in interventions to improve school engagement. Previous efforts, such as 'Check & Connect' (Lehr et al., 2004), have shown that monitoring and addressing student engagement is linked to lower instances of absenteeism. Further efforts in this line would be supported by the evidence in this present study.

Kindergarteners' health status also emerged as significant. Regardless of SES, children in poorer states of health had higher odds of being chronically absent relative to their healthier peers as found in prior research (Allen, 2003; Jackson, et al., 2011; Krenitsky-Korn, 2011; Pourat et al., 2009). While it is widely accepted that access to important health care services and federal health programs for young children, such Medicaid, can overcome children's impaired school readiness (Currie, 2005) as well as absenteeism (Zhang, 2012), health-related coverage and services for children still remains out of reach for many children. Given our finding of a strong health-attendance relationship, finding ways that children and their families who are currently shut out of health-care supports can participate in programs (both on and off school sites) that actively support the health and well-being of children is critical to both health and successful school-going behavior. Additionally, it is important to identify which particular health

issues might be more likely to be associated with chronic absenteeism. Prior research suggests, for instance, that children with asthma are 3.2 times more likely to be chronically absent as their peers without asthma (Krenitsky-Korn, 2011). Therefore, there remain opportunities to address not only general issues pertaining to access to health care but also ways to develop school supports for specific health needs.

We found that children in families with more siblings tended to have lower odds of being chronically absent. Children with additional siblings (especially older ones) might be under more supervision, which has been shown to be critical in reducing absenteeism (Sampson & Laub, 1994). Or, it might be the case that many siblings can walk to school together or take public transportation together, particularly in more densely populated areas (Author, 2010, 2014) – and this may not be possible with fewer or no siblings. Determining the precise mechansisms underlying this finding, however, remains open for future research. Nonetheless, in going forward, varying supports might be considered. For example, school and community supports might ensure that children in small families attend school as frequently as children in larger families who have more 'in-house' support. Prior research has suggested that a stronger school-community-family partnership can lower child absenteeism (Steven B. Sheldon, 2007). Therefore, our finding on the link between siblings and absenteeism would support interventions in which schools and communities could work in tandem with smaller families to promote good attendance. For instance, schools and communities might offer children big-sibling types of programs to walk children to school or escort them on public transportation, carpooling, or other mechanisms to ensure that children with fewer siblings go to school.

Finally, several meso-contextual factors proved to be significant predictors of chronic absenteeism. We can conclude that children with parents who were more involved at school

tended to have lower odds of chronic absenteeism. Higher rates of absenteeism are linked to families in which parents are absent from, unaware of, or uninvolved in their children's schooling (Catsambis & Beveridge, 2001; Fan & Chen, 2001; Jeynes, 2003; McNeal Jr., 1999; Muller, 1993). Our findings underscore this. Given that parental detachment from school has been found to increase child absenteeism (Lehr et al., 2004; Sheldon, 2007), schools might continue identifying new ways to spur parental engagement. Perhaps the set of straightforward indicators utilized in this study to measure the role of meso-context might aid schools in identifying ways to boost the importance of being present in school activities. But for those families who cannot be part of school functions for various reasons such as work schedules, awareness is critical. Research suggests that increased communication to the parents about a child's schooling can help to reduce absence rates (Epstein & Sheldon, 2002). Hence, our study would support efforts to increase both involvement in and awareness about school.

Finally, a key set of findings in our study was related to the moderating role of SES. As established previously, SES holds significant predictive power in increasing and/or reducing chronic absenteeism (e.g., Author, 2009; Nauer et al., 2014; Ready, 2010). As hypothesized, children from lower SES families, relative to higher SES families, tended to have higher odds of being chronically absent. This relationship has been previously established and discussed extensively in the literature on chronic absenteeism. However, the value of this finding in this particuarly study comes from the fact that even after accounting for the wide span of factors in the bioecological model, SES still continued to emerge as a significant interactive factor, as seen in Table 4. Understanding how effects differ by subgroups provides a platform for both researchers and policymakers to develop an agenda that attemps to parse the factors that not only matter the most, but exactly for whom.

Given these findings, this study supports continued efforts at reducing chronic absence as well as new paths for further research. These efforts are especially important in kindergarten. As mentioned, of all elementary school years, kindergarten chronic absenteeism rates are highest. Hence, children are missing the most amount of school during one of the most formative and critical years for academic and development (Juel, 1988; Pianta & Walsh, 1996; Smith, 1997). Determining how to promote positive influences and mitigate negative factors during this critical year will thus serve to not only better shape research, policy, and practice around this detrimental schooling behavior but aid in creating stronger interventions and policies to curb absenteeism as well.

Future Research

Future endeavors might build upon our study in several meaningful ways. First, one potential limitation of this study is that it focused exclusively on a cross section of kindergarteners. While kindergarteners face the highest incidence of chronic absenteeism, a further adaptation of the bioecological model would be to analyze factors shaping how absenteeism behaviors change over time. In incorporating change over time, future research might consider what factors contribute to persistent chronic absenteeism gaps and compare whether the factors affecting chronic absenteeism in any single year are different from those that affect chronic absenteeism as children grow older.

A second potential limitation is that this study focused on the correlates of chronic absenteeism. We do not causally attribute any of the factors to absenteeism; yet, the strength of our design does yield important insights into the patterns of absenteeism and the likely influences that deserve further study. Hence, our study is useful in guiding future research designs – with some drawing upon experimental or quasi-experimental methods – that will help distinguish

correlates of chronic absenteeism from causal impacts. For instance, it might be possible to randomly assign health interventions to families and children to determine the role that they play on reducing school absenteeism. Or, one could implement a school engagement program like 'Check & Connect' (Lehr et al., 2004) to determine the effects of monitoring and addressing attitudes towards school. Quasi-experimentally, it could be possible to test for the effects of having another sibling in the family, with the appropriate panel data where one could monitor children over time and hence changes to family structure over time. Hence, while many of the factors in this study cannot necessarily be randomly assigned, such as siblings, there are certainly ways to address the effects of these factors.

Finally, based on our results, we can identify patterns linking specific factors to chronic absenteeism. However, it was not possible to determine the underlying mechanisms through which these significant factors influenced chronic absenteeism. Research designs based on qualitative methods have a strong potential to provide additional insight into mechanisms driving the consistent findings in our study.

In conclusion, chronic absenteeism in early education poses enormous challenges for young students as it constrains their ability to achieve positive educational, health, and developmental successes in current and future years if they are excessively missing school. Therefore, future work in this area will allow for us to further detect origins of this problem in school and reduce its negative consequences.

References

Alexander, K. L., Entwisle, D. R., & Horsey, C. S. (1997). From first grade forward: Early foundations of high school dropout. *Sociology of Education*, *70*(2), 87–107.

Allen, G. (2003). The impact of elementary school nurses on student attendance. *The Journal of School Nursing*, *19*(4), 225–231.

Balfanz, R., & Byrnes, V. (2012). *The importance of being there: A report on absenteeism in the nation's public schools*. Baltimore: Johns Hopkins University Center for Social Organization of Schools.

Balfanz, R., & Legters, N. (2004). *Locating the dropout crisis. Which high schools produce the nation's dropouts? Where are they located? Who attends them? Center for Research on the Education of Students Placed at Risk CRESPAR*. Baltimore, MD: Center for Research on the Education of Students Placed At Risk, Publications Department, CRESPAR/Johns Hopkins University, 3003 N. Charles St., Suite 200, Baltimore, MD 21218. Web site: http://www.csos.jhu.edu.

Bealing, V. (1990). Pupil perceptions of absenteeism in the secondary school. *Maladjustment and Therapeutic Education*, *8*(1), 19–34.

Bloom, B., Dey, A. N., & Freeman, G. (2006). *Summary health statistics for U.S. children : National Health Interview Survey , 2005*. Washington, D.C.

Bridges, M., Fuller, B., Rumberger, R., & Loan, T. (2004). *Preschool for California's children: Promising benefits, unequal access*. Berkeley, CA.

Broadhurst, K., Paton, H., & May-Chahal, C. (2005). Children missing from school systems: Exploring divergent patterns of disengagement in the narrative accounts of parents, carers, children and young people. *British Journal of Sociology of Education*, *26*(1), 105–119.

Bronfenbrenner, U., & Morris, P. (2006). The bioecological model of human development. In R. Lerner & W. Damon (Eds.), *Handbook of child psychology (6th ed.): Vol. 1, Theoretical models of human development* (pp. 793–828). Hoboken, NJ: John Wiley & Sons, Inc. http://doi.org/10.1002/9780470147658.chpsy0114

Bronfenbrenner, U. (1993). Ecological models of human development. In M. Gauvain & M. Cole (Eds.), *Readings of the development of children* (2nd Ed., pp. 37–43). New York: Freeman.

Catsambis, S., & Beveridge, A. A. (2001). Does neighborhood matter? Family, neighborhood, and school influences on eighth-grade mathematics achievement. *Sociologcial Focus*, *34*(4), 435–457.

Connolly, F., & Olson, L. S. (2012). *Early elementary performance and attendance in Baltimore City schools' pre-kindergarten and kindergarten*. *Baltimore Education Research Consortium*. Baltimore: Baltimore Education Research Consortium. 2701 North Charles Street Suite 300, Baltimore, MD 21218. Tel: 410-516-4044; Web site: http://www.baltimore-berc.org.

Currie, J. (2005). Health disparities and gaps in school readiness. *The Future of Children*, *15*(1), 117–138.

deJung, J. E., & Duckworth, K. (1986). *Measuring student absences in the high schools*. San

Francicsco.

Dryfoos, J. G. (1990). *Adolescents at risk: Prevalence and prevention*. New York: Oxford University Press.

Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., … Japel, C. (2007). School readiness and later achievement. *Developmental Psychology*, *43*(6), 1428–1446.

Ekstrom, R. B., Goertz, M. E., Pollack, J. M., & Rock, D. A. (1986). Who drops out of high school and why? Findings from a national study. *Teachers College Record*, *87*(3), 356–373.

Fan, X., & Chen, M. (2001). Parental involvement and students' academic achievement: A meta-analysis. *Educational Psychology Review*, *13*(1), 1–22.

Fine, M. (1994). Chartering urban school reform. In M. Fine (Ed.), *Chartering Urban School Reform: Reflections on Public High Schools in the Midst of Change.* (pp. 5–30). New York: Teachers College Press.

Finn, J. D. (1989). Withdrawing from school. *Review of Educational Research*, *59*(2), 117–142. http://doi.org/10.3102/00346543059002117

Finn, J. D. (1993). *School engagement and students at risk*. Washington, DC.

Gershenson, S., Jacknowitz, A., & Brannegan, A. (2014). *Are student absences worth the worry in U.S. primary schools?* Washington, DC.

Gresham, F. M., & Elliot, S. M. (1990). *Social skills rating system*. Circle Pines, MN: American Guidance Service.

Hallfors, D., Vevea, J. L., Iritani, B., Cho, H., Khatapoush, S., & Saxe, L. (2002). Truancy, grade point average, and sexual activity: a meta-analysis of risk indicators for youth substance use. *The Journal of School Health*, *72*(5), 205–11.

Harte, A. J. (1994). *Improving school attendance: Responsibility and challenge*. Toronto, Canada: Canadian Education Association, 252 Bloor Street West, Suite 8-200, Toronto, Ontario M58 1V5, Canada ($8; $3 handling charge on all billed orders).

Jackson, S. L., Vann, W. F., Kotch, J. B., Pahel, B. T., & Lee, J. Y. (2011). Impact of Poor Oral Health on Children's School Attendance and Performance. *American Journal of Public Health*, *101*, 1900–1906.

Jeynes, W. H. (2003). A meta-analysis: The effects of parental involvement on minority children's academic achievement. *Education and Urban Society*, *35*(2), 202–218. http://doi.org/10.1177/0013124502239392

Johnson, G. M. (2005). Student alienation, academic achievement, and WebCT use. *Education Technology and Society*, *8*(2), 179–189.

Juel, C. (1988). Learning to read and write: A longitudinal study of 54 children from first through fourth grades. *Journal of Educational Psychology*, *80*(4), 437–447.

Kane, J. (2006). School exclusions and masculine, working-class identities. *Gender and Education*, *18*(6), 673–685.

Kearney, C. (2008). An interdisciplinary model of school absenteeism in youth to inform professional practice and public policy. *Educational Psychology Review*. Retrieved from

http://link.springer.com/article/10.1007/s10648-008-9078-3

Krenitsky-Korn, S. (2011). High school students with asthma: attitudes about school health, absenteeism, and its impact on academic achievement. *Journal of Pediatric Nursing*, 37, 61-8.

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 (JESPAR)*, *9*(3), 279–301. http://doi.org/10.1207/s15327671espr0903_4

Lehr, Camilla A.Hansen, AnastasiaSinclair, M. F. (2003). Moving beyond dropout towards school completion: An integrative review of data-based interventions. *School Psychology Review*, *32*(3), 342–364.

Marvul, J. N. (2012). If you build it, they will come: A successful truancy intervention program in a small high school. *Urban Education*, *47*(1), 144–169. http://doi.org/10.1177/0042085911427738

McNeal Jr., R. B. (1999). Parental involvement as social capital: Differential effectiveness on science achievement, truancy, and dropping out. *Social Forces*, *78*(1), 117. http://doi.org/10.2307/3005792

Muller, C. (1993). Parental involvement and academic achievement: An analysis of family resources available to the child. In B. Schneider & J. S. Coleman (Eds.), *Parents, their children, and schools* (pp. 77–114). Boulder, CO: Westview Press.

Mulligan, G. M., Hastedt, S., & McCarroll, J. C. (2012). *First-time kindergartners in 2010-11: First findings from the kindergarten rounds of the Early Childhood Longitudinal Study, kindergarten class of 2010-11 (ECLS-K:2011)*. Washington, DC.

Nauer, K., Mader, N., Robinson, G., & Jacobs, T. (2014). *A better picture of poverty: What chronic absenteeism and risk load reveal about NYC's lowest income elementary schools*. New York, NY: Center for New York City Affairs.

Newmann, F. M. (1981). Reducing student alienation in high schools: Implications of theory. *Harvard Educational Review*, *51*(4), 546–564.

Olson, S. L., Sameroff, A. J., Kerr, D. C. R., Lopez, N. L., & Wellman, H. M. (2005). Developmental foundations of externalizing problems in young children: the role of effortful control. *Development and Psychopathology*, *17*(1), 25–45.

Orfield, G., & Kornhaber, M. L. (Eds.). (2001). *Raising standards or raising barriers? Inequality and high-stakes testing in public education.* New York: Century Foundation Press.

Pianta, R. C., & Walsh, D. J. (1996). *High-risk children in schools: Constructing sustaining relationships*. New York: Routledge.

Posner, M. I., & Rothbart, M. K. (2000). Developing mechanisms of self-regulation. *Development and Psychopathology*, *12*(03), 427–441.

Pourat N., & Nicholson G. (2009) Unaffordable dental care is linked to frequent school absences. *UCLA Health Policy Research Brief*, November, 1–6.

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: applications and data*

analysis methods. Thousand Oaks: Sage Publications.

Ready, D. D. (2010). Socioeconomic disadvantage, school attendance, and early cognitive development: The differential effects of school exposure. *Sociology of Education*, *83*(4), 271–286. http://doi.org/10.1177/0038040710383520

Reid, K. (1982). The self-concept and persistent school absenteeism. *British Journal of Education Psychology*, *52*(2), 179–187.

Reid, K. (1983). Institutional factors and persistent school absenteeism. *Educational Management Administration & Leadership*, *11*(1), 17–27.

Romero, M., & Lee, Y.-S. (2007). *A national portrait of chronic absenteeism in the early grades*. New York.

Rothman, S. (2001). School absence and student background factors : A multilevel analysis. *International Education Journal*, *2*(1), 59–68.

Rumberger, R. W. (1995). Dropping out of middle school: A multilevel analysis of students and schools. *American Educational Research Journal*, *32*(3), 583–625.

Sampson, R. J., & Laub, J. H. (1994). Urban poverty and the family context of delinquency: A new look at structure and process in a classic study. *Child Development*, *65*(2), 523. http://doi.org/10.2307/1131400

Sheldon, S. B. (2007). Improving student attendance with school, family, and community partnerships. *The Journal of Educational Research*, *100*(5), 267–275. http://doi.org/10.3200/JOER.100.5.267-275

Sheldon, S. B., & Epstein, J. (2004). Getting students to school: Using family and community involvement to reduce chronic absenteeism. *School Community Journal*. Retrieved from http://eric.ed.gov/?id=EJ794822

Smith, S. S. (1997). A longitudinal study: The literacy development of 57 children. In C. K. Kinzer, K. A. Hinchman, & D. J. Leu (Eds.), *Inquiries in literacy theory and practice* (46th ed.). Chicago: National Reading Conference.

Snijders, T., & Bosker, R. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). Los Angeles: SAGE.

Southworth, P. (1992). Psychological and social characteristics associated with persistent absence among secondary aged school children with special reference to different categories of persistent absence. *Personality and Individual Differences*, *13*(3), 367–376. http://doi.org/10.1016/0191-8869(92)90116-7

StataCorp. (2013). *Stata Statistical Software: Release 13.* College Station, TX: StataCorp L.P.

Stouthamer-Loeber, M., & Loeber, R. (1988). The use of prediction data in understanding delinquency. *Behavioral Sciences & the Law*, *6*(3), 333–354. http://doi.org/10.1002/bsl.2370060305

Tudge, J., Odero, D., Hogan, D., & Etz, K. (2003). Relations between the everyday activities of preschoolers and their teachers' perceptions of their competence in the first years of school. *Early Childhood Research …*.

Votruba-Drzal, E., Li-Grining, C. P., & Maldonado-Carreño, C. (2008). A developmental perspective on full- versus part-day kindergarten and children's academic trajectories

through fifth grade. *Child Development*, *79*(4), 957–978.

Weiss, H. (2005). *Preparing educators to involve families: From theory to practice*. Thousand Oaks, CA: Sage Publications.

Zhang, S. (2012). Do Our Children Become Healthier and Wiser? A Study of the Effect of Medicaid Coverage on School Absenteeism. *International Journal of Health Services*, *42*(4), 627–646.

Table 1. Predictor variables from the Early Childhood Longitudinal Study-Kindergarten Class of 2010-2011 (ECLS-K: 2011) used to represent components of Bronfenbrenner's bioecological model of development as they relate to chronic absenteeism.

Bioecological Component	Predictor
Process Reciprocal interactions occurring between children and other individuals, symbols and objects in their immediate contexts.	Child's: • Learning activities at home (interactions with objects and symbols) • Parents' involvement in home (parent-child interactions) • Interpersonal behavior at school (child-peer interactions)
Person The dispositions of children, their biopsychological attributes, as well as their ascribed characteristics	Forces ("active behavioral dispositions" that promote positive development) • Approaches to learning (i.e., keeps belongings organized; shows eagerness to learn new things; works independently) • Self-control • Liking school Resource characteristics ("biopsychological liabilities and assets"; "developmental assets in the form of ability knowledge, skills, and experience") • Externalizing problems • Internalizing problems • English Language Learner (ELL) status • Disability status • Math ability • Body mass index (BMI) • Health status (Excellent, Very Good; Good; Fair) Demographic factors • Gender • Race/ethnicity (White, Black, Latino, Asian, Other) • Age at kindergarten entry
Microsystem The immediate environments of children	Child's: • Number of siblings • Mother's marital status (at time of birth)

	• Socio-economic status • Parents' marital status • Out-of-home pre-K care
Exosystem Connection between two or more settings, one of which does not contain the child	Parents' weekly hours of employment
Mesosystem Connections between the microsystems of home and school	Child's parents' attendance at: • Back-to-school night • PTA/PTO meeting • Parent-teacher conference • Volunteer event
Macrosystem "Overarching pattern of micro-, meso- and exosystems characteristic of a given culture or subculture…"	Household Socioeconomic Status (SES)

Table 2: Descriptive Statistics (n=9,350)

	Mean	*SD*
Outcome (Spring Kindergarten)		
Chronic absenteeism	0.12	*0.32*
Process		
Home learning activities	2.96	*0.46*
Home parental involvement	4.13	*2.20*
School interpersonal skills	3.03	*0.62*
Person		
Approaches to learning	3.00	*0.67*
Self-control	3.12	*0.61*
Externalizing problem behaviors	1.57	*0.61*
Internalizing problem behaviors	1.44	*0.47*
Expresses liking school	2.68	*0.57*
ELL	0.13	*0.34*
Disability	0.20	*0.40*
Entry math ability	30.60	*10.87*
BMI	16.41	*2.30*
Health scale		
Excellent	0.59	*0.49*
Very good	0.29	*0.45*
Good	0.10	*0.30*
Fair	0.03	*0.16*
Age at kindergarten entry (months)	66.14	*4.64*
White	0.56	*0.50*
Black	0.11	*0.31*
Latino	0.20	*0.40*
Asian	0.06	*0.25*
Other	0.06	*0.24*
Female	0.51	*0.50*

	Mean	*SD*
Context: Microsystem		
Number of siblings	1.46	*1.10*
Mother married at child's birth	0.70	*0.46*
Parents currently married	0.73	*0.45*
SES composite	0.06	*0.81*
Out-of-home prekindergarten care		
Relative	0.24	*0.43*
Non-relative	0.11	*0.32*
Center	0.70	*0.46*
Head Start	0.14	*0.35*
Multiple	0.32	*0.47*
Hours of care	15.81	*13.98*
Out-of-home care outside of kindergarten hours		
Relative	0.24	*0.43*
Non-relative	0.07	*0.26*
Center	0.20	*0.40*
Multiple	0.06	*0.23*
Hours of care	5.87	*9.79*
Context: Exosystem		
Weekly hours of employment: mother	22.26	*19.63*
Weekly hours of employment: father	32.65	*22.12*
Context: Mesosystem		
Parent attended back-to-school night	0.81	*0.39*
Parent attended PTA/PTO meeting	0.39	*0.48*
Parent attended parent-teacher conference	0.91	*0.28*
Parent volunteered at school	0.60	*0.49*

Table 3: Bioecological predictors of Chronic Absenteeism (Main Model)

	Odds	*SE*		Odds	*SE*
Process			Context: Microsystem		
Home learning activities	1.52 ***	*(0.15)*	Number of siblings	0.87 **	*(0.03)*
Home parental involvement	1.04	*(0.02)*	Mother married at child's birth	1.22	*(0.13)*
School interpersonal skills	1.07	*(0.13)*	Parents currently married	0.88	*(0.11)*
			SES composite	0.67 ***	*(0.05)*
Person			Out-of-home prekindergarten care		
Approaches to learning	0.78 *	*(0.09)*	Relative	1.27	*(0.22)*
Self-control	1.06	*(0.14)*	Non-relative	0.76	*(0.16)*
Externalizing problem behaviors	0.78 *	*(0.08)*	Center	0.75 *	*(0.10)*
Internalizing problem behaviors	1.22 *	*(0.11)*	Head Start	1.10	*(0.19)*
Expresses liking school	0.75 ***	*(0.05)*	Multiple	0.93	*(0.19)*
ELL	0.74	*(0.13)*	Hours of care	1.00	*(0.00)*
Disability	0.87	*(0.08)*	Out-of-home care outside of kindergarten hours		
Entry math ability	0.99	*(0.01)*	Relative	0.83	*(0.14)*
BMI	1.00	*(0.02)*	Non-relative	0.72	*(0.18)*
Health scale			Center	0.63 **	*(0.11)*
Very good	1.08	*(0.10)*	Multiple	0.93	*(0.19)*
Good	1.44 ***	*(0.19)*	Hours of care	1.01 *	*(0.01)*
Fair	1.80 ***	*(0.37)*			
Age at kindergarten entry (months)	1.00	*(0.01)*	Context: Exosystem		
Black	0.90	*(0.14)*	Weekly hours of employment: mother	0.99 ***	*(0.00)*
Latino	1.04	*(0.14)*	Weekly hours of employment: father	1.00	*(0.00)*
Asian	2.42 ***	*(0.48)*			
Other	1.63 ***	*(0.26)*	Context: Mesosystem		
Female	0.89	*(0.07)*	Parent attended back-to-school night	0.80 *	*(0.09)*
			Parent attended PTA/PTO meeting	0.83 *	*(0.08)*
			Parent attended parent-teacher conference	0.89	*(0.13)*
			Parent volunteered at school	1.01	*(0.10)*
Model Notes:					
Level 2 variance component	0.96				
Log Likelihood	-2416.13				
n (students)	7,560				
n (schools)	844				

**** p < 0.001, ** p < 0.01, * p < 0.05*

Table 4: Models by Socioeconomic Status

	Low SES	Middle SES	High SES
Process			
Home learning activities	1.28	1.33	2.27 ***
Home parental involvement	1.03	1.06	1.02
School interpersonal skills	1.10	1.07	1.10
Person			
Approaches to learning	1.00	0.68 *	0.67
Self-control	0.92	1.20	1.09
Externalizing problem behaviors	0.83	0.72	0.74
Internalizing problem behaviors	1.57 ***	0.85	1.37
Expresses liking school	0.80 *	0.64 ***	0.74 **
ELL	0.55 *	1.18	1.34
Disability	0.71 *	1.04	0.95
Entry math ability	0.98 *	1.01	0.99
BMI	0.99	1.01	0.98
Health scale			
Very good	1.23	0.95	1.05
Good	1.38	1.33	1.67
Fair	1.70	1.84	2.18
Age at kindergarten entry (months)	0.99	1.02	0.99
Black	0.88	1.09	0.47
Latino	0.92	1.09	1.57
Asian	2.93 *	1.64	2.03 *
Other	1.71 *	1.82 *	1.20
Female	0.98 *	0.86	0.84
Model Notes:			
Level 2 variance component	0.88	1.32	1.02
Log Likelihood	-815.24	-849.07	-729.75
n (students)	1,980	2,570	3,010
n (schools)	590	730	640

	Low SES	Middle SES	High SES
Context: Microsystem			
Number of siblings	0.93	0.81 *	0.89
Mother married at child's birth	0.93	1.44 *	1.17
Parents currently married	0.93	0.91	0.59
SES composite	0.63	0.52	0.68
Out-of-home prekindergarten care			
Relative	1.89 *	1.24	0.47
Non-relative	1.43	0.45 *	0.65
Center	1.01	0.56 *	0.77
Head Start	1.24	1.24	0.64
Multiple	0.64	1.13	1.60
Hours of care	1.00	1.00	0.99
Out-of-home care outside of kindergarten hours			
Relative	0.79	0.91	0.81
Non-relative	0.80	0.55	0.66
Center	0.40 **	0.75	0.57
Multiple	1.03	0.59	1.49
Hours of care	1.01	1.00	1.04 **
Context: Exosystem			
Weekly hours of employment: mother	0.99 *	0.99 *	0.99
Weekly hours of employment: father	0.99	1.00	1.01
Context: Mesosystem			
Parent attended back-to-school night	0.70 *	0.86	0.91
Parent attended PTA/PTO meeting	1.02	0.80	0.67 *
Parent attended parent-teacher conference	1.27	0.85	0.50 *
Parent volunteered at school	1.15	0.93	0.90

**** p < 0.001, ** p < 0.01, * p < 0.05*

Footnotes

[1] According to Bronfenbrenner and Morris (2006), these types of learning activities "…can be carried on in the absence of other persons" (p. 814) and are considered "solo activities" (p. 814).

[2] Bronfenbrenner's bioecological model also incorporates the element of *time*. However, we do not explicitly include time given that as of the writing and completion of this study, our primary outcome is measured at a single time point.

[3] HGLMs are similar to hierarchical linear models, except that HGLMs are used in cases where standard assumptions of linearity and normality do not hold. In our case, our chronic absenteeism outcome is dichotomous which makes HGLM an appropriate method with which to analyze our data. As noted in Raudenbush & Bryk (2002) HGLMs are also referred to as generalized linear mixed models or generalized linear models with random effects (p. 292).