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School attendance problems and absenteeism as early warning signals: review and implications for health-based protocols and school-based practices

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School attendance has been historically linked to healthy states of functioning, whereas school attendance problems/absenteeism have been historically linked to unhealthy states of functioning. Indeed, school attendance and its problems are deeply embedded within multiple domains of functioning at both analytic and systemic levels. This article utilizes complex systems theory and the concept of early warning signals to illustrate how changes in school attendance could indicate instability and perhaps sudden transitions to unhealthy states of functioning for students, families, schools, and communities. The article reviews how school attendance problems/absenteeism intersect with functioning at analytic (academic, social–emotional, mental health, physical health, family) and systemic (school and community) levels. The article also includes recommendations for how viewing changes in school attendance as early warning signals could improve health-based protocols (enhancing access to care; integrating systems of care) and school-based practices (developing multi-tiered systems of support models and community asset maps; modifying educational and policy perspectives). A primary theme involves more streamlined efforts to identify movement from healthy to unhealthy states among individuals to assign proactive and personalized treatment avenues (health-based protocols) and among systems to enact needed intervention supports and reforms (school-based practices).

KEYWORDS

school attendance, school attendance problems, school absenteeism, complex systems theory, early warning signals, functional impairment

1. Introduction

Childhood education is a core aspect of the United Nations Declaration of Human Rights (Article 26, United Nations General Assembly, 1948). Formal or informal school attendance is thus a fundamental aspect of daily life for most youths worldwide. *School attendance* in the modern era involves many forms across different instructional formats, including in-person presence at home or in a designated building for educational purposes; full participation, positive engagement, and adequate competency-based attainment in virtual/distance/remote learning programs; or a mixture of physical presence and participation/engagement/attainment

in blended or hybrid learning programs (Patrick and Chambers, 2020; Li and Wang, 2022). School attendance can occur as well within the context of residential, inpatient, juvenile justice, and alternative educational and other facilities (Kumm et al., 2020; Knollmann et al., 2022).

Conversely, *school attendance problems* (SAPs) also impact many youths worldwide. SAPs in the modern era include, for in-person learning formats, complete absence from school on one or more days (absenteeism), partial absences from school (e.g., via missed classes or sections of a school day), tardiness to school, morning misbehaviors designed to miss school, and/or substantial mental/physical health challenges as well as structural and operational barriers that preclude formal school attendance (Kearney et al., 2023). SAPs can also include, for virtual/distance/remote learning formats, and particularly post-pandemic, missed log-ins, limited number of interfacing hours per day, incomplete assignments, delayed timelines for meeting course objectives, problematic student-teacher interactions, and deficits in measures of competency, mastery, and achievement, among other metrics (National Forum on Education Statistics, 2021).

School attendance and SAPs/absenteeism have been studied by professionals across myriad disciplines over the past century, which has produced a wide swath of perspectives on these issues. These perspectives can be grouped generally into *analytic* approaches that focus on specific contexts and narrow-band variables that impact school attendance/SAPs/absenteeism as well as *systemic* approaches that focus on overarching contexts and broad-band variables that impact school attendance/SAPs/absenteeism (Kearney, 2021). Analytic approaches in this area often focus on microsystem (immediate environment) and mesosystem (interconnected microsystems) ecological impacts such as student health, caregiver-student interactions, family-school communications, and peer victimization (Pengpid and Peltzer, 2019; Lee et al., 2023). Systemic approaches in this area often focus on exosystem (social structures) and macrosystem (cultural elements) ecological impacts such as school climate, educational policy, transportation schemes, and economic patterns (Berkowitz et al., 2017; Stein and Grigg, 2019). Both approaches also focus on chronological ecological impacts as students advance through different levels of education (e.g., preschool to elementary school, grades, primary to secondary) and encounter new developmental challenges at each level (Smerillo et al., 2018). Health-based protocols that address attendance/SAPs/absenteeism often draw from analytic approaches, whereas school-based practices that address attendance/SAPs/absenteeism often draw from systemic approaches (Wilkins and Bost, 2016; Melvin et al., 2019).

Analytic and systemic approaches to school attendance/SAPs/absenteeism have produced a rich literature base as well as fundamental results pertinent to healthy and unhealthy functioning (Kearney et al., 2022). At an analytic level, school attendance has been generally linked to student benefits and SAPs/absenteeism have been generally linked to student impairments across critical domains of functioning (e.g., academic, social–emotional, mental health, physical health, family) (Ansari and Pianta, 2019). At a systemic level, school attendance rates are often linked to enhanced school funding and are an important federal marker for accountability purposes. Conversely, school absenteeism rates are a federal marker of reduced school quality (Darling-Hammond et al., 2016). In addition, schools and surrounding communities with high chronic absenteeism rates are commonly associated with resource-deprived, insalubrious, and unsafe climates and environments (Sugrue et al., 2016).

At an analytic level, eventual school completion/graduation is associated with long-term individual benefits into adulthood, especially opportunities for more advanced levels of education and greater earning potential (Lara et al., 2018). Conversely, school dropout (permanent departure from school prior to completion) is associated with long-term impairments into adulthood, including greater difficulties across economic, health, interpersonal, legal, occupational, and psychiatric domains (Lansford et al., 2016; Rocque et al., 2017; Ansari et al., 2020; Rumberger, 2020). At a systemic level, school retention and graduation rates are closely associated with positive school and community variables such as constructive student-teacher relationships, school-sponsored activities, greater connectedness, high-quality and varied educational options, and supportive social networks (Zaff et al., 2017). Conversely, school and communities with high school dropout rates are commonly associated with substantial barriers to school completion; examples include deliberate student exclusion, pervasive and biased exclusionary discipline practices, transportation vulnerabilities, and lack of access to rigorous coursework, instructional materials, and supportive technologies (DePaoli et al., 2018; UNESCO, 2019).

An intricate and deep entwinement exists of school attendance with healthy states of functioning and SAPs/absenteeism with unhealthy states of functioning at both analytic and systemic levels. Such entwinement raises the possibility that SAPs/absenteeism could be utilized as salient early warning signals for diagnostic/conceptual, assessment/evaluation, and treatment/intervention purposes across health-and school-based settings. A key potential advantage of this approach would be more streamlined efforts to identify movement from healthy to unhealthy states among individuals to assign proactive and personalized treatment avenues (health-based protocols) and among systems to enact needed intervention supports and reforms (school-based practices). The next section introduces complex systems theory and the concept of early warning signals to help guide these efforts. Subsequent sections include a review of how SAPs/absenteeism intersect with functioning at analytic (academic, social–emotional, mental health, physical health, family) and systemic (school and community) levels. The article concludes with recommendations for how SAPs/absenteeism as early warning signals may improve certain health-based protocols (enhancing access to care; integrating systems of care) and school-based practices (developing multi-tiered systems of support models and community asset maps; modifying educational and policy perspectives).

2. Complex systems theory and early warning signals

Complex systems theory has emerged to help explain how systems can undergo sudden transitions from one state to another, such as from healthy to unhealthy status. Examples include abrupt onsets of epidemics, financial market collapses, natural disasters, and wildlife extinction events (Scheffer et al., 2009). Complex systems theory focuses on level of resilience in a system and its potential decline over time (Fraccascia et al., 2018). Such decline creates greater system instability, or increased vulnerability to perturbations or minor contextual disturbances that may propel the system past a tipping

point and thus a sudden transition to an altered and possibly unhealthy state (Wichers et al., 2019). Complex systems theory has been extended to health concepts such as physical and mental functioning systems as well as to educational concepts such as the K-12 school system (Mital et al., 2014; Rutter et al., 2017). Such concepts within complex systems theory are understood as multifaceted, dynamic, and dimensional rather than as rudimentary, static, and categorical. As such, a focus is made on factors within a system that are most sensitive to instability and thus movement toward tipping points and sudden transitions (Nelson et al., 2017). With respect to health and educational systems, for example, this may involve identifying critical aspects and periods of risk for fitness deterioration or for academic failure (Jacobson et al., 2019; Wright and Woods, 2020).

Those operating from complex systems theory often focus on early warning signals, or elements associated with destabilization or critical slowing down of a particular ecological system (Clements et al., 2019). Early warning signals may serve as a tool to detect shifts in functioning ahead of time and thus possibly deter destabilization (Helmich et al., 2022). Helmich et al. (2021) issued several recommendations for exploring early warning signals and critical transitions in psychopathology, including attempts to distinguish normal variation from formal system transition, or from a healthy to an unhealthy mental state, and to identify sudden symptom shifts that preceded the system change. Sometimes the focus in this regard is on granular variables such as momentary changes in affective states (Schreuder et al., 2020). Early warning signals could also include broader constructs, however, such as prodromal states, functional deficits, and chaos indicators (e.g., Oliver et al., 2015).

Youths and their families as well as schools and communities operate in a complex ecological system with various levels of influential factors that can move them, sometimes suddenly, from a harmonious and healthy state to a discordant and unhealthy state. Disturbed functioning in an unhealthy state intersects with the clinical concept of impairment, or interference with and/or reduction in adequate system performance (Calderón-Larrañaga et al., 2019). For students and their primary caregivers, such impairment can include deterioration in academic, social–emotional, mental health, physical health, and family functioning. For schools and communities, such impairment can include deterioration in climate, engagement, resources, safety, and graduation rates, among other variables. The next sections review ways in which SAPs/absenteeism intersect with various aspects of perturbed functioning. An emphasis is placed on student and family functioning given the theme of this special series. However, a section on school and community functioning is included as well to help set the stage for later recommendations for improving school-based practices.

3. School attendance problems and absenteeism and domains of functioning

Considerable debate exists as to the direction of school attendance/absenteeism and its concomitant benefits/impairments; either can be a cause and/or a consequence of the other. This debate is set aside for now in favor of a parallel approach (i.e., concurrent school attendance/absenteeism with benefits/impairments) for practical purposes and until future empirical work specifically addresses this question for this population (Kearney, 2022). Instead, the assumption adopted for the following sections is that SAPs/absenteeism are proximal and integral features across many key domains of functioning and thus a potentially salient warning signal of an unhealthy state.

3.1. Academic functioning

Academic functioning involves a wide array of metrics and concepts such as achievement in numeracy and literacy and other subjects (including grade point average), grade progression/retention, standardized test scores, and school engagement, among others (Wang et al., 2020). School absenteeism is closely associated with deficits in many areas of academic functioning. These deficits became especially pronounced during the COVID-19 pandemic as absenteeism rates spiked (Kuhfeld et al., 2020). Many of these effects are expected to last several years, disproportionately affect vulnerable students, and intersect with variables such as teacher disengagement, lower academic expectations, and less access to academic supports (Howard-Jones et al., 2022; Kipp, 2022).

School absenteeism is associated with deficits in numeracy and literacy achievement, and these deficits appear to become cumulative over time (Ansari and Gottfried, 2021; Carroll et al., 2022). In related fashion, lower grade point average has been associated with multiple levels of absenteeism severity, and course failure with absenteeism is often a key element of early warning systems that predict later school dropout (Skedgell and Kearney, 2018; Balfanz and Byrnes, 2019). Key mechanisms in this regard could include long-term declines in executive functioning capabilities such as working memory and cognitive flexibility, social alienation, student illness and risky behaviors, and less teacher-based instruction (Fuhs et al., 2018; Gottfried and Ansari, 2021; Sosu et al., 2021; Klein et al., 2022). The relationship between school absenteeism and impaired academic achievement is highly multifaceted and complex, however, including not just many of the variables described here but also broader exosystem and macrosystem variables (e.g., biased/inappropriate academic placements; level of school funding for academic resources; youth employment to support family members economically) (Singer et al., 2021; Lee et al., 2023).

Grade retention has also been found to be associated with school absenteeism and dropout at schoolwide and individual levels, though findings vary (Hughes et al., 2018; Martorell and Mariano, 2018; Gubbels et al., 2019). Possible though not necessarily robust mechanisms of such a relationship include reduced student motivation (Rhodes et al., 2018), social disconnection and stigma (Valbuena et al., 2021), stress, and negative impact on academic self-concept and self-confidence (Goos et al., 2021). Grade retention can intersect as well, however, with school-based disciplinary policies, externalizing behavior problems, and student-teacher variables and can be disproportionately assigned by race/ethnicity (Mattison et al., 2018; Peguero et al., 2018).

Student absenteeism also negatively affects standardized test scores, particularly for core classes (e.g., English, math), later grades, and spring semester timelines, and does so across ages and demographic groups (Aucejo and Romano, 2016; Gershenson et al., 2017; Santibañez and Guarino, 2021). Key mechanisms may include absenteeism during test preparation windows as well as congestion or

spillover effects when returning absentee students cause a slowing of instruction and impair educational outcomes for other students (Gottfried and Kirksey, 2017; Gottfried, 2019). Others contend that out-of-school factors such as students' home lives account for much of the association between school absenteeism and suppressed test score achievement (Pyne et al., 2023).

School engagement is a multidimensional construct that generally refers to student effort, participation, or involvement in learning activities (Ben-Eliyahu et al., 2018). School engagement is often thought of as *academic* (e.g., asking questions, paying attention in class), *affective* (e.g., emotional state, sense of belongingness at school), *behavioral* (e.g., following rules, participating in school-related activities), and *cognitive* (e.g., investment in learning, self-regulation) in nature (Fredricks et al., 2004; Appleton et al., 2006). School disengagement, which can include school absenteeism, refers to lack of student interest and commitment to learning activities (Baiden et al., 2020). Longitudinal and other studies reveal a general pattern of school disengagement to academic failure/absenteeism to school dropout, though many reciprocal processes and nuanced pathways exist (Archambault et al., 2022; Piscitello et al., 2022). In addition, many studies reveal that early school absenteeism tends to beget later additional school absenteeism (e.g., Ansari and Pianta, 2019). Key mechanisms of these longitudinal processes could include declining self-efficacy and self-esteem with respect to academic performance, alienation from teachers, less caregiver and peer social support, and school climate and safety issues (Martinot et al., 2020).

3.2. Social–emotional functioning

Social–emotional functioning is a multifaceted construct that broadly includes self-regulation, academic mindsets, and social competence, among other personal and moral variables (Schoon, 2021). Schools are primary settings for social–emotional development and intervention for youths and so a natural, bidirectional link exists between impairment in this functional domain and school absenteeism (Sheridan et al., 2019; Lindholdt et al., 2023). In addition, frameworks to guide the conceptualization, assessment, and treatment of SAPs often include a specific focus on social–emotional functioning (e.g., Kearney and Albano, 2018; Nichols et al., 2021). Issues regarding emotional self-regulation, academic mindsets, and social competence are presented in this section. Note that some topics (e.g., aggression, association with truant peers, participation in school-based activities) in subsequent sections overlap with social–emotional functioning.

Emotional regulation refers to one's ability to monitor, evaluate, and modify emotional responses to achieve a particular goal (Bettis et al., 2022). Youths with SAPs have been shown to demonstrate less healthy emotional regulation strategies via less use of cognitive reappraisal and greater use of expressive suppression, which may be impacted by level of parental control (Hughes et al., 2010, 2022). Emotional regulation difficulties in youths with behavior disorders have also been linked to SAPs (Classi et al., 2012; Kim and Page, 2013). Possible mechanisms or impacts for these findings include anxious and depressive symptoms and comorbid psychiatric diagnoses as well as personality characteristics such as inhibition, neuroticism, schizoid/schizotypal features, and social introversion (Van Ameringen et al., 2003; Filippello et al., 2018; Carpentieri et al., 2022; de Groot et al., 2023). In addition, these findings may intersect with others that have shown school absenteeism to relate to less self-management, self-efficacy, and social awareness, particularly among middle school students (West et al., 2018; Santibañez and Guarino, 2021). Conversely, interventions to enhance emotional self-regulation in youths have been shown to improve school attendance (Chu et al., 2015; Lall, 2020).

Academic mindset refers to attitudes and beliefs a student has with respect to their own abilities, which can affect motivation and behavior at school (Wanzer et al., 2019). Negative attitude toward school is a substantial risk factor for school absenteeism (Gubbels et al., 2019). Bacon and Kearney (2020) examined a very large sample of youths with various levels of school absenteeism via decision tree analysis. Youths with 10–20% absenteeism often expressed negative attitudes and beliefs about their ability to complete difficult or challenging work, ask questions in class, actively participate in class, hand in assignments in a timely fashion, and tolerate frustration. These students also expressed negative attitudes and beliefs about their school's ability to notice absences, prevent bullying, and provide a safe environment and a good education. Conversely, a positive growth mindset has been found to mitigate the odds of chronic absenteeism (Malika et al., 2021). Possible mechanisms for these effects include academic tenacity, school belongingness, resilience, and transmission of mindset beliefs by teachers (e.g., Thomas et al., 2019).

Social competence refers to effectiveness in social skills as well as the presence of adaptive interpersonal relationships (Persich and Robinson, 2022). Chronic school absenteeism has been linked to greater social isolation and peer victimization, less peer support and social engagement, and fewer friendships (Gottfried, 2014; Rahman et al., 2023). Children with SAPs also exhibit greater loneliness and negative affect than their school-attending peers (Jones and Suveg, 2015). Gonzálvez et al. (2019a) found that youths with SAPs demonstrated worse social competence overall than youths with no SAPs. This effect was more pronounced among youths missing school with negative affectivity (anxiety/depression) and social aversion. Other mechanisms explaining reduced social competence with greater school absenteeism may include anxious speech patterns, difficulty concentrating, extended speech latencies, less speech, less assertiveness and friendliness, poorer social performance, greater difficulties with interpersonal relationships, and perceptions by others as less likeable and socially desirable (Scharfstein and Beidel, 2015; de Lijster et al., 2018). School-based mechanisms in this regard may include degrees of school engagement and safety, effective classroom management practices, and social–emotional learning instruction in interpersonal and related skills (Darling-Hammond and Cook-Harvey, 2018). Extended school absence can also result in hindered developmental competencies and milestones related to social functioning (Kearney and Albano, 2018).

3.3. Mental health functioning

The intricate relationship between school attendance/SAPs/absenteeism and mental health functioning has been well-documented for many decades (Kearney et al., 2019a,b). Lawrence et al. (2019) found that students with a mental disorder experienced significantly greater school absences over time, especially compared to students without a mental disorder, and that absences due to a mental disorder accounted for 13.4% of all days absent from school. The depth of this

relationship is so substantial that entire subtypes of SAPs have been proposed on the basis of clinical symptom profiles. Examples include *school refusal* (anxiety-based absenteeism; King and Bernstein, 2001); *school phobia* (fear-based absenteeism; Pikulski et al., 2020); *school withdrawal* (parent-instigated absenteeism sometimes due to separation anxiety; Havik and Ingul, 2021); and *truancy* (delinquent-based absenteeism; Gerth, 2022). Diagnostic categories most commonly associated with school absenteeism, and addressed in this section, include emotional disorders, disruptive behavior disorders, substance use, developmental disorders, and traumatic disorders. Many other mental disorders (e.g., bipolar, eating, psychotic), however, have also been associated with school absenteeism (John et al., 2022).

Emotional disorders have been associated with SAPs for decades and represent one of the highest risk groups for school absenteeism (Redmond and Hosp, 2008). This grouping includes anxiety disorders, particularly generalized, social, and separation anxiety disorders, as well as anxiety-related problems such as health anxiety, obsessions and compulsions, panic attacks, perfectionism, selective mutism, somatic complaints, and specific fears (Finning et al., 2019a; John-Mora et al., 2023). This grouping also includes mood disorders and especially depression as well as self-harm behavior and suicidal ideation (Finning et al., 2019b; Epstein et al., 2020). Mechanisms for this relationship broadly include (a) school-based stimuli that provoke negative affectivity (anxiety, depression) and thus a desire to miss school, and (b) negative affectivity (whether specific to school or not) that interferes with social and academic competence, concentration, participation in school activities, performance before others, and test-taking, among other aspects, and that also interferes with school attendance (e.g., Gallé-Tessonneau et al., 2019). More specific mechanisms can include rigid thinking, overestimating the likelihood of school-based threats, low self-efficacy regarding academic work, perceived low self-competence and coping ability, sleep problems, and expectations of negative evaluation in academic and social situations (Heyne et al., 2015; Askeland et al., 2020).

Disruptive behavior disorders also commonly co-occur with school absenteeism, particularly attention-deficit/hyperactivity disorder (ADHD) and conduct disorder (Egger et al., 2003; Niemi et al., 2022). This relationship may be partly due to school-administered exclusionary discipline practices (arrest, detention, expulsion, suspension) for student misbehavior that preclude future school attendance (Wang et al., 2023). Mechanisms more specific to absenteeism and ADHD may include elevated rates of comorbid learning disorder, difficulty forming friendships, inattention, executive functioning deficits, poor parental supervision, student-teacher conflict, and peer victimization (Fleming et al., 2017; Zendarski et al., 2022). Mechanisms more specific to absenteeism and conduct disorder may include aggression toward others (including bullying), association with truant peers, rule-breaking, acute responses to threat that include school aversion, and callous-unemotional traits that can be linked to peer exclusion and poor teacher relationships, among other consequences (Fairchild et al., 2019; Levine et al., 2022). Youths with disruptive behavior disorders (as well as substance use disorders discussed next) are also at higher risk of broader-based variables such as school disengagement, lower academic attainment, and worse health outcomes (Fleming et al., 2017).

Substance use and its disorders are also deeply entwined with school absenteeism, with the literature base primarily focused on marijuana/cannabis, tobacco, alcohol, and use of multiple substances (Gakh et al., 2020). Possible mechanisms specific to this relationship include missing school to engage in substance use and other risky behaviors, less supervision/monitoring, less self-control, stress, criminality, and self-medication for emotional and sleep disorders (Kiani et al., 2018; Dennermalm et al., 2022). The relationship between substance use and school absenteeism is likely quite complex, however, intersecting with family substance use, maltreatment, race/ethnicity, poverty, interaction with the juvenile justice system, and other broader variables (Maynard et al., 2017; Iverson et al., 2018).

Developmental disorders such as intellectual developmental disorder, autism spectrum disorder, and learning disorder are also common among youths with school absenteeism (Totsika et al., 2020; Melvin et al., 2023). Youths with disabilities in general, which can include medical (next section) as well as developmental and related disorders, are a highly vulnerable group for school absenteeism (Allison et al., 2019). Youths with developmental disorders are at particular risk of being bullied and harassed at school (Bitsika et al., 2021). In addition, youths with a developmental disorder (and especially more than one) often experience chronic medical conditions, multiple psychiatric comorbidities, prolonged social isolation, inadequate resources and clinical interventions in special education placements, and parents with mental health problems, all variables that can interfere with school attendance (Black and Zablotsky, 2018; Melin et al., 2022). Youths with learning disorders are also at increased risk for SAPs, which may be impacted by avoidance of aversive academic and other school-based experiences, low self-esteem, less perceived self-efficacy in academic and social situations, and less parental control and expectations for child academic success (Filippello et al., 2020).

Traumatic disorders and experiences also intersect with SAPs in collective and individual ways. School violence and other school-based traumatic events, as well as pervasive school safety problems and victimization in general, relate closely to widespread patterns of student absenteeism (Polanin et al., 2021). At a more individual level, multiple adverse child experiences, and in particular neighborhood violence and family substance use, predict chronic absenteeism (Stempel et al., 2017). Child maltreatment intersects closely with school absenteeism for various reasons (e.g., betrayal trauma, physical injury) as well, including situations where youths are neglected or placed in residential care or where parents keep a child home from school to conceal signs of abuse (Armfield et al., 2020; Maclean et al., 2020). Traumatic experiences and their effect on school attendance (and classroom performance) may be exacerbated in certain educational settings where less efforts are devoted to detecting and addressing these issues (Blodgett and Lanigan, 2018). Mitigating effects, however, include child resilience bolstered by access to a trusted adult, community support, cultural engagement, and control of one's personal circumstances (Bellis et al., 2018).

3.4. Physical health functioning

School absenteeism has been associated with physical health problems at both individual and epidemiological levels. At the *individual* level, any acute or chronic health problem can be associated with SAPs, though particularly common conditions that interfere with school attendance include asthma, allergies, dental problems, diabetes,

and seizure disorders (Leroy et al., 2017). General mechanisms linking health problems with school absenteeism include anxiety, barriers to care, disease burden, complications, pain, stigma, social isolation, suboptimal symptom control, sleep problems, traumatic brain and other injury, and need for outside or emergency assistive devices, medication, or medical appointments and care (e.g., Cobham et al., 2020). More specific mechanisms include caregiver asthma, home-based mold (asthma); nasal obstruction, irritability (allergies); unmet therapeutic care, poor oral health (dental problems); elevated hemoglobin A1c, poor glucose monitoring (diabetes); and cognitive impairments and caregiver fear of sending a child to school (seizure disorders) (Hsu et al., 2016; Blaiss et al., 2018; Everhart et al., 2018; Ruff et al., 2019; Thingholm et al., 2020; Lystad et al., 2022). A connection between medical problems and school absenteeism may be further exacerbated in schools with no nurse or health center. In these settings, school officials may be more predisposed to sending home a child with physical symptoms as opposed to providing on-site care and thus minimizing school absence (Allen et al., 2018).

Youths with SAPs also commonly report somatic complaints, particularly abdominal pain, diarrhea, dizziness, fatigue, headache, heart palpitation, nausea, muscular or joint ache, and vomiting (Li et al., 2021). Somatic complaints in this population have been linked to school-based negative affectivity and sensitivity to school-based stressors, attempts to miss school due to alleged illness, and parental work absence (Havik et al., 2015; Hysing et al., 2017). Other key factors can include depression, impaired coping skills, social withdrawal, temperament, and family conflict about the symptoms (Nayak et al., 2018). A connection between somatic complaints and school absenteeism may be exacerbated as well in situations where health professionals unnecessarily excuse absences related to less severe or unexplained anxiety or somatic symptoms (Birioukov, 2016).

At the *epidemiological* level, school absenteeism patterns have been used as an early warning system to surveil and stem infectious diseases and other illness outbreaks (Bates, 2017). Illness-related absenteeism may be a better metric than all-cause absenteeism in this regard because youths and schools are important transmitters of infection, because school absence often occurs at the immediate onset of symptoms, because schoolchildren may easily spread illness to older family members, and because schools can serve as a central intervention point (Donaldson et al., 2021). School attendance patterns have been used to surveil conjunctivitis, coronavirus, fever, influenza, intestinal disease, and skin and other conditions (e.g., Tsang et al., 2023). School absenteeism patterns for illness surveillance may be less effective, however, than methods such as web-based apps/measures and for times of the year when school is not in session (Schellpfeffer et al., 2017).

3.5. Family functioning

School absenteeism and changes in family functioning intersect at both systemic and analytic levels. At a systemic level, researchers have examined how school absenteeism intersects with family experiences surrounding seasonal migration, immigration status, interaction with the legal system, school-based discrimination, biased disciplinary practices, and lack of access to school and community care (Kearney et al., 2023). Family residential mobility and housing insecurity also closely relate to school absenteeism patterns, especially if delays occur in new school and transportation assignments (Green et al., 2019). Many families also face barriers to regular school attendance such as difficulty securing documentation for enrollment purposes, less access to academic and technological supports and requirements, and greater exposure to health-based threats (Reimer and Hill, 2022). Many youths also depart a school campus prematurely or drop out of school permanently to support their family economically, either directly (e.g., employment) or indirectly (e.g., child care, assistance for family members with physical or mental health problems) (Chang et al., 2019).

At an analytic level, as mentioned, school absenteeism can be highly disruptive to families when caregivers must miss work, arrange alternative transportation and child care options, attend school-based conferences, absorb financial costs, and experience other daily disturbances (Marchbanks et al., 2014). Child behavior problems associated with school absenteeism can also be disrupting, taxing, stigmatizing, and stressful for family members (Maynard et al., 2018). Family disruption can further erode productive communications with school officials regarding policies, causal events, intervention directions, accommodation plans, and other aspects related to absenteeism (Havik et al., 2014). In addition, often in conjunction with such disruption, school absenteeism is related to problematic parenting behaviors such as inaction, ineffective response strategies, overprotectiveness, vague commands, aggression, and reinforcement of attention-seeking behavior (Kearney, 2019; Chockalingam et al., 2022). Low parenting self-efficacy can be a key mechanism in families of youths with SAPs (Carless et al., 2015).

School absenteeism can also be central to significant, maladaptive changes in family dynamics. A primary example is greater family conflict regarding stressors from, and disagreements about how to resolve, SAPs (Sosu et al., 2021). Family conflict may increase as school absenteeism severity becomes moderate and may actually decline with greater absenteeism severity once family members acquiesce and withdraw from problem-solving efforts (Fornander and Kearney, 2019). In addition, family conflict may be greater in situations where a child actively rejects school as opposed to having difficulties attending school due to emotional problems (Gonzálvez et al., 2019b). Family as well as marital conflict can impair communication and problem-solving abilities and reduce a student's motivation to return to school (Ingul et al., 2019). Such conflict can produce other situations that may exacerbate school absenteeism as well, such as maltreatment, substance use, trauma, and other adverse child experiences (Duke, 2020).

Other key changes in family dynamics related to school absenteeism include enmeshment, detachment, and isolation. Enmeshment surrounds overinvolvement of family members into each other's lives with greater emotional dependency and less autonomy (Berryhill et al., 2018). Enmeshment could be manifested by parents attending school with their child, advocating for unrealistic school-based accommodations, or unnecessarily rescuing a child from anxiety-provoking situations. Detachment refers to under-involvement of family members into each other's lives, including greater caregiver and child passivity (Lindblom et al., 2017). Detachment could be manifested by lack of response to school official notices and appeals, less supervision and academic involvement, and failure to intervene early in an absenteeism resolution process. Other families are quite isolated from outside systems and have little contact with external agencies or teachers and other school officials (Tucker

and Rodriguez, 2014). Families of youths with SAPs have also been found to have lower levels of achievement orientation, active-recreational orientation, cohesion, and expressiveness (Hansen et al., 1998; Fornander and Kearney, 2019).

3.6. School and community functioning

School absenteeism rates are also sometimes a warning signal for changes that can rapidly affect the K-12 educational system, including shifts in school funding, school closures, and truancy and legal policies. Elevated school absenteeism and dropout rates can cause schools to lose funding and force a shift from costlier rehabilitative to less costly punitive paradigms for school attendance and other problems (Mallett, 2016). Diminished school enrollment and lower standardized test scores can also produce rapid school closures, particularly in impoverished neighborhoods, which can further accelerate academic decline if transfers to new transportation routes and schools are delayed or onerous (Kirshner et al., 2016). In addition, truancy, and other legal policies, including punitive zero-tolerance laws, are often enacted to compel attendance in response to high absenteeism rates. Such policies, however, generally ignore more systemic problems outside a family's control, are applied disproportionately to minority groups, and paradoxically increase barriers to future school attendance (Conry and Richards, 2018).

School absenteeism rates can also signal problems in school climate, or the quality and character of daily school life (Thapa and Cohen, 2017). Dimensions of school climate include *relationships* (social relationships, school connectedness, leadership, culture); *environment* (school facilities, physical comfort, cleanliness); *safety/discipline* (school safety, fairness of rules, bullying and aggression, disciplinary harshness, drug use); and *academic* (academic outcomes, equality of opportunity, engagement, cohesiveness/competitiveness) (Gonzálvez et al., 2023). Studies reveal a general intersection of school absenteeism rates with perceived negative school climate (Van Eck et al., 2017). More specifically, school absenteeism rates are inversely associated with positive school climate variables such as academic engagement, order and discipline, parental involvement, personal connectedness, school safety, school satisfaction, student access to resources, student interpersonal relations, and student–teacher relations (Hendron and Kearney, 2016; Daily et al., 2020; Hamlin, 2021). These effects are pronounced for vulnerable student groups and particularly for those who experience a school setting as oppressive (Kohli et al., 2017). Potential mechanisms relevant here include prejudicial and discriminatory treatment of student groups by school officials, assignment to less rigorous courses, greater exposure to harassment based on protected status, student-faculty ethnicity mismatch, and teacher qualification gaps (Kutsyuruba et al., 2015).

Widespread patterns of school absenteeism in certain geographical communities have also been used to identify unhealthy economic, political, and other exosystem/macrosystem states and policies that produce inequitable resources and practices and disproportionate outcomes (Lenhoff et al., 2022). Root cause analyses of areas with high chronic school absenteeism have uncovered key sources such as inadequate transportation, housing dilapidation, high use of emergency services, unsafe avenues to school, and food insecurity, among others (Kearney and Childs, 2023). Others contend that high rates of unexcused absences are a signal for crises and challenges faced by students and families outside of school (Pyne et al., 2023). School absenteeism and dropout rates can also reflect economic push and pull factors, as when students leave school to assist a family or to pursue available and lucrative employment opportunities that do not require high school completion (McDermott et al., 2018). School absenteeism and dropout rates intersect as well with shifts in labor, demographic, technological, climate, and immigration/migration patterns (Brewer and McEwan, 2010; Kearney et al., 2022).

School absenteeism rates have also been used as a key element of early warning systems to predict later school dropout, often in conjunction with school disengagement and behavior problems (Balfanz and Byrnes, 2019). More nuanced early warning systems and algorithms, however, include nonacademic variables, are better tailored to a particular community, consider intersectionality of influencing factors, and examine specific mechanisms within pathways. Examples of identified nonacademic variables include marital status, family structure, and medical restrictions (Chu et al., 2019; Jarbou et al., 2022). Analyses tailored to a particular community can reveal pertinent local conditions such as elevated rates of homelessness, pregnancy, and substance use (US Department of Education, 2016). Machine learning and data mining techniques are also helpful for simultaneously examining multiple and intersecting (e.g., disability × socioeconomic status) factors to pinpoint more precise outcomes for different student groups (Newman et al., 2019). Specific mechanisms to explain pathways to certain outcomes can be identified as well. Hancock et al. (2017), for example, investigated the oft-cited relationship between school absenteeism and community poverty via multilevel modeling to identify mechanisms such as degree of access to learning activities, availability of high-quality teachers, opportunities to complete missed academic work, and parent-school faculty language differences.

4. Implications for health-based protocols and school-based practices

Changes in school attendance are deeply embedded with changes in functioning in many domains and may thus be a particularly sensitive signal that reflects system instability and that could indicate (sometimes sudden) movement from a healthy to an unhealthy state for students, families, schools, and communities. Changes in school attendance have several key advantages as a potential signal: they are typically recognizable, fluid, dynamic, applicable to most students and families, easily measured daily, and represent a clear intervention target and outcome variable. As such, a focus on changes in school attendance as a signal of impaired functioning across many domains has several implications for health-based protocols (enhancing access to care; integrating systems of care) and school-based practices (developing multi-tiered systems of support and community asset maps; modifying educational and policy perspectives). These implications are discussed in the next sections.

4.1. Enhancing access to care

A view of changes in school attendance as a key signal of system instability has implications for enhancing access to health-based care for students and their families. A substantial gap exists between the

prevalence of child health disorders and accessed services for these disorders (Wainberg et al., 2017). This gap and its causes (barriers) are especially pertinent to SAPs for several reasons. First, many youths experience changes in school attendance but caregivers and health professionals are often unsure as to whether these changes are transient and normal or are problems in need of intervention (Kazdin, 2019). Second, families and others that seek community-based care for SAPs often face fragmented service delivery systems in part due to confusion about whether SAPs lie more within educational, medical, mental health, or family or other intervention realms (Radez et al., 2021). Third, common structural barriers especially pertinent to SAPs include inaccessible and too few providers, cost, transportation challenges, stigma, long wait times, lack of insurance, cultural and language differences, and lack of provider knowledge about SAPs (Kearney, 2019; Tambling et al., 2021). Substantial barriers also impede effective home-school collaborations to address SAPs, including time poverty, negative interactions with school personnel, and lack of awareness about the issue (Williams and Sánchez, 2011).

A view of school attendance changes as a key signal of system instability (and unhealthy status) means that caregivers and health professionals would benefit from guidelines to quickly determine if such changes are innocuous or in need of intervention because several domains of functioning risk impairment. Kearney et al. (2022) outlined functional impairment guidelines for SAPs across school, social, and family domains. The school domain included timing of absences (greater impairment from absences early in a school year, during critical evaluation periods, and in preschool or high-impact grade levels); interference with academic competence; and whether absences trigger an administrative or legal action that impedes future school attendance. The social domain included interference with social competence; interference in interpersonal relationships; and enhanced risk of harm to others. The family domain included interference with daily family functioning; significant and maladaptive changes in family dynamics; and substantial cost to family members. Measures of functional impairment relevant to SAPs would enhance cost-effective screening and rapid clinical decision-making processes and may also signal other problems such as physical or mental health disorders.

Treatment barriers with respect to SAPs could be partly addressed by integrating service delivery systems within schools (later section) and by leveraging novel modes of service delivery when even subtle changes occur in school attendance. New digital modes of delivery for mental health intervention include games and computer-assisted programs, mobile text messaging, portals, robots, smartphone (and other digital device) applications, telehealth videoconferencing, virtual reality, and wearable devices, among others (Hollis et al., 2017). Key elements of these delivery modes include peer-to-peer communication, reminders, skills development, social networking, and therapeutic and emotional regulation support (Liverpool et al., 2020). Digital device applications, portals, and text messaging can be used to inform parents of absences in real time and allow absent students to upload academic work to minimize impairment (Smythe-Leistico and Page, 2018). Other novel modes of service delivery could be expanded to better reach absent students at home, incorporate school attendance assessment and intervention techniques, provide mentoring, surveil developmental problems, and distribute a community asset map of available supports (later section).

4.2. Integrating systems of care

Another barrier to care especially pertinent to SAPs is lack of surveillance across systems of care regarding youths separated from the educational process (Kazdin, 2019). Many families of youths with SAPs, and particularly those with comorbid health problems and/or disabilities, must navigate several different systems (educational, medical, mental health, legal, developmental) to access appropriate or available care or to meet obligations accrued as a result of the SAPs (Gottfried et al., 2019; Kearney and Benoit, 2022). Many youths also transition between these systems, which disrupts their ability to attend school. Youths in child protective services and juvenile justice agencies are at particularly high risk of chronic absenteeism (Yoon et al., 2021). SAPs are also commonly aggravated by family exigent circumstances that require seeking survival resources across multiple agencies (e.g., employment, housing, nutrition) (Sugrue et al., 2016).

These disparate systems of care are often quite disconnected, particularly with respect to sharing information relevant to student location and school attendance (Balfanz and Byrnes, 2013; Klein et al., 2020). Sokol et al. (2019) reviewed screening tools for social determinants of health in children across various care agencies, finding that variables assessed in the education domain included lack of child care, degree of parental education, and concerns about a child's learning or behavior at school. None included school attendance or absenteeism. This is unfortunate given that school absenteeism is often viewed as a wicked problem in need of complex, coordinated interventions (Childs and Lofton, 2021). Researchers and others have thus emphasized the need for shared alliances or integration across agencies that address families with various needs and especially with respect to SAPs (Balfanz and Byrnes, 2018). Key aspects of these shared alliances include multiagency tracking of students using interoperable metrics as well as coordinated intervention across systems to address the needs of particularly vulnerable students with SAPs.

A primary goal of multiagency tracking of students involves collaboration among various agencies to identify students separated from the educational process and to facilitate their reintegration to an appropriate school completion pathway. A secondary goal of such tracking is to identify key drivers of school absenteeism in a given community, such as high rates of housing/food insecurity or foster care, that lead to lengthy school displacements for students (Richardson et al., 2018). Such tracking should include sharing early warning signal data that is best interoperable across agencies, such as residential status, family contact with various entities, and school assignment, placement, enrollment, attendance, transportation, and impairment data (Welsh, 2018). Data provided in real time via attendance dashboards could be shared across school districts, state and service agencies, and relevant community partners (Chang and Balfanz, 2016). Recent advances in data mining and algorithmic modeling also provide the means to examine disaggregated data to better inform pertinent local components of attendance dashboards as well as websites for information dissemination and psychoeducation regarding SAPs (Boustani et al., 2020; Kearney and Childs, 2023).

Shared alliances would also benefit the most vulnerable of students with respect to school attendance, particularly those with chronic physical/mental health conditions, academic and developmental problems, and family disarray and lack of resources. Such alliances could include representatives from various systems of care that are based in a school setting to reduce access, stigma, transportation, cost, and other concerns (Lewallen et al., 2015). These alliances would review longstanding absenteeism cases, incubate family-school-community partnerships to boost wraparound care, and institute necessary case management and accommodation practices to address salient learning, health, and behavioral issues that interfere with school attendance (Cumming et al., 2022). These alliances can be linked as well to school-based teams that utilize attendance data as an early warning signal for multiple issues (next section).

4.3. Developing multi-tiered systems of support and community asset maps

Recall that access to care barriers with respect to SAPs could also be addressed by integrating service delivery systems within a school system, which is the current source of mental health and other nonacademic care for most children and adolescents (Duong et al., 2021). An emerging service delivery model within schools involves multi-tiered systems of support (MTSS) to provide various levels of student support based on prescribed need (Stoiber and Gettinger, 2016). MTSS models are typically arranged into three tiers that include universal intervention for preventative purposes (Tier 1); early and less complex interventions for emerging or acute problems (Tier 2); and later and more complex interventions for chronic and severe problems. MTSS models have been designed for many academic, social, and behavioral challenges and have been more recently extended to the arrangement of interventions for SAPs *per se* (Kearney and Graczyk, 2014, 2020, 2022).

Proposed MTSS models for various issues often rely on school attendance data as a key early warning signal of problems that require additional levels of support (Freeman et al., 2016). Tier 1 assessment methods in this regard include screening for various kinds of SAPs (e.g., complete and partial absences), important precursors to SAPs such as sudden changes in academic work, and reasons and categories for missing school (e.g., illness, unexcused) (Kearney, 2016). School attendance data should be supplemented with screening instruments for academic, behavioral, emotional, and social functioning as well as for important contextual variables across different ecological levels to determine personalized Tier 2 supports (Kearney and Childs, 2022). An example includes a student with short-term absenteeism and academic and mental health challenges whose family changes residence during the academic year and thus requires additional transitional support. School attendance and supplemental data can also be used to inform decisions about appropriate Tier 3 services, particularly for cases involving extensive contextual influences (Hobbs et al., 2018). An example includes a student with long-term absenteeism and disability coupled with family dysfunction, peer victimization, and exclusionary discipline who requires an innovative plan to achieve school completion.

Key advantages of utilizing attendance data as an early warning signal in a school-based MTSS approach are that the data are usually comparable across educational districts and subject to cost-effective tracking software and mobile applications (Pangrazio et al., 2023). Frequent attendance data review also allows schools to eschew a "wait to fail" approach that long delays intervention until a legal tripwire is triggered for unexcused absences (Conry and Richards, 2018). Absenteeism rates can also signal school climate problems and community barriers to school attendance. In addition, an MTSS approach based on attendance data review can facilitate task sharing among in-house personnel to streamline intervention (Raviola et al., 2019). This could involve a school attendance team that reviews data and implements same-day intervention for any school absence, an applied school support team (e.g., school-based counselor, nurse, psychologist, social worker) that implements interventions for Tier 2 cases, and a school administrative team (e.g., principal, vice principal, dean) that coordinates referrals for more advanced Tier 3 cases (Kearney, 2016).

An important adjunct of MTSS models, especially for SAPs, is a community asset map of internal school-based and external community-based resources to identify functional domain support options, particularly for highly vulnerable students such as those with disabilities (Bryan et al., 2020). Such maps could help streamline care by supplying front-line personnel such as school counselors with real-time data about immediately available and appropriate support options. Examples of internal resources include alternative educational schools and pathways, second chance programs, mentoring opportunities, adult readiness initiatives, and truancy diversion and other restorative efforts to boost academic enrichment and enhance school completion (Todić et al., 2020). Examples of external resources can include health professionals, businesses, and private and public legal, developmental, and social services agencies to provide supports necessary to facilitate school attendance (Mitchell et al., 2019). Self-assessment resources are available for schools to map existing supports and develop additional supports specific to SAPs (Attendance Works, 2023).

4.4. Modifying educational and policy perspectives

A view of changes in school attendance as a warning signal also has ramifications for contemporary K-12 educational and policy perspectives regarding SAPs and their associated (e.g., mental health, school climate) effects. The current dominant educational/policy perspective of school absenteeism emphasizes parental responsibility, compulsory school attendance until a set age, and various punitive and exclusionary administrative and legal consequences for days missed from school (Reyes, 2020). This perspective typically centers around deficit narratives that place much of the blame, stigma, and onus for resolving SAPs on students and families, even in circumstances beyond their control (Grooms and Bohorquez, 2022). Unexcused absences in particular are often associated with willful, deliberate, and deviant student behavior (Birioukov, 2016). The current dominant educational/policy perspective diminishes the complex nature of school absenteeism, often ignoring community-based and other broader root causes of SAPs, constrains student/family agency and access to needed supports, and limits opportunities for school completion (Childs and Lofton, 2021).

A focus on changes in school attendance as a warning signal may be the premise for modifying educational and policy perspectives away from simple absenteeism deterrence and toward holistic attendance enhancement (Gentle-Genitty et al., 2020). A holistic approach in this regard would include greater emphasis on Tier 1 strategies shown to boost attendance rates, including existing school-based strategies to improve physical and mental health, social–emotional learning, safety, and climate (Langford et al., 2015). More specifically, a holistic approach would involve universal and frequent screening of even subtle attendance changes, qualitative methods to understand relevant contextual factors, assignment of focused and restorative interventions, and partnerships with community entities for empowering supports (Kim and Gentle-Genitty, 2020; Kipp and Clark, 2022). A more holistic approach toward improving attendance would also include an understanding that the surrounding community must often be an additional and sometimes primary target of intervention (Kearney and Graczyk, 2022). In essence, systems themselves must send their own signal that school attendance at any level is valued, appreciated, important, and prioritized (Warne et al., 2020).

5. Conclusion

School attendance problems/absenteeism are often examined statically as a health-based syndrome or as a school-based condition that requires remediation. An alternative approach is to view changes in school attendance more dynamically as early warning signals of potentially unhealthy functioning in multiple ecological domains. This approach dovetails with recent efforts to view school attendance problems more dimensionally and flexibly with respect to definition, demarcation, subtyping, risk and protective factors, interventions, and school completion (Kearney and Gonzálvez, 2022). In addition, viewing changes in school attendance as early warning signals can help health-and school-based professionals maximally leverage innovative and radical developments in service delivery options for youths (Kruk et al., 2022). At the same time, such an approach enhances one of the most fundamental endeavors of childhood that maintains healthy societal functioning: education.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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