Published in final edited form as:
Child Dev. 2012 January ; 83(1): 351–366. doi:10.1111/j.1467-8624.2011.01677.x.

School Attendance Problems and Youth Psychopathology: Structural Cross-Lagged Regression Models in Three Longitudinal Datasets

Jeffrey J. Wood, **Sarah D. Lynne**, **David A. Langer**, **Patricia A. Wood**, **Shaunna L. Clark**, **J. Mark Eddy**, and **Nicholas Ialongo**

Abstract

This study tests a model of reciprocal influences between absenteeism and youth psychopathology using three longitudinal datasets (Ns= 20745, 2311, and 671). Participants in 1st through 12th grades were interviewed annually or bi-annually. Measures of psychopathology include self-, parent-, and teacher-report questionnaires. Structural cross-lagged regression models were tested. In a nationally representative dataset (Add Health), middle school students with relatively greater absenteeism at study year 1 tended towards increased depression and conduct problems in study year 2, over and above the effects of autoregressive associations and demographic covariates. The opposite direction of effects was found for both middle and high school students. Analyses with two regionally representative datasets were also partially supportive. Longitudinal links were more evident in adolescence than in childhood.

Youth psychopathology is strongly associated with school avoidance among children and adolescents, but causal pathways linking the two are not established (Egger, Costello, & Angold, 2003; Wood, 2007). With the high rates of psychological disorders among American youth (Costello et al., 1998), much effort has been devoted to understanding the risk factors for and determinants of youth psychopathology (Cicchetti & Cohen, 2006). School absenteeism represents a potential risk factor for psychopathology that is a widespread and potentially preventable problem; at least 8% of US elementary school students and 11% of secondary students exhibit elevated absenteeism (Epstein & Sheldon, 2002; McCluskey et al., 2004; Needham et al., 2004). Absenteeism is a symptom of certain childhood disorders, such as conduct disorder, and a potential consequence of others, such as social phobia (e.g., American Psychiatric Association, 2000). However, a dearth of longitudinal research and appropriate study design has left unanswered two pivotal questions: Is absenteeism a risk factor for psychological problems; and, does pre-existing psychopathology presage the onset or worsening of absenteeism?

A concurrent association between absenteeism and youth psychopathology is well-established. In a large community sample, over 25% of children exhibiting school refusal met criteria for a current *DSM-IV* disorder, whereas only 6.7% of regular attendees did so (*OR* = 3.0–3.6; Egger et al., 2003). Other studies using convenience samples have also illustrated a relatively high level of mental health need among children and youth exhibiting high levels of absenteeism (Brandibas, Jeunier, Clanet, & Fouraste, 2004; Kearney, 2003; Lounsbury, Steel, Loveland, & Gibson, 2004). The most common disorders and mental health syndromes linked with absenteeism are disruptive behavior disorders (and high levels of conduct problems) and depressive and anxiety disorders (and high levels of internalizing

Correspondence regarding this study should be addressed to Dr. Jeffrey Wood, Moore Hall, UCLA-GSEIS, Los Angeles, CA 90095. jeffwood@ucla.edu.

symptoms). These disorders and elevated symptom profiles are seen in both children and adolescents who avoid school.

Although the nature of the interrelation between absenteeism and psychopathology remains to be clarified, it is possible that they are reciprocal risk factors, wherein the presence of one uniquely increases the risk that the other will emerge or worsen. In some cases absenteeism likely emerges as part of a psychological disorder. Depressed youth often lack energy, have reduced interest or motivation, and are reactive to minor stressors, likely making school a relatively aversive experience for some and increasing avoidance. Youth with high anxiety are well known to be prone to phobic reactions to school as a result of inflated perceptions of threat related to separation from parents, social evaluation, or academic difficulty (Kearney, 2003). And youth with significant conduct problems sometimes fail to attend school as one means of violating rules, defying authority, and attaining more immediately reinforcing contingencies. There may also be youth who fail to attend school for reasons unrelated to psychopathology whose mental health is then adversely affected by being out of school. There are numerous putative mechanisms that might lead to mental health problems among youth who are frequently absent (Wood, 2007). For example, absenteeism is associated with low parental monitoring and affiliation with deviant peers (McNeal, 1999); and conduct problems may emerge in the context of these two conditions (Patterson & Yoerger, 1997). Elevated absenteeism can trigger educational and social failure (e.g., Ceci & Williams, 1997), and such failure can elicit low self-esteem and depressed mood (e.g., Capaldi, 1992). Social isolation also tends to exacerbate or maintain depression (e.g., Palinkas & Browner, 1995). Even among children with pre-existing symptomatology, school avoidance may contribute to increasing mental health difficulties.

At present, models of reciprocal influences between absenteeism and psychopathology have not been tested. With longitudinal data, state-of-the-art statistical methods, such as structural cross-lagged regression analysis, have the capacity to simultaneously evaluate three different pathways of association between absenteeism and psychopathology (Ferrer & McArdle, 2003). First, autoregressive paths estimate the influence of absenteeism at time t to absenteeism at time $t + 1$. A similar autoregressive path is estimated for psychopathology. Second, cross-lagged paths estimate the influence of absenteeism at time t on psychopathology at time $t + 1$. A similar cross-lagged path is estimated for the influence of psychopathology at time t on absenteeism at time $t + 1$. Finally, the concurrent residual correlation between absenteeism and psychopathology at all time points is estimated. The cross-lagged associations are of primary interest for understanding reciprocal influences between absenteeism and psychopathology over time. The advantage of the structural cross-lagged regression technique is that cross-lagged effects are estimated while simultaneously controlling for autoregressive and concurrent associations. The present study employs such statistical models in conjunction with large, population-based longitudinal datasets that are capable of illustrating the timing and sequencing linking absenteeism with child psychopathology.

In structural cross-lagged regression analysis of longitudinal data, one must account for potential third variables. Numerous influences and processes in a child's environment may serve as explanatory factors that could account for a linkage between absenteeism and psychopathology. For example, families in low socioeconomic strata are more likely to have children with high levels of mental health need (Wadsworth & Achenbach, 2005) and are more likely to have children who are absent from school more frequently (Corville-Smith et al., 1998) than are more economically advantaged families. As a result, even if there was no direct relationship between absenteeism and psychopathology, these two variables might be significantly correlated in a sample of families with varying socioeconomic status levels. It is important to control for such potential third variables in evaluations of reciprocal

influences between absenteeism and psychopathology. Although statistical controls must be implemented judiciously, models that take into account potential confounds can help illustrate whether a preceding condition represents a unique risk factor for an outcome.

In any longitudinal model, the time linking the independent variable with the putative dependent variable must be correctly specified in order to select an assessment strategy that will detect hypothesized changes if they do occur (Cohen et al., 2003, p. 477). Although it is impossible to know the exact timing of such changes, previous research on risk factors are suggestive of a plausible timeframe linking absenteeism and psychopathology. Mechanisms linking absenteeism to the onset or worsening of mental health problems—such as academic failure or poor parental monitoring, as noted above— probably require months before a sufficient number of individuals experience significant mood or behavioral problems to detect the trend statistically in a nonclinical sample. Previous studies that have found an increase in psychopathology over time due to other experiential risk factors (e.g., peer harassment) often set a measurement interval of one year to allow intermediate processes to unfold (e.g., Juvonen et al., 2000). Based on this research precedent and the evident appropriateness of this timing for the phenomena in question, datasets with repeated measures using an interval of one year between assessments were selected for the present study.

It is important to consider that a youth's developmental level could influence the relationship between absenteeism and psychopathology. For younger children, although absenteeism may promote certain risk conditions (e.g., social isolation), other risk conditions (e.g., academic failure; involvement with delinquent activities outside of the home) may be less likely to occur than they would be for older children or adolescents. For example, higher levels of parental monitoring of younger children would tend to mitigate problems with out-of-home delinquent involvement on school days; and the relative impact of academic "failure" may be less pronounced for young children due to teacher lenience in earlier grade levels and students' lesser achievement orientation at this age level. Thus, the nature of the psychopathology-absenteeism linkage may change according to the youth's developmental level as well as environmental circumstances (e.g., opportunities for school avoidance linked with parental employment status and family structure). It was hypothesized that older youth (in upper elementary and secondary school levels) would exhibit a stronger longitudinal absenteeism-psychopathology linkage than would younger children.

Understanding the nature of the psychopathology-absenteeism relationship may promote public health efforts to reduce the incidence of psychopathology by providing an empirical foundation for identifying youth at risk of developing mental health problems. This study investigates the reciprocal influences of absenteeism and psychopathology over time in US youth ranging from first through twelfth grades. The specific question of interest is: are there significant cross-lagged associations between psychopathology and absenteeism over time, above and beyond autoregressive associations and the effects of demographic covariates?

Method

This study involves secondary data analysis of three regionally or nationally representative school-based longitudinal datasets that feature annual measures of youth psychopathology and school attendance. Of the three datasets, two are universal prevention studies implemented in at-risk elementary school populations and one is a nationally representative longitudinal study of middle- and high-school students.

Datasets and Participants

Demographics for the study participants in the three datasets are presented in Table 1. Epidemiological sampling procedures were used in each study, resulting in representative regional or national samples. Due to the different information that was collected from each sample, some demographic characteristics are not available in every sample.

Add Health—The National Longitudinal Study of Adolescent Health (Add Health) is a nationally representative dataset that explores the causes of health-related behaviors of adolescents in grades 7 through 12 (Harris, 2008). The initial school sample included a stratified, random sample of all secondary schools in the US. Schools were stratified into 80 clusters based on factors such as region, urbanicity, ethnicity, and school size. A sample of 80 high schools and 52 middle schools was selected. In the first year, 20745 adolescents (evenly distributed between grades 7–11) participated in an in-home interview in 1995. One year later, 14738 adolescents completed a second in-home interview (see Harris, Halpern, Entzel, Tabor, Bearman, & Udry, 2008, for more details). Data on youth psychopathology and attendance were obtained at both assessments.

JHU-PIRC—The Johns Hopkins Prevention Intervention Research Center study (JHU-PIRC) involved two classroom-based universal preventive interventions, which were fielded in 19 Baltimore City schools with two consecutive cohorts of first graders (N = 2311) in the 1985–86 and 1986–87 school years (Dolan, Kellam, Brown, Werthamer-Larsson, Rebok, Mayer, et al., 1993). A primary focus of the longitudinal component of the study was on early risk behaviors and long-term mental health outcomes. Schools were located in 5 socio-demographically distinct areas in eastern Baltimore. Of the 2311 children originally enrolled, 1431 remained in the study at the end of 8th grade (see Petras, Ialongo, et al., 2005, for more details). Children were assessed annually from grades 1–8.

LIFT—The Linking the Interests of Families and Teachers (LIFT) trial sampled 12 public elementary schools in Eugene, OR (population 200,000) situated in neighborhoods with high levels of juvenile arrests relative to the local area (Reid et al., 1999). Six schools participated in the universal prevention condition (10 weeks), and six schools served as controls. Schools were randomly assigned to condition, and to have either 1st or 5th graders participate, serving as the basis of an accelerated longitudinal design. The 12 schools participating in the study had an average free-lunch rate of 47% of students. The initial sample comprised 671 students (50.82% female; see Eddy, Reid, & Fetrow, 2000, for more details). Absenteeism and psychopathology were measured annually through the 10th grade (for 1st grade baseline cohort) or 12th grade (for 5th grade baseline cohort), with the exception of study years 5, 7, and 9 during which psychopathology measurements were not gathered. At the last assessment point, 600 participants (90%) were still participating in the study.

Measures

The study measures are organized by construct. Due to the large total number of measures involved in the three datasets, the key details of each measure are summarized. To illustrate commonalities among the three datasets, two general psychopathology constructs (conduct problems and anxiety and depression) are noted in association with each corresponding measure.

Psychopathology

Add Health—The Center for Epidemiologic Studies Depression (CES-D) scale (Radloff, 1977) was administered to youth annually. High alpha coefficients have been reported on the CES-D in this sample (.84 to .87) as well as concurrent associations with a measure of

self-esteem (Crockett et al., 2005). The Add Health dataset also includes a 15-item measure of conduct problems, the Delinquency Scale (DS; Cronbach's alpha = .79 in this sample), which correlates as expected with contextual indicators such as poverty and parent education (Cleveland, 2003).

JHU-PIRC—The Teacher Observation of Classroom Adaptation-Revised (TOCA-R; Werthamer-Larsson et al., 1991) was completed by teachers on a yearly basis in grades 1–6 for each participant (teachers also completed a version of the TOCA-R when children were in 7th grade, but item content and format were changed, so this time-point of data was dropped for this study). The TOCA-R is administered as an interview to teachers and the interviewer records the teacher's ratings of the adequacy of each child's performance on a six-point scale (*never true* to *always true*). The TOCA-R yields a scale pertaining to conduct problems (alphas >.80 over the course of the study). Excellent predictive validity for the TOCA-R has been demonstrated in this sample (Petras, Ialongo, et al., 2005). The Baltimore How I Feel (BHIF) scale is a 30-item, youth self-report scale of depressive and anxious symptoms. Children report the frequency of depressive and anxious symptoms over the last two weeks on a three-point scale. Items were mostly keyed to *DSM-III-R* criteria for major depression, and overanxious and separation anxiety disorders. A pool of items was drawn from existing child self-report measures, including the Children's Depression Inventory (Kovacs, 1983) and the Revised-Children's Manifest Anxiety Scale (Reynolds & Richmond, 1985). The alphas for the depression and anxiety scales range from .79 and .85 over the course the JHU-PIRC trial. Additional evidence supports test-retest reliability and predictive validity (Ialongo et al., 2004). The BHIF was completed annually from grades 4 to 8 (at grades 2 and 3, similar self-report instruments were also administered to children, but item content varied for a portion of the children at these two time-points, precluding meaningful inclusion in longitudinal analyses). The BHIF scale was administered on a classroom-wide basis and did not require children to read.

LIFT—The Child Behavior Checklist (CBCL) and Teacher Report Form (TRF; Achenbach, 1991) were administered annually to parents and teachers, respectively. Both measures are well-validated and reliable instruments with age- and gender-based norms. Each features broadband scales measuring externalizing behavior (conduct problems) and internalizing problems (anxiety/depression). Cronbach's alphas for both scales in the LIFT sample have been above .70 (Knutson et al., 2004). CBCLs/TRFs were completed annually from 1st to 4th grade (in the 1st grade baseline sample) and 5th to 8th grade (in the 5th grade baseline sample), then biannually until 10th grade (in the 1st grade baseline sample) or 12th grade (in the 5th grade baseline sample).

Absenteeism

In JHU-PIRC and the LIFT trial, attendance records were collected from schools on an annual basis throughout the study and the records reflect overall yearly attendance. The LIFT school records had separate categories for excused absences, and suspensions and expulsions. However, the JHU-PIRC school records counted suspensions as excused absences. In Add Health, youth reported their total annual number of (a) excused absences (given as a multiple choice item with options of 0 absences; 1–2 absences [coded as 1]; 3–10 absences [coded as 6]; and 10 or more absences [coded as 10]); and (b) unexcused absences (this item solicited an open-ended numeric response from the youth). The estimate of the total number of annual absences for youth in the Add Health study was obtained by adding the number of reported excused absences (using the estimated values noted above) and unexcused absences. The Add Health study has a separate category for suspensions and expulsions, and these were not considered in this study.

Control variables

Demographic information based on school records, child-report, and parent-report is available to varying degrees in each of the three datasets. Whenever appropriate and possible, youth age, sex, race and ethnicity, intervention status, parent level of education, family structure, and family income were used as covariates in the models.

Data Reduction and Transformations

Absenteeism was positively skewed at all times of assessment in all three datasets. Indicators of psychopathology also showed evidence of positive skew. Therefore, when possible, these variables were dichotomized. Despite the loss of information that can result from dichotomization, a categorical approach has several advantages. First, researchers note that it is important to set a minimum threshold of 20 days absent to identify children with significant attendance problems rather than legitimate absences due to minor illness (McCluskey et al., 2004), underscoring the possible advantage of measuring absenteeism in a categorical manner. Second, repeated measures of categorical variables permit a transition analysis that tests the predicted probability of switching from one category to another over time given the influence of an independent (categorical) variable. Significant transitions over time can be identified, offering a less ambiguous representation of the results than in comparable continuous variable models.

In the LIFT and JHU-PIRC datasets, psychopathology and absenteeism variables were reduced and dichotomized in the followed manner: In LIFT, yearly raw CBCL and TRF scores were converted to T scores and then coded dichotomously according to whether or not they were greater than 59 (representing the borderline clinical range and higher, and corresponding to 1 SD above the population mean; 0 = no, 1 = yes). In JHU-PIRC, TOCA-R and BHIF scores were standardized and children were coded according to whether or not they fell at or above 1 SD greater than the mean ($z \geq 1$; 0 = no, 1 = yes) at each year. Because children reported on both anxiety and depression in JHU-PIRC using the BHIF, scores on the two subscales were averaged to create yearly composite scores prior to standardization. In both LIFT and JHU-PIRC, youth with ≥20 absences in a given year were coded (1) for frequently absent (McCluskey et al., 2004); otherwise, they were coded as (0).

The Add Health absenteeism data was different from the LIFT and JHU-PIRC data in that absences were not a true continuous variable but rather a combination of a multiple choice variable (0, 1–2, 3–10, and more than 10 days of *excused* absences) plus all *unexcused* absences reported by the participants (see *Absenteeism*, above). As a result, dichotomizing absenteeism with McCluskey et al.'s (2004) cut-point of 20 absences would exclude all youth with fewer than 10 *unexcused* absences from the dichotomized absentee group (i.e., even if youth had actually had 20 or more *excused* absences), limiting comparability with the LIFT and JHU-PIRC datasets and previous research. Hence, the Add Health absenteeism and psychopathology variables were evaluated as log base 10 transformed continuous variables to account for skew while maintaining a continuous scale. A limitation of log base 10 transformations is that the process of normalizing the data results in regression coefficients that can only be interpreted in terms of direction of effect.

Multiple Datasets

There are several advantages to using more than one dataset to test hypotheses. This approach permits a test of invariance of the conceptual model across different samples. Different measurement and demographic features of each dataset allow for elucidation of the conditions in which the model holds. For example, Add Health (Harris, 2008) is nationally representative but focuses exclusively on the adolescent age-group and therefore cannot test hypotheses about elementary school children. JHU-PIRC (Dolan et al., 1993) lacks a parent-

report measure of psychopathology, but offers validated measures of depression and anxiety each year from grades 4–8, permitting an evaluation of changes in reciprocal associations between absenteeism and psychopathology from childhood to early adolescence. LIFT has multiple informants and covers multiple developmental periods, but has a relatively smaller sample size. Furthermore, the two school-based universal prevention datasets have a unique profile of being population-based within specific regions of the US and having large at-risk samples with yearly repeated measures for more than two years in a row. They also include school records pertaining to youth attendance. No other known US longitudinal datasets include all of these features. In short, the use of the selected datasets allows for more thorough exploration of the conceptual model guiding this study.

Data Analytic Approach

The primary analyses were conducted via structural cross-lagged regression models in MPlus 5.1 (Muthen & Muthen, 2008; see Figure 1). Three different pathways of association were simultaneously evaluated; cross-lagged, autoregressive, and concurrent. The cross-lagged analyses were of primary interest in the current study. These represented associations between absenteeism at time *t* and psychopathology at time *t* + 1 as well as the reciprocal association between psychopathology at time *t* and absenteeism at time *t* + 1. These effects were allowed to vary across time to provide information regarding changes in reciprocal associations between absenteeism and psychopathology across childhood and adolescence. Autoregressive pathways estimated the association between absenteeism at time *t* with absenteeism at time *t* + 1 as well as the association between psychopathology at time *t* and psychopathology at time *t* + 1. The autoregressive pathways were also allowed to vary across time. Concurrent residual correlations between absenteeism and psychopathology at the same time of assessment were estimated and held constant across times of assessment, while the residual variances were freely estimated within construct over time. Covariates were entered as predictors of both absenteeism and psychopathology at each time of assessment. Thus, significant associations between absenteeism at time *t* and psychopathology at time *t* + 1 are above and beyond the variance accounted for by the association between psychopathology at time *t* − 1 and absenteeism at time *t*, after adjusting for covariates. As such, significant associations between absenteeism and psychopathology over time represent risk factors, not just markers of the problem. To account for missing data, full information maximum likelihood (FIML) parameter estimation was used. Statistical tests were performed with weighted data for the Add Health dataset to achieve an approximation of population parameters.

Results

The mean number of days absent varied from sample to sample: Add Health: *M*s: 5.7 – 6.5, *SD*s: 5.8 – 8.1; JHU-PIRC: *M*s: 14.3 – 25.0, *SD*s: 16.8 – 26.8; LIFT: *M*s: 10.0 – 16.7, *SD*s: 10.0 – 20.3. For measures of anxiety and depression, *M*s (*SD*s) ranged from 11.4 – 11.5 (8.01 – 8.02) for Add Health; 1.63 – 1.95 (.39 – .41) for JHU-PIRC; and 48.8 – 51.1 (9.0 – 11.9) for LIFT. For measures of conduct problems, Ms (SDs) ranged from 3.0 – 3.5 (4.2 – 4.7) for Add Health; 1.96 –2.09 (1.02 – 1.12) for JHU-PIRC; and 47.6 – 52.1 (8.8 – 11.2) for LIFT.

Primary Analyses

All final models fit the data adequately (see below). All of the autoregressive pathways were statistically significant (*p*s < .01) for both absenteeism and psychopathology across all grades and datasets (see below). These results indicated that previous absenteeism was a predictor of future absenteeism. Likewise, previous psychopathology was a predictor of future psychopathology. In most models, positive concurrent residual correlations between

absenteeism and psychopathology were found (see below). This indicated that within a particular time of assessment (e.g., 4th grade), higher levels of absenteeism were associated with higher levels of psychopathology.

Cross-lagged absenteeism and symptoms of anxiety and depression

Add Health—Analyses were conducted separately for middle school and high school to evaluate differences in cross-lagged associations at these two developmental stages. The structural cross-lagged analyses using log base 10 transformed continuous indicators of anxiety and depression and absenteeism reached adequate levels of model fit in both the middle school (CFI = 1.00, RMSEA = .009) and high school (CFI = .987, RMSEA = .073) subsamples. Concurrent residual correlations were positive and significant for both middle (*B* = .010, *SE* = .001, *Est./SE* = 7.14, $p < .001$) and high school (*B* = .012, *SE* = .001, *Est./SE* = 11.62, $p < .001$) students. An evaluation of the autoregressive pathways revealed that previous absenteeism predicted subsequent absenteeism in both the middle (*B* = .41, *SE* = .02, *Est./SE* = 19.91, $p < .001$) and high school (*B* = .42, *SE* = .02, *Est./SE* = 27.57, $p < .001$) groups. Likewise, previous anxiety and depression predicted subsequent anxiety and depression in both middle (*B* = .52, *SE* = .02, *Est./SE* = 26.61, $p < .001$) and high school students (*B* = .58, *SE* = .02, *Est./SE* = 38.07, $p < .001$). Cross-lagged associations revealed that higher levels of absenteeism at the first assessment were significantly associated with higher reported anxiety and depression at the follow-up assessment in middle school but not high school students (see Table 2). The reciprocal association was significant in both the middle school and high school groups (see Table 2). Higher levels of anxiety and depression at the first assessment were associated with higher levels of absenteeism at the follow-up assessment. Among both middle and high school students, lower household income, single parent households, as well as being of neither Asian nor African American descent were associated with higher levels of absenteeism (*p*s < .05). Lower parental education was associated with high school absenteeism (*p*s < .05). Female gender, lower parent education, and African American race or ethnicity were associated with higher levels of anxiety and depression at both middle school and high school levels (*p*s < .05). In the middle school subsample, lower household income was associated with anxiety and depression; in the high school subsample, single parent household as well as Asian American and Hispanic race or ethnicity were associated with anxiety and depression (*p*s < .05).

JHU-PIRC—The dichotomous variable structural cross-lagged analysis reached adequate levels of model fit (CFI = 0.977, RMSEA = 0.052). The concurrent residual correlation was positive and marginally significant (*B* = .08, *SE* = .05, *Est./SE* = 1.76, $p = .079$). All of the autoregressive pathways from absenteeism at time *t* to absenteeism and time *t* + 1 were significant (*B*s = .71 – .96, *SE*s = .07 – .09, all *p*s < .001). Likewise, all of the autoregressive pathways from anxiety and depression at time *t* to anxiety and depression at time *t* + 1 were statistically significant (*B*s = .71 –.82, *SE*s = .08 – .10, all *p*s < .001). An evaluation of the cross-lagged pathways revealed that high anxiety and depression in 6th grade was marginally associated with an increased predicted probability of chronic absenteeism in 7th grade (see Table 3). However, this association did not differ significantly from the same effect at different grades. There were no other significant cross-lagged associations between absenteeism and anxiety and depression. Lower family income was associated with an increased predicted probability of chronic absenteeism ($p < .001$). Furthermore, females ($p < .001$) and African Americans ($p = .023$) had significantly higher predicted probabilities of high anxiety and depression.

LIFT—Structural cross-lagged regression analyses with dichotomous indicators were used to evaluate cross-lagged associations between absenteeism and anxiety and depression problems among the first grade cohort (CFI = .910, RMSEA = .055) and fifth grade cohort

(CFI = .970, RMSEA = .039). The concurrent residual correlation was positive and significant for the fifth grade cohort (*B* = .32, *SE* = .08, *Est./SE* = 4.19, $p < .001$) but was not significant for the first grade cohort. As was found in the JHU-PIRC and Add Health datasets, the autoregressive pathways from absenteeism at time *t* to absenteeism at time *t* + 1 were statistically significant across grades for both cohorts (*B*s = .44 – 1.38, *SE*s = .12 – .40, all *p*s < .007). A similar effect was found regarding the association between anxiety and depression at time *t* and anxiety and depression at time *t* + 1 (*B*s = .54 – 1.25, *SE*s = .13 – .33, all *p*s < .002). Contrary to expectations, the evaluation of the cross-lagged effects revealed that chronic absenteeism in 6th grade was associated with a decreased predicted probability of high anxiety and depression in 7th grade among the fifth grade cohort (see Table 3). However, chronic absenteeism in 5th grade was marginally associated with an increased predicted probability of high anxiety and depression in 6th grade among the fifth grade cohort. This same association was found to be statistically significant between 7th and 8th grades among the fifth grade cohort as well as 8th and 10th grades among the first grade cohort. High anxiety and depression in 7th grade was significantly associated with an increased predicted probability of chronic absenteeism in 8th grade (fifth grade cohort). The same association approached significance between 3rd and 4th grades, 6th and 8th grades, as well as between 8th and 10th grades (first grade cohort). There were no other significant cross-lagged associations between absenteeism and anxiety and depression.

The significant cross-lagged pathways were evaluated to determine if they differed statistically from the same pathways at different grades within cohort. Among the first grade cohort, the pathway from 8th grade chronic absenteeism to 10th grade high anxiety and depression was significantly different from the same association at other grades (*Wald* χ^2 = 4.95 – 8.13, *df* = 1, *p* = .015 – .026) with the exception of the 1st to 2nd grade association. None of the marginally significant pathways in the first grade cohort differed statistically from similar pathways at different grades. Among the fifth grade cohort, the association between high anxiety and depression in 7th grade with chronic absenteeism in 8th grade was marginally to significantly different from the same association at other grades (*Wald* χ^2 = 2.85 – 7.30, *df* = 1, *p* = .007 – .091). Moreover, the association between chronic absenteeism in 6th grade and high anxiety and depression in 7th grade was significantly different from the same association at other grades (*Wald* χ^2 = 5.95 – 9.54, *df* = 1, *p* = .002 – .015) with the exception of the 8th to 10th grade association. In addition, the cross-lagged pathways from chronic absenteeism to high anxiety and depression from both 5th to 6th and 7th to 8th grades were significantly different from the 8th to 10th grade association among the fifth grade cohort (*Wald* χ^2 = 4.19, *df* = 1, *p* = .041 and *Wald* χ^2 = 6.66, *df* = 1, *p* = .010, respectively).

Those participants who were older in the first grade cohort had an increased predicted probability of chronic absenteeism (*p* = .009). Living in a single parent household was associated with an increased predicted probability of chronic absenteeism in the 5th grade cohort (*p* = .013). Low mother education and low household income were associated with an increased predicted probability of high anxiety and depression in the 5th grade cohort (*p* = .001 and .016, respectively).

Overall, evidence of reciprocal associations was found in all three datasets with the strongest associations occurring during the adolescent years. There was more evidence of reciprocal influences between absenteeism and anxiety and depression in the LIFT and Add Health data compared with the JHU-PIRC sample of urban Baltimore children.

Cross-lagged absenteeism and conduct problems

Add Health—The continuous variable analyses using log base 10 transformed indicators of both absenteeism and conduct problems reached adequate levels of model fit in both the middle school (CFI = .997, RMSEA = .035) and high school (CFI = .977, RMSEA = .090)

subsamples. As with the evaluations of associations between anxiety and depression and absenteeism, the analyses between conduct problems and absenteeism were conducted separately for middle school and high school students to evaluate differences in cross-lagged associations at these two developmental stages. Concurrent residual correlations were positive and significant in both middle (B = .014, SE = .002, $Est./SE$ = 8.64, p < .001) and high school students (B = .021, SE = .001, $Est./SE$ = 15.15, p < .001). The autoregressive pathways for both absenteeism and conduct problems were significant. Previous absenteeism predicted subsequent absenteeism at both the middle (B = .40, SE = .02, $Est./SE$ = 19.30, p < .001) and high school (B = .40, SE = .02, $Est./SE$ = 26.21, p < .001) levels and previous conduct problems predicted subsequent conduct problems in both middle (B = .52, SE = .02, $Est./SE$ = 29.16, p < .001) and high school (B = .51, SE = .01, $Est./SE$ = 38.70, p < .001). Cross-lagged associations revealed that higher levels of absenteeism at the first assessment were significantly associated with higher reported conduct problems at the follow-up assessment at the middle school level (see Table 2). This association was not significant in the high school group. However, the reciprocal association was significant for both middle school and high school students (see Table 2). Higher levels of conduct problems at the first assessment were associated higher levels of absenteeism at the follow-up assessment. In addition, higher levels of conduct problems were reported by males, those of Hispanic ethnicity, and individuals from single parent households in both middle and high school (ps < .05). Covariate association with absenteeism is the same as reported for the Add Health anxiety and depression analysis.

JHU-PIRC—Dichotomous variable cross-lagged associations between absenteeism and conduct problems were evaluated, simultaneously controlling for autoregressive and concurrent associations as well as relevant covariates (CFI = .976, RMSEA = .043). The concurrent residual correlation was positive and significant (B = .12, SE = .04, $Est./SE$ = 2.70, p = .007). All of the autoregressive pathways from absenteeism at time t to absenteeism and time t + 1 were significant (Bs = .60 – .90, SEs = .07 – .09, all ps < .001). Similarly, all of the autoregressive pathways from conduct problems at time t to conduct problems at time t + 1 were statistically significant (Bs = .55 –.94, SEs = .08 – .13, all ps < .001). An evaluation of the cross-lagged pathways revealed that high teacher reported conduct problems in 2nd grade were significantly associated with a higher predicted probability of chronic absenteeism in 3rd grade (see Table 4). This association is marginally to significantly higher than the same association between previous conduct problems and subsequent absenteeism at other grades (*Wald* χ^2 = 2.86 – 5.67, df = 1, p = .017 – .091). Chronic absenteeism in 5th grade was marginally associated with a higher predicted probability of high conduct problems in 6th grade; however, this pathway was not statistically different from the same pathway at different grades. There were no other significant cross-lagged associations between absenteeism and conduct problems. Lower family income was associated with a higher predicted probability of chronic absenteeism as well as high conduct problems (all ps < .001). In addition, males had a higher predicted probability of conduct problems (p < .001).

LIFT—Structural cross-lagged regression analyses with dichotomous indicators were used to evaluate cross-lagged associations between absenteeism and conduct problems among the first grade cohort (CFI = .974, RMSEA = .041) and fifth grade cohort (CFI = .981, RMSEA = .039). The concurrent residual correlation was positive and significant for the first grade cohort (B = .17, SE = .08, $Est./SE$ = 1.98, p = .048) but not the fifth grade cohort. As was found in previous analyses, the autoregressive pathways from absenteeism at time t to absenteeism at time t + 1 were statistically significant across grades for both cohorts (Bs = .51 – 1.97, SEs = .17 – .27, all ps < .004). Similarly, the association between conduct problems at time t and conduct problems at time t + 1 was significant across grades and

cohorts (*B*s = .55 – 1.38, *SE*s = .17 – .39, all *p*s < .010). Contrary to expectations, chronic absenteeism in 2nd grade was significantly associated with a decreased predicted probability of high conduct problems 3rd grade among the first grade cohort (see Table 4). However, among the fifth grade cohort, chronic absenteeism in 10th grade was significantly associated with an increased predicted probability of conduct problems in 12th grade. The same association approached significance between 3rd and 4th grades for the first grade cohort. In addition, high conduct problems were associated with increased predicted probability of chronic absenteeism in the transition from 6th grade to 8th grade (first grade cohort) as well as 7th grade to 8th grade (fifth grade cohort). There were no other significant cross-lagged associations between absenteeism and conduct problems.

The significant cross-lagged pathways were evaluated to determine if they differed statistically from the same pathways at different grades within cohort. Among the first grade cohort, the marginally significant pathway from 3rd grade chronic absenteeism to 4th grade high conduct problems was marginally to significantly different from the same association at other grades (*Wald* χ^2 = 3.46 – 5.32, *df* = 1, *p* = .021 – .063) with the exception of the 1st to 2nd grade association and the 6th to 8th grade association. In addition, the association between chronic absenteeism and conduct problems from 2nd to 3rd grade was statistically different from the same association from 6th to 8th grade (*Wald* χ^2 = 6.08, *df* = 1, *p* = .014). Among the fifth grade cohort, the association between high conduct problems in 7th grade with chronic absenteeism in 8th grade was significantly different from the same association at 5th to 6th grade (*Wald* χ^2 = 4.24, *df* = 1, *p* = .040). The association between chronic absenteeism in 10th grade and high conduct problems in 12th grade was marginally different from the same association at 8th to 10th grade (*Wald* χ^2 = 3.82, *df* = 1, *p* = .051).

Older relative age and living in a single parent household were associated with an increased predicted probability of chronic absenteeism (*ps* < .01). Low family income and living in a single parent household were associated with an increased predicted probability of high conduct problems (*ps* < .05).

The results of these structural cross-lagged regression models suggest that youth engaging in more absenteeism in adolescence (but not childhood) may be at risk for subsequent increases in conduct problems in the following year, even after controlling for their previous level of conduct problems, concurrent absenteeism, and numerous demographic characteristics that significantly predict these adjustment problems. In contrast, there was some evidence that youth conduct problems were heightened in the year before increased absenteeism occurred among both younger and older students.

Discussion

Absenteeism and psychopathology may act as reciprocal risk factors for one another during childhood and adolescence. There was somewhat more evidence of this effect for psychopathology→absenteeism links than for absenteeism→psychopathology links (particularly with regard to conduct problems), for adolescents as compared to children, and in the Add Health dataset as compared to the two regionally representative datasets. Of note, no predicted absenteeism→psychopathology longitudinal paths were conventionally significant below the 5th to 6th grade time period. Relations among absenteeism and symptomatology varied from sample to sample at the model level, but there was at least some support in each dataset that a higher level of one of these factors in one year tended to presage the onset of increases in the other factor in the following year, over and above autoregressive associations and covariation with demographic variables.

Most previous studies of the linkage between school absenteeism and youth psychopathology have used convenience samples and relatively simple statistical models with few controls, no consideration of reciprocal influences over time, and limited capacity to investigate issues of timing and sequencing or the role of developmental level. Of the few studies to use a regionally representative dataset to examine this linkage, Egger et al. (2003) found strong cross-sectional links between *DSM-IV* disorders and absenteeism, but the direction of effects could not be specified since the two variables were assessed simultaneously. Up to this point in the field, it has been unclear whether this association is largely spurious and attributable to third variables. In contrast, the analytic approach taken here is less easily explained away as a spurious finding than most correlational approaches.

The developmental level of the youth appeared to influence the pattern of findings for both anxiety and depression as well as conduct problems. For example, the only conventionally significant effects obtained in this study in which time 1 absenteeism significantly predicted time 2 conduct problems involved youth in secondary school (high school students in the LIFT sample and middle school students in the Add Health sample) rather than elementary school. Adolescent onset conduct problems appear to have different origins when compared to the childhood onset variety, with some evidence pointing to influence of the peer environment and cultural factors in adolescent onset conduct problems as compared to more influence of intrapersonal and family factors regarding childhood onset conduct problems (McCabe, Hough, Wood, & Yeh, 2001). Potentially, school absenteeism in secondary school can sometimes be a product of early adolescent peer and cultural influences, but may inadvertently become an early step along the path of accelerating conduct problems. An interactive combination of hormonal changes, decreased parental monitoring, increased autonomy, and increased influence of peers during this developmental period heighten the risk of deviant, sensation-seeking behaviors even among some youth who were previously behaviorally well-regulated (McCabe et al., 2001; Moffitt, 1993; Silberg, Rutter, Tracy, Maes, & Eaves, 2007). School absenteeism may reflect early experimentation with self-directed behaviors previously restricted by parents and school personnel as well as by a youth's relative balance of impulse control and pleasure-seeking, which actually declines (in favor of pleasure-seeking) following the hormonal changes of puberty, likely contributing to the puberty-related increase in nonviolent conduct problems seen in adolescence (Rowe, Maughan, Worthman, Costello, & Angold, 2004; Steinberg, Albert, Cauffman, Banich, Graham, & Woolard, 2008). Such experimentation may ultimately be benign in nature for some, but for others may potentiate entry into more deviant behaviors during the unsupervised period of the school day that develop momentum and expand in range beyond mere truancy.

In considering that this effect was found for middle school but not high school students in the Add Health dataset, it is worth considering that early absenteeism is also a significant predictor of eventually dropping out of school (Lehr, Sinclair, & Christenson, 2004). It may be that many of those who are most at risk for a truancy-mediated pathway into conduct problems drop out of school upon entering or during high school and thus are not well-represented in samples such as the Add Health dataset which select students who are currently enrolled in target high schools.

Reciprocal relations among absenteeism and anxiety and depression varied among the three samples, with evidence of cross-lagged effects at the secondary school level for both the Add Health (nationally representative) and LIFT (regionally representative) samples. In considering the significant findings from these samples, it is worthwhile considering that separation anxiety disorder, social phobia, specific phobia (e.g., of school), and depression each have in common an element of avoidance or withdrawal (e.g., as exhibited by symptoms related to avoiding specific activities or losing interest in previously pleasurable

activities) that can include school as a threatening or unpleasurable stimulus. As with conduct problems, it is plausible that early in the course of developing one of these disorders, school absenteeism can play a gateway function by creating conditions that promote increased anxiety or depressive symptoms. Avoidance of feared stimuli tends to promote intensification of fear symptoms (Deacon & Maack, 2008) as well as depressed mood (Moitra, Herbert, & Forman, 2008) and social withdrawal tends to prolong or exacerbate episodes of depression (Palinkas & Browner, 1995). For some youth, school absenteeism may therefore be an early symptom of an anxiety or depressive disorder that, through a chain reaction, elicits additional symptoms. As one example, a student who begins to avoid school due to fear of separation from parents may, through negative reinforcement, learn a basic coping strategy (i.e., avoidance of separation) that reduces the unpleasant sensation of fear, and therefore generalize this strategy to additional situations (e.g., playdates, staying in a room alone, sleeping by oneself) that begin to increase the pervasiveness of separation anxiety. As such, psychopathology would seem to be an important risk factor for absenteeism just as absenteeism might heighten symptoms of negative mood.

In contrast with the Add Health and LIFT models, there was only one conventionally significant cross-lagged path in the JHU-PIRC sample (conduct problems→absenteeism at 2nd to 3rd grade). Notably, there were significant bivariate relations among the absenteeism and psychopathology variables over time in preliminary descriptive analyses for JHU-PIRC; the introduction of statistical controls eliminated the effect. One interpretation is that other sources of stress experienced by the urban youth studied in the JHU-PIRC sample might contribute to both absenteeism and psychopathology, overwhelming or at least masking any unique covariation among these two variables. Of course, it is important to note that applying statistical controls can be a fairly conservative analysis that assumes that the effects of an IV are only its unique effects, whereas it may be that some of the explained variance shared with the covariates also represents a direct effect of the IV on the DV and that the association between the covariates and the DV is to some degree noncausal or indirect. Nonetheless, while making this more conservative assumption eliminated any effects of absenteeism→psychopathology in the JHU-PIRC sample, there were findings consistent with the hypothetical model in the other samples that emerged even when statistical controls were applied.

It is important to recognize that the school environment itself probably plays an important role with regard to youth absenteeism and psychopathology. Structural school factors associated with urban neighborhoods such as poor maintenance and upkeep of school grounds are linked with increased absenteeism and in some cases have been found to predict to absenteeism more so than demographic factors, which are typically powerful predictors of absenteeism (e.g., Branham, 2004). Absenteeism may serve as an avoidant coping mechanism for youth attending chaotic or unsafe schools. These same school characteristics, due to their stressful nature, are probable risk factors for increased anxiety and depression as well as conduct problems (Ma, Truong, & Sturm, 2007). The literature on positive behavioral supports in schools shows that implementing violence prevention, conflict resolution, and related programs to reduce chaos and stress in schools can have a measureable impact on youth symptomatology (e.g., Dolan et al., 1993; Eddy et al., 2000; Lane, Wehby, Robertson, & Rogers, 2007). It stands to reason that implementation of such programs on a schoolwide basis could impact the association between absenteeism and psychopathology in a number of ways—for example, by attenuating the association to some extent. In the modern era, with increasing use of positive behavioral supports in public schools, it would be useful to understand the impact of such supports on the longitudinal linkage between absenteeism and psychopathology. Another possible influence of the school environment on this linkage stems from the practice of suspending or expelling students for

chronic absenteeism in some schools (e.g., Gottfredson, Gottfredson, Czeh, Cantor, Crosse, & Hantman, 2000, p. 3–22). Seemingly, this practice might magnify the effects of absenteeism on the small group of students who are already developing patterns of school avoidance or psychopathology and are then required to miss additional time at school. Of note, the JHU-PIRC trial counted suspensions as excused absences. While this could have confounded the results by increasing the association between conduct problems and absenteeism, the JHU-PIRC trial in fact yielded minimal evidence of a link between these two variables, with only one significant finding out of eight tests of association suggesting a cross-lagged effect (with conduct problems serving as a risk factor for absenteeism in early elementary school), reducing concerns about interpretation of the results.

Other limitations of the study should be noted. The methodological differences between the three datasets add complexity to the interpretation of the overall pattern of findings. In the Add Health study, all measures were based on youth self-report, increasing the risk of method variance accounting for some of the findings. Second, studies of school absenteeism have noted that poor school record keeping and the difficulty in distinguishing true excused and unexcused absences generally renders it impossible to make this distinction effectively for data analytic purposes (McCluskey et al., 2004). The conceptual model adopted in this paper, as described above, assumes that absences that occur for a variety of reasons may still have ill effects on youth psychological adjustment if they are too frequent. However, it is possible that absences could be effectively classified in ways that would show differential links with youth psychopathology (see, e.g., Kearney, 2003). Additionally, while informative, the log-transformed models used for the Add Health dataset can only be interpreted in terms of direction of effect, not the magnitude of the effect. The reciprocal influences could be of a relatively small magnitude and this needs to be clarified in future research.

Implications for Practice and Conclusion

Identifying risk factors for psychopathology can inform preventive intervention development (Ialongo et al. 2004; Kazdin, 1999). If absenteeism acts as a risk factor for the onset or exacerbation of psychopathology, selective and indicated prevention models targeting absenteeism could be developed that might ultimately reduce the incidence of mental health disorders. Illustratively, research on other risk factors for childhood conduct problems (e.g., poor parenting practices) offered useful directions for intervention development (e.g., parent training). Risk factors that can be changed represent the best candidates for preventive intervention (Dishion & Patterson, 1999). According to the conceptual model guiding this study, the occurrence of elevated absenteeism can trigger or exacerbate mental health problems; if prevented, such outcomes might be avoided. Notably, evidence-based treatments have been developed that significantly improve attendance rates, illustrating the malleability of the problem (Kearney & Hugelshofer, 2000). Thus, absenteeism could be a useful target for preventive intervention if it indeed plays a contributing role in the development of psychological problems. It is of significance that public schools are natural allies in the prevention of absenteeism.

The present findings represent an important step towards examining reciprocal relations among absenteeism and youth psychopathology. These findings are consistent with the hypothesis that these two aspects of youth adjustment may at times exacerbate one another, leading over the course of time to more of each. Further delineation of the characteristics of youth exhibiting high levels of absenteeism who are most likely to go on to develop psychopathology would be useful in planning for the development of a school-based selective prevention model for this at-risk group of youth.

Acknowledgments

This research was supported by NIMH grant MH081087 awarded to the first author. This study uses data from Add Health, a program project designed by J. Richard Udry, Peter S. Bearman, and Kathleen Mullan Harris, and funded by a grant P01-HD31921 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development, with cooperative funding from 17 other agencies. Special acknowledgment is due Ronald R. Rindfuss and Barbara Entwisle for assistance in the original design. Persons interested in obtaining data files from Add Health should contact Add Health, Carolina Population Center, 123 W. Franklin Street, Chapel Hill, NC 27516-2524 (addhealth@unc.edu). No direct support was received from grant P01-HD31921 for this analysis.

References

Achenbach, TM. Manual for the teacher's report form and 1991 profile. Burlington, VT: Department of Psychology; 1991.

Brandibas G, Jeunier B, Clanet C, Fouraste R. Truancy, school refusal and anxiety. School Psychology International. 2004; 25:117–126.

Branham D. The wise man builds his house upon the rock: The effects of inadequate school building infrastructure on student attendance. Social Science Quarterly. 2004; 85:1112–1128.

Capaldi DM. Co-occurrence of conduct problems and depressive symptoms in early adolescent boys: II. A 2-year follow-up at grade 8. Development & Psychopathology. 1992; 4:125–144.

Ceci SJ, Williams WM. Schooling, intelligence, and income. American Psychologist. 1997; 52:1051–1058.

Cicchetti, D.; Cohen, DJ. Developmental psychopathology: risk, disorder, and adaptation. 2. Hoboken, NJ: John Wiley & Sons, Inc; 2006.

Cleveland HH, Wiebe RP. The moderation of adolescent-to-peer similarity in tobacco and alcohol use by school levels of substance use. Child Development. 2003; 74:279–291. [PubMed: 12625450]

Cohen, J.; Cohen, P.; West, SG.; Aiken, LS. Applied multiple regression/correlation analysis for the behavioral sciences. 3. NJ: Lawrence Erlbaum Associates; 2003.

Corville-Smith J, Ryan BA, Adams GR, Dalicandro T. Distinguishing absentee students from regular attenders: The combined influence of personal, family, and school factors. Journal of Youth & Adolescence. 1998; 27:629–640.

Costello EJ, Messer SC, Bird HR, Cohen P, Reinherz HZ. The prevalence of serious emotional disturbance: a re-analysis of community studies. Journal of Child & Family Studies. 1998; 7:411–432.

Crockett LJ, Randall BA, Shen YL, Russell ST, Driscoll AK. Measurement equivalence of the center for epidemiological studies depression scale for Latino and Anglo adolescents: a national study. Journal of Consulting & Clinical Psychology. 2005; 73:47–58. [PubMed: 15709831]

Deacon B, Maack DJ. The effects of safety behaviors on the fear of contamination: An experimental investigation. Behaviour Research & Therapy. 2008; 46:537–547. [PubMed: 18313031]

Dishion TJ, Patterson GR. Model building in developmental psychopathology: a pragmatic approach to understanding and intervention. Journal of Clinical Child Psychology. 1999; 28:502–512. [PubMed: 10587901]

Dolan LJ, Kellam SG, Brown CH, Werthamer-Larsson L, Rebok GW, Mayer LS, et al. The short-term impact of two classroom-based preventive interventions on aggressive and shy behaviors and poor achievement. Journal of Applied Developmental Psychology. 1993; 14:317–345.

Eddy JM, Reid JB, Fetrow RA. An elementary-school based prevention program targeting modifiable antecedents of youth delinquency and violence: Linking the Interests of Families and Teachers (LIFT). Journal of Emotional & Behavioral Disorders. 2000; 8:165–176.

Egger HL, Costello EJ, Angold A. School refusal and psychiatric disorders: a community study. Journal of the American Academy of Child & Adolescent Psychiatry. 2003; 42:797–807. [PubMed: 12819439]

Epstein JL, Sheldon SB. Present and accounted for: Improving student attendance through family and community involvement. The Journal of Educational Research. 2002; 95:308–318.

Ferrer E, McArdle JJ. Alternative structural models for multivariate longitudinal data analysis. Structural Equation Modeling. 2003; 10(4):493–524.

Gottfredson, G.; Gottfredson, DC.; Czeh, ER.; Cantor, D.; Crosse, SB.; Hantman, I. Final report for the National Institute of Justice, U. S. Department of Justice, Grant # 96-MN-MV-008. Ellicott City, MD: Gottfredson Associates, Inc; 2000. National study of delinquency prevention in schools.

Harris, KM. The National Longitudinal Study of Adolescent Health (Add Health), Waves I & II, 1994–1996; Wave III, 2001–2002 [machine-readable data file and documentation]. Chapel Hill, NC: Carolina Population Center, University of North Carolina at Chapel Hill; 2008.

Harris, KM.; Halpern, CT.; Entzel, P.; Tabor, J.; Bearman, PS.; Udry, JR. The National Longitudinal Study of Adolescent Health: Research Design [WWW document]. 2008. URL: http://www.cpc.unc.edu/projects/addhealth/design

Ialongo, NS.; Kellam, SG.; Poduska, J. Tech Rep No 2. Baltimore, MD: Johns Hopkins University; 1999. Manual for the Baltimore How I Feel.

Ialongo NS, Koenig-McNaught AL, Wagner BM, Pearson JL, McCreary BK, Poduska J, et al. African American children's reports of depressed mood, hopelessness, and suicidal ideation and later suicide attempts. Suicide & Life-Threatening Behavior. 2004; 34:395–407. [PubMed: 15585461]

Lane KL, Wehby JH, Robertson EJ, Rogers LA. How do different types of high school students respond to schoolwide positive behavior support programs? characteristics and responsiveness of teacher-identified students. Journal of Emotional and Behavioral Disorders. 2007; 15(1):3–20.

Lehr CA, Sinclair MF, Christenson SL. Addressing student engagement and truancy prevention during the elementary school years: A replication study of the check and connect model. Journal of Education for Students Placed at Risk. 2004; 9:279–301.

Lounsbury JW, Steel RP, Loveland JM, Gibson LW. An investigation of personality traits in relation to adolescent school absenteeism. Journal of Youth & Adolescence. 2004; 33:457–466.

Kazdin AE. Current (lack of) status of theory in child and adolescent psychotheraphy research. Journal of Clinical Child Psychology. 1999; 28:533–543. [PubMed: 10587904]

Kearney CA. Bridging the gap among professionals who address youths with school absenteeism: Overview and suggestions for consensus. Professional Psychology: Research & Practice. 2003; 34:57–65.

Kearney CA, Hugelshofer DS. Systemic and clinical strategies for preventing school refusal behavior in youth. Journal of Cognitive Psychotherapy. 2000; 14:51–65.

Knutson JF, DeGarmo DS, Reid JB. Social disadvantage and neglectful parenting as precursors to the development of antisocial and aggressive child behavior: Testing a theoretical model. Aggressive Behavior. 2004; 30:187–205.

Kovacs, M. Unpublished manuscript. Pittsburgh: University of Pittsburgh; 1983. The children's depression inventory: A self-rated depression scale for school-age youngsters.

Ma S, Truong K, Sturm R. School characteristics and behavior problems of U.S. fifth-graders. Psychiatric Services. 2007; 58(5):610–610. [PubMed: 17463338]

McCabe KM, Hough R, Wood PA, Yeh M. Childhood and adolescent onset conduct disorder: A test of the developmental taxonomy. Journal of Abnormal Child Psychology. 2001; 29:305–316. [PubMed: 11523836]

McCluskey CP, Bynum TS, Patchin JW. Reducing chronic absenteeism: An assessment of an early truancy initiative. Crime & Delinquency. 2004; 50:214–234.

McNeal RB. Parental involvement as social capital: Differential effectiveness on science achievement, truancy, and dropping out. Social Forces. 1999; 78:117–144.

Moitra E, Herbert JD, Forman EM. Behavioral avoidance mediates the relationship between anxiety and depressive symptoms among social anxiety disorder patients. Journal of Anxiety Disorders. 2008; 22:1205–1213. [PubMed: 18282686]

Muthen, LK.; Muthen, B. MPlus Users Guide. 5. Los Angeles, CA: Muthen & Muthen; 1998–2007.

Needham BL, Crosnoe R, Muller C. Academic failure in secondary school: the inter-related role of health problems and educational context. Social Problems. 2004; 51:569–586. [PubMed: 20354573]

Palinkas LA, Browner D. Effects of prolonged isolation in extreme environments on stress, coping, and depression. Journal of Applied Social Psychology. 1995; 25:557–576.

Patterson, GR.; Yoerger, K. A developmental model for late-onset delinquency. In: Osgood, DW., editor. Motivation and delinquency. Lincoln, NE: University of Nebraska Press; 1997.

Petras H, Ialongo N, Lambert SF, Barrueco S, Schaeffer CM, Chilcoat H, Kellam S. The utility of elementary school TOCA-R scores in identifying later criminal court violence among adolescent females. Journal of the American Academy of Child & Adolescent Psychiatry. 2005; 44:790–797. [PubMed: 16034281]

Radloff LS. The CES-D Scale: A self-report depression scale for research in the general population. Applied Psychological Measurement. 1977; 1:385–401.

Reid JB, Eddy JM, Fetrow RA, Stoolmiller M. Description and immediate impacts of a preventive intervention for conduct problems. American Journal of Community Psychology. 1999; 27:483–517. [PubMed: 10573832]

Rowe R, Maughan B, Worthman CM, Costello EJ, Angold A. Testosterone, antisocial behavior, and social dominance in boys: Pubertal development and biosocial interaction. Biological Psychiatry. 2004; 55:546–552. [PubMed: 15023584]

Silberg JL, Rutter M, Tracy K, Maes HH, Eaves L. Etiological heterogeneity in the development of antisocial behavior: The Virginia twin study of adolescent behavioral development and young adult follow-up. Psychological Medicine. 2007; 37:1193–1202. [PubMed: 17376258]

Steinberg L, Albert D, Cauffman E, Banich M, Graham S, Woolard J. Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. Developmental Psychology. 2008; 44:1764–1778. [PubMed: 18999337]

Wadsworth ME, Achenbach TM. Explaining the link between low socioeconomic status and psychopathology: testing two mechanisms of the social causation hypothesis. Journal of Consulting & Clinical Psychology. 2005; 73:1146–1153. [PubMed: 16392987]

Werthamer-Larsson L, Kellam SG, Wheeler L. Effect of first-grade classroom environment on child shy behavior, aggressive behavior, and concentration problems. American Journal of Community Psychology. 1991; 19:585–602. [PubMed: 1755437]

Wood, JJ. Understanding and addressing attendance problems in urban schools. In: Gates, G., editor. Emerging Thought and Research on Student, Teacher, and Administrator Stress and Coping. Information Age Publishing, Inc; Charlotte, NC: 2007.

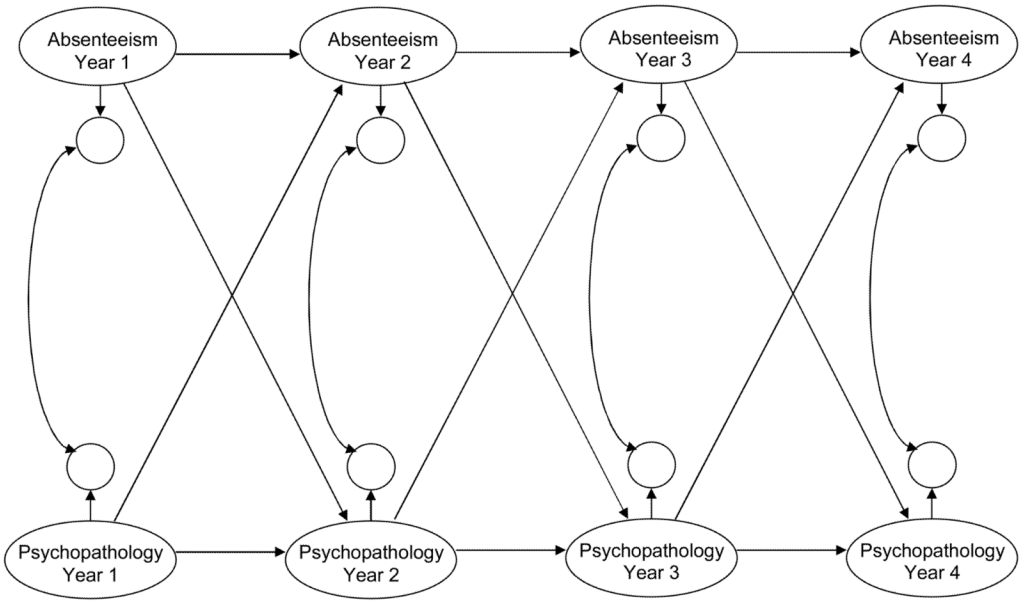

Figure 1.
Autoregressive cross-lagged model of the association between absenteeism and psychopathology. Autoregressive pathways are displayed as the pathways within a construct over time (e.g., absenteeism year 1 to absenteeism year 2). Cross-lagged pathways are displayed as the pathways between constructs over time (e.g., absenteeism year 1 to psychopathology year 2). Residual correlations are illustrated by the double headed curved arrow

Table 1

Demographics for Youth and Families in the Three Samples

Variable	*Add Health* *N* = 14428	*JHU-PIRC* *N* = 2297	*LIFT (1st Grade Baseline)* *N* = 281	*LIFT (5th Grade Baseline)* *N* = 314
Gender: boy (%)	7056 (50.3)	1148 (50.0)	128 (45.6)	157 (50.0)
Year 1 age (*M [SD]*)	--	6.32 (0.45)	6.77 (0.44)	10.51 (0.51)
Year 1 grade level (%)				
1		2297 (100)	281 (100)	
5				314 (100)
7	2234 (20.4)			
8	2259 (19.6)			
9	2883 (20.2)			
10	3231 (18.9)			
11	3098 (17.5)			
12	644 (3.4)			
Race/ethnicity (%)				
White	7777 (68.6)	757 (33.0)	236 (84.0)	272 (86.6)
African American	3142 (15.6)	1504 (65.5)	7 (2.5)	4 (1.3)
Asian	969 (3.9)	7 (0.3)	5 (1.8)	7 (2.2)
Native American	124 (0.8)	21 (0.9)	7 (2.5)	11 (3.5)
Hispanic	2142 (11.0)	8 (0.3)	18 (6.4)	12 (3.8)
Parent education (% <12 years)	2227 (16.8)	481 (33.3)	48 (17.8)	35 (11.2)
Family income (% <$20k)	2737 (24.8)	770 (56.2)	108 (38.8)	86 (27.7)
Intervention status (% in experimental group)	--	968 (42.2)	151 (53.7)	185 (58.9)

Note. *N*s reflect the number of youth in each sample who had at least one year of valid absenteeism data and a corresponding proceeding year of valid psychopathology data. Percentages given for each variable reflect the proportion of cases relative to the valid *n* (nonmissing cases) for the variable. For the Add Health sample, frequencies are raw but corresponding percentages are weighted.

Table 2

Structural Cross-Lagged Regression Models of Absenteeism and Psychopathology for the Add Health Dataset.

Anxiety & Depression	**Abs. -> A.D.**	**A.D. -> Abs.**
Middle School T1 -> T2	0.06^{***} (0.02)	0.05^{**} (0.02)
High School T1 -> T2	0.02 (0.01)	0.10^{***} (0.02)
Conduct Problems	Abs. -> Psy.	Psy. -> Abs.
Middle School T1 -> T2	0.06^{**} (0.02)	0.11^{***} (0.02)
High School T1 -> T2	0.001 (0.01)	0.10^{***} (0.01)

Note:

$^{\dagger}p < .10$,

$^{*}p < .05$,

$^{**}p < .01$,

$^{***}p < .001$. Coefficiencts are unstandardized log10 transformed; standard errors are in parentheses; Abs. = Absenteeism; A.D. = Anxiety & Depression; C.P. = Conduct Problems.

Table 3

Dichotomous Cross-Lagged Regression Paths of Absenteeism and Anxiety & Depression for the PIRC and LIFT Datasets

	JHU-PIRC		LIFT First Grade Cohort		LIFT Fifth Grade Cohort	
Grade	**Abs. -> A.D.**	**A.D. -> Abs.**	**Abs. -> A.D.**	**A.D. -> Abs.**	**Abs. -> A.D.**	**A.D. -> Abs.**
1st -> 2nd			0.21 (0.15)	0.20 (0.17)		
2nd -> 3rd			−0.13 (0.13)	0.14 (0.15)		
3rd -> 4th			0.06 (0.10)	0.27† (0.17)		
4th -> 5th	0.07 (0.07)	0.02 (0.08)				
4th -> 6th			0.11 (0.10)	0.11 (0.14)		
5th -> 6th	0.02 (0.05)	0.01 (0.06)			0.25† (0.15)	−0.16 (0.22)
6th -> 7th	−0.07 (0.05)	0.09† (0.05)			−0.46* (0.20)	−0.29 (0.21)
6th -> 8th			0.01 (0.12)	0.16† (0.09)		
7th -> 8th					0.48* (0.19)	0.38* (0.16)
8th -> 10th			0.59** (0.21)	0.23† (0.14)	−0.14 (0.12)	0.03 (0.11)
10th -> 12th					0.20 (0.14)	−0.25 (0.16)

Note.

† $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$. Coefficients are unstandardized probits; standard errors are in parentheses; Abs. = Absenteeism; A.D. = Anxiety & Depression.

Table 4

Dichotomous Cross-Lagged Regression Paths of Absenteeism and Conduct Problems for the PIRC and LIFT Datasets

	JHU-PIRC		LIFT First Grade Cohort		LIFT Fifth Grade Cohort	
Grade	**Abs. -> C.P.**	**C.P. -> Abs.**	**Abs. -> C.P.**	**C.P. -> Abs.**	**Abs. -> C.P.**	**C.P. -> Abs.**
1st -> 2nd			−0.05 (0.19)	0.22 (0.18)		
2nd -> 3rd	−0.05 (0.09)	0.26** (0.09)	−0.48* (0.24)	−0.11 (0.15)		
3rd -> 4th	0.06 (0.07)	0.03 (0.07)	0.35† (0.20)	0.02 (0.10)		
4th -> 5th	0.03 (0.06)	0.03 (0.06)				
4th -> 6th			−0.10 (0.11)	−0.09 (0.10)		
5th -> 6th	0.09† (0.05)	0.09 (0.06)			0.54 (0.39)	−0.07 (0.12)
6th -> 7th					0.08 (0.17)	0.16 (0.11)
6th -> 8th			0.25 (0.18)	0.25* (0.10)		
7th -> 8th					0.07 (0.13)	0.29* (0.12)
8th -> 10th			−0.26 (0.25)	0.12 (0.10)	−0.05 (0.09)	0.05 (0.10)
10th -> 12th					0.37* (0.16)	0.06 (0.12)

Note.

† $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$. Coefficients are unstandardized probits; standard errors are in parentheses; Abs. = Absenteeism; C.P. = Conduct Problems.