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Exploratory two-level analysis of individual- and school-level factors on truant youth emotional/psychological functioning

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Introduction

Truancy is a legal term that generally refers to unauthorized and intentional absence from compulsory school. The definition of truancy varies across jurisdictions, which complicates measurement and research on its prevalence. For example, in jurisdictions containing truancy centers law enforcement may detain and transport youth to a truancy center for one unexcused absence, while schools may refrain from notifying legal authorities about truancy until a student has at least a specific number of unexcused absences in a specific period of time, which varies by school district. Truancy is a serious problem that affects most school districts in the U.S. but unfortunately, estimates of the prevalence of truancy in the U.S. are also lacking (Education Commission of the States, 2007; National Center for School Engagement, 2006). Recent statistics on truancy in California and Colorado indicate the truancy rate within school districts is approximately 10 percent of the student population (Colorado Department of Education, 2011; Dropout Nation, 2010). Similar truancy rates have been reported in other jurisdictions (Garry, 2001).

Research has established an association of truancy with a variety of other problem behaviors, including poor performance in school (Bridgeland, Dilulio, & Morison, 2006; Caldas, 1993; Lamdin, 1996), family problems (Baker, Sigmon, & Nugent, 2001; Kearney & Silverman, 1995), sexual risk behaviors (Houck, Hadley, Tolou-Shams, & Brown, 2012), substance use (Dembo et al., 2013; Soldz, Huyser & Dorsey, 2003), delinquent behavior (Henry & Huizinga, 2007; Loeber & Farrington, 2000; Puzzanchera, Stahl, Finnegan, Tierney, & Snyder, 2003), criminal behavior (Schroeder, Chaisson, & Pogue, 2004), and poor emotional and psychological functioning (Diebolt & Herlache, 1991; Egger, Costello,

& Angold, 2003; Kearney & Silverman, 1995). Whether truancy precedes these problems, is a resulting consequence, or both, is still an open empirical question.

Truancy and Absenteeism

Truancy is a broad concept that encompasses several forms of absenteeism from school. The psychological literature commonly recognizes three forms of school absenteeism: parent-driven absenteeism, truancy, and school refusal (Hersov, 1985; Kearney & Silverman, 1990, 1996). Parent-driven absenteeism is motivated by the parent, not the child, and is considered the result of neglectful parenting practices. School refusal refers to absenteeism from school that is motivated by emotional distress or mental health problems such as anxiety (both general and social) and depression. Like truancy, school refusal refers to absenteeism that is motivated by the child. Unlike truancy, school refusal is authorized by the parents and deemed the result of psychological distress. From a psychological perspective, truancy is considered the result of conduct problems or antisocial behavior. Research has demonstrated that school refusal and truancy are not mutually exclusive categories (e.g., Berg, Butler, Franklin, Hayes, Lucas, & Sims, 1993; Berg, Casswell, Goodwin, Hullin, McGuire, & Tagg, 1985; Egger et al., 2003).

Mental Health and Truancy

School refusers—A respectable body of research has examined mental health problems among youths classified as school refusers. School refusers demonstrate symptoms of mood disorders such as major depression and dysthymia, anxiety disorders such as generalized anxiety, separation anxiety, and panic disorder, and disruptive behavior disorders such as oppositional defiant, ADHD and conduct disorders (e.g., Egger et al., 2003; Kearney, 2002; Kearney & Albano, 2004; McShane, Walter, & Rey, 2001). Studies also indicate many school refusers suffer from comorbidity mental health diagnoses (e.g., Kearney, 2002; McShane et al., 2001).

Truants—Limited studies were found in the literature on mental health problems among truant youths. Hodges and Kim (2000) found mixed results about the association between truancy (youths reported by their parents to attend school 75% or less of the time) and mental health. Their results indicated truant youth did not significantly differ from non-truant youth in their total scores on the Child Behavior Checklist (CBCL; Achenbach, 1991), an instrument used to assess mental health and antisocial behavior problems. Truant youths were more likely, however, to have higher levels of impairment in their general functioning (school, work, home, community, substance use, interaction with others, etc.), which included mood/emotional functioning. As mentioned, Hodges and Kim's study used total scores on the CBCL, which was comprised of 118 items for various mental health problems like depression and anxiety as well as conduct problems like oppositional defiance and conduct disorder. Due to the crude measurement of mental health problems, which may be completely confounded by the other domains included in the total scores of these scales, the nature of the potential association between mental health and truancy is unclear. The present study examines four specific domains of mental health problems (ADHD, anxiety, depression, and mania) and may offer more clarification than Hodges and Kim's study as to how mental health problems vary among truant youth.

In a second study of mental health problems and truancy, Steinhausen, Muller, and Metzke (2008) compared levels of mental health problems among school refusers (youths who indicated they were afraid of attending school), truant youths (youths who indicated that they skipped/cut classes), and control youths (those not identified as school refusers or truants). Steinhausen et al. used the Youth Self Report (YSR), which is a version of the CBCL for self-reporting among older children and adolescents. The YSR contained 112 items describing symptoms of anxiety, somatic complaints, depression, attention problems, social problems, and conduct problems that can be combined into two indexes of internalizing and externalizing problems. Steinhausen et al.'s mean comparisons indicated school refusers suffered from significantly higher levels of internalizing mental health problems, including anxiety and depression, than either truants or control youths. Truants were significantly more likely to demonstrate externalizing problems, than school refusers or control youths. Steinhausen et al.'s study is limited, however, by the way truancy was defined (affirmative response to one question about cutting class). Similar to Hodges and Kim's study (2000), the measures of mental health problems were crude composite indicators, preventing examination of specific domains of mental health functioning. Moreover, Steinhausen et al.'s study relied on responses to two questions to classify youth as school refusers, truants, or control youth. Since truancy is a legal term, it is important to categorize youth as truant based on definitions recognized by legal and school authorities. The present study utilizes a sample of youths identified as truant by local law enforcement and school authorities, and as such offers a more valid measure of truancy than other studies of mental health among truant youth.

School and Truant Youths' Mental Health

Scholars have long recognized the effect that school environment has on student attitudes and behavior (see Berg, 1992; Thapa, Cohen, Guffey, & Higgins-D'Alessandro, 2013). Studies have shown the school environment can influence student school performance, behavior, and health (e.g., Markham, Aveyard, Bisset, Lancashire, Bridle, & Deakin, 2008; Markham, Young, Sweeting, West, & Aveyard, 2012; Mortimore, Sammons, Stoll, Lewis, & Ecob, 1988; Rutter, Maugham, Mortimore, & Ouston, 1979; West, Sweeting, & Leyland, 2004). This research on school setting and student health generally focuses on two areas: substance use and mental/emotional health.

A respectable body of research has examined the connection between school setting and student substance use (i.e., tobacco, alcohol, marijuana, and other drugs). Generally, a positive school environment is associated with lower substance use (e.g., Kasen, Johnson, & Cohen, 1990; LaRusso, Romer, & Selman, 2008). In a review of the multilevel effects of school environment on student health, as indicated primarily by substance use (though one study included in the review looked at physical activity as a health indicator, not substance use), Bonell et al. (2013) identified 42 studies. Of these, Bonell et al. considered only 10 studies as statistically rigorous enough (i.e., utilizing multilevel regression controlling for covariates) to deserve detailed review. Their review found schools implementing more authoritative principles improved student-level academic attainment and lowered student-level truancy. Importantly, such schools also reduced risk for student-level substance use (or poor health).

Research has also demonstrated an association between school environment and student mental/emotional health. Individual level and multilevel studies indicate students who attend better school environments are at reduced risk of demonstrating mental health problems (e.g., Briere, F. N., Pascal, S., Dupere, V., & Janosz, M., 2013; Joyce & Early, 2014; Kasen, Cohen, Chen, Johnson, & Crawford, 2009; Kasen et al., 1990; LaRusso et al., 2008; Kuperminc, Leaderbeater, & Blatt, 2001; Roeser, Eccles, & Sameroff, 1998; Shochet, Dadds, Ham, & Montague, 2006; Way, Reddy, & Rhodes, 2007). Evidence from school interventions targeted to improve school settings, however, show mixed results for the benefits of school context on student mental health. In a review of 39 multilevel studies that examined the association between environment and student health, where an intervention was implemented to improve the school setting, Kidger et al. (Kidger, Araya, Donovan, & Gunnell, 2012) found inconsistent support for the contention that school environment can shape and benefit student-level mental health.

While the literature contains many studies of the association between school and student health, to the authors' knowledge, there is no research that addresses whether school affects mental health among truant youth, specifically. That is, there is no research that examined multilevel differences in mental health problems among truants across school settings. The present study offers a preliminary step toward addressing this gap in the literature. The present exploratory multilevel analysis sought to answer the following two questions. First, is the factor structure of truant youths' emotional/psychological functioning similar at the individual and school levels (middle vs. high school)? Second, how do covariates for the adolescents (at individual-level) and type of school (at school-level) affect truant youths' emotional/psychological functioning? Following a discussion of the results, research and service implications are considered.

Method

Study procedures were approved and monitored for ethics by the university Institutional Review Board. Participants were involved in a NIDA-funded, prospective longitudinal intervention for truant youth involved in substance use, known as the Brief Intervention (BI) project (see Dembo, Briones-Robinson, Schmeidler, et al., in press). The BI was adapted from previous work using brief intervention on drug-abusing youth (Winters & Leitten, 2007) and designed to promote abstinence and prevent relapse among drug-using adolescents. Youths receiving the intervention were taught to develop adaptive beliefs and problem-solving skills derived from elements of Motivational Interviewing, Rational-Emotive Therapy, and Problem-Solving Therapy. The BI services were free, voluntary, and home-based.

Youths were recruited for the project from the truancy center, a school-based center located in a large urban area in the southeastern U.S. where truant youth are detained during school hours, and a community diversion program. Youth are brought to the truancy center by local law enforcement. Law enforcement officers detain and transport any youth reported as truant by the local school district and any youth they encounter in the community during school hours without authorization to be absent from school. The school district in the study location considers any student with five or more unexcused absences to be truant (Dembo &

Gulledge, 2009). Research staff explained the study, collected assent and consent documents, and obtained baseline interview data on youths and their parents/guardians who were interested in the project and met eligibility criteria. After baseline data were collected, participants were randomly assigned to one of three intervention conditions: (1) BI-youth only (BI-Y), (2) BI-youth plus one parent session (BI-YP), or (3) standard truancy services (STS). The present study analyzed baseline data collected on these youths and their parents/guardians.

Participants

Eligibility for the participants in this study was based on already established criteria as part of the BI project. Eligible youths met the following criteria: (1) age 11 to 17 years at time of baseline, (2) less than two misdemeanor arrests on official criminal record, (3) alcohol or other drug use, as determined by a screening instrument (Personal Experience Screening Questionnaire [Winters, 1992]) or as reported by a school or truancy center social worker, and (4) lived within 25-mile radius of the truancy center. The total sample consisted of 300 youths, who were enrolled and completed baseline interviews between March 2, 2007 and June 22, 2012.

Assessment Procedures

Each youth and parent was paid \$15 for completing the in-home, baseline interview. On average, youth interviews took one hour to complete, and parent interviews took 30 minutes to complete.

Measures

Data collection instruments—Baseline interviews relied on use of the Adolescent Diagnostic Interview ([ADI], Winters & Henly, 1993), and the Adolescent Diagnostic Interview- Parent/Guardian ([ADI-P], Winters & Stinchfield, 2003) instruments. Both the ADI and ADI-P were designed to be delivered within a highly structured and standardized format (e.g., most questions are yes/no) to capture *DSM-IV* criteria for substance use disorders and related areas of functioning. These instruments have demonstrated strong reliability and validity involving over 1000 drug clinic adolescents for the ADI and approximately 200 parents/guardians for the ADI-P (Winters & Henly, 1993; Winters & Stinchfield, 2003).

Covariates for participants and family—Baseline information was collected on the youths' socio-demographic characteristics, living situation, parent reports of annual income, substance use, self-reported, past year delinquency, and sexual risk behaviors. These variables were used as covariates in the multilevel analyses. Following is a description of these covariates.

Socio-demographic characteristics: Several socio-demographic covariates were used in this study. Age was measured in number of years at baseline interview. The average age was 14.8 years. Gender was dummy coded with male as the reference category (1 = female, 0 = male). Most of the youth were male (63%). Since this study took place in the southeast U.S. where the population contains a high proportion of Hispanic and minority residents, it was

important to measure both race and ethnicity (Hispanic). Race was a dummy variable, where 1 = African American and 0 = other race. Ethnicity was also a dummy variable, where 1 = Hispanic and 0 = non-Hispanic. The youths indicated they were primarily white (non-Hispanic), African-American (non-Hispanic), and Hispanic. Table 1 shows the distributions of the youths' demographic characteristics, as well as the other baseline covariates used in this study.

Living situation: Youths and their parents provided information regarding the living situation for the youths at baseline. Few youth resided with both biological parents. Most youths lived with their biological mother, either as the sole parent or along with another adult, such as a stepfather or boyfriend. For the analyses, a measure of the living situation at baseline was created, where 1= living with birth mother alone and 0 = other living arrangement. The coding for this measure reflects research indicating children growing up in one biological parent households are more likely to experience adverse family events, such as neighborhood violence or an alcohol/drug problem (U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2014).

Family income: Parents reported on their annual family income at baseline interview. The majority of the families in the study reported modest annual incomes. A family income covariate was created, where values ranged from 1 = less than \$5,000 to 6 = more than \$75,000.

Marijuana use: Marijuana use at baseline was measured through self-report questions on the ADI and urine tests (UA). The self-report questions probed ever using marijuana as: never, less than five times, or five or more times. Urine specimens for drug use were collected with the Onsite CupKit® urine screen procedure, where for marijuana (THC) positive tests thresholds were 50 ng/ml of urine and surveillance windows were 5 days for moderate use, 10 days for heavy use, and 30 days for chronic use.

The self-report and urine test results for marijuana were combined to create a measure of marijuana use at baseline. Marijuana use was coded into five categories: (1) use denied and UA (7%); (2) use denied and UA missing (due to reasons beyond the youth's control [e.g., incarcerated]: 0.3%, or not due to reasons beyond the youth's control [e.g., participant refusal]: 0.3%); (3) self-reported use one to four times, but UA missing or negative (17%); (4) self-reported use five or more times, but UA test missing or negative (29%); and (5) UA positive (46%; 98% of which self-reported use). Since there were very few cases in the "Denied use, urine test missing" category, these cases were placed in the "Denied use, urine test negative" category. Table 1 presents these results. (Data were also collected use of alcohol and other illicit substances, in addition to marijuana. Few to none of the youths' self-reported use of substances other than marijuana and alcohol, and urine tests confirmed little to no use of substances other than marijuana but could not test for alcohol use. Consequently, marijuana was the only indicator of substance use included in this study.)

Self-reported delinquency: Youths were asked to self-report their involvement in 23 delinquent behaviors in the year prior to the baseline interview date. The 23 items include acts of disorderly conduct, pan-handling, theft, possession of stolen goods, motor vehicle

theft, burglary, robbery, weapon possession, simple assault, aggravated assault, sexual assault, prostitution, gang involvement, and drug sales. These questionnaire items were based on the work of Elliott, Ageton, Huizinga, Knowles, and Canter (1983), and included a validity check for frequent reports of each behavior where youths who reported committing an act 10 or more times were also asked to indicate how often they participated in this behavior (once a month, once every two or three weeks, once a week, two to three times a week, once a day, or two to three times a day). Following Elliott et al. (1983), five summary indices of delinquent behavior (i.e., general theft, crimes against persons, index crimes, drug sales, and total delinquency) were initially developed. Correlations between the five alternative measures of delinquency were strong and statistically significant (mean $r = .60$). Consequently, only total delinquency was used in the present study.

The distribution of the total delinquency measures was non-normal, with some youths reporting no delinquent behavior and others reporting several hundred (even thousands in a few cases). Therefore, this measure was transformed using logarithm to the base 10. Since the logarithm of 0 does not exist, the score of -1 was added to total delinquency before taking the log. This evaluates the difference between no offense and 1 offense as equal in importance as the difference between 1 offense and 10, or between 10 offenses and 100 (Dembo & Schmeidler, 2002). Skewness (-0.32) and kurtosis (0.38) of the log transformed measure of total delinquency were substantially lower than those of the untransformed measure (6.23 and 46.71 , respectively).

Sexual risk behaviors: Youths were also asked to self-report their lifetime involvement in sexual risk behavior at baseline using the POSIT HIV/STD Risk Behavior instrument (Young & Rahdert, 2000). This 11-item instrument has been pilot tested and found to have very good psychometric properties (e.g., internal consistency = 0.80 , one-week test-retest reliability = 0.90 ; concurrent validity with the Sexual Risk Questionnaire scores: $r = 0.80$). Research examining the association between sexual risk behaviors and other problem behaviors has commonly used the sexual risk factors of lack of condom use and number of sexual partners (Brook, Balka, Abernathy, & Hamburg, 1994; Bryan, Ray, & Cooper, 2007; Cooper, 2002; Elkington, Bauermeister, Brackis-Cott, Dolezal, & Mellins, 2009; Goldstein, Barnett, Pedlow, & Murphy, 2007; Komro, Tobler, Maldonado-Molina, & Perry, 2010; Morris, Baker, Valentine, & Pennisi, 1998; Morris, Harrison, Knox, Tromanhauser, & Marquis, 1995; Murphy, Brecht, Herbeck, & Huang, 2009; Wetherill & Fromme, 2007; also see, de Guzman & Bosch, 2007; Warren et al., 1998). Hence, a measure of youths' involvement in sexual risk behaviors was created by summing the number of affirmative responses to four indicators: had sexual intercourse, had sexual intercourse without using a condom, had sex with two or more people, and had a sexually transmitted disease. Table 1 reports the proportion of youth providing affirmative responses to the four items of sexual risk behavior, as well as the summary measure for the number of sexual risk behaviors used in the analyses. Since relatively few youth who reported having an STD, the summary measure was recoded to include youth reporting all four sexual risk behaviors into category three of this ordinal measure. Comparison of the prevalence of sexual risk behaviors for participants in this study with findings reported in the Centers of Disease Control's Youth Risk Behavior Surveillance (CDC, 2009, 2011) indicates a much higher rate of sexual

intercourse among youths in our study, than that reported by youths in the YRBS nationally (47%) or in Florida (overall, 48%; 9th grade, 31%; 10th grade, 45%; 11th grade, 57%). This result is consistent with the expectation that truant youth engage in sexual risk behavior at a higher rate than the general youth population.

Level of school—The movement from middle school to high school has been found to be an important transition point in youth psychological/emotional, physical, and interpersonal development (e.g., Blyth, Simmons, & Carlton-Ford, 1983; Eccles et al., 1993; Seidman, Allen, Aber, Mitchell, & Feinman, 1994). Therefore, differences in mental health and emotional problems among truant youth may be expected when comparing middle school versus high school. At entry into the study, almost all youth were attending middle schools (36%) or high schools (58%). Ten youth (3%) were attending elementary school, 7 youth (2%) were attending combined schools (e.g., virtual school or exceptional student educational centers), and the type of school attended could not be determined for two youth (0.7%). Hence, the two-level analysis focused on distinguishing differences in youth across two levels of school: middle school (coded 1) versus high school (coded 0). That is, youths were divided into two groups, middle school versus high school. The multilevel analyses examined differences in the outcome variables and covariates across these two levels (groups) of schooling.

Emotional/mental health functioning factors—The youth reported relatively high rates of emotional or mental health issues. The ADI contains multiple questions for mental health issues in various functioning domains that are linked to *DSM-IV* criteria. Four domains of mental health problems for ADHD, anxiety, depression and mania-like were created from items in the ADI. For each item in the ADI, youth not reporting the experience were coded as 0, those reporting the experience were coded as 1. Each of the mental health measures was created using exploratory and confirmatory factor analyses using maximum likelihood (ML) and Bayesian estimation procedures. The resulting factor scores representing four domains of mental health functioning were then used in the multilevel analyses reported in this study.

Maximum likelihood estimation procedures are extensively used in statistical analyses. For ML estimation, the comparative fit index (CFI) and the Tucker-Lewis index (TLI) were used to evaluate model fit. The typical range for both CFI and TLI is between 0 and 1, although the TLI may achieve values slightly greater than 1, with values greater than .90 indicating an acceptable fit and values greater than .95 indicating a good fit (Hu & Bentler, 1999). In addition, model fit was assessed by the root mean square error of approximation (RMSEA); RMSEA values of .05 or less indicate a close model fit, and values between .05 and .08 indicate an adequate fit (Browne & Cudeck, 1993).

In recent years, Bayesian analysis has become popular as well. Bayesian estimation is a preferred approach for analyzing relatively complex models, especially when data are sparse or samples are small, where asymptotic distributions underlying ML estimation procedures are unlikely to hold (Lynch, 2010; Rupp, Dey, & Zumbo, 2004; Scheines, Hoijtink, & Boomsma, 1999). When samples are large, the results of maximum likelihood and Bayesian analysis tend to be similar. Two estimates of model adequacy are important in Bayesian

analysis: convergence and mixing, and model fit. In Bayesian analysis, Markov chain Monte Carlo (MCMC) estimation algorithms are used to make random draws of parameter values, resulting in an approximation to the joint distribution of all parameters in the analysis. Usually, several MCMC chains are used, involving different starting values and different random seeds in making the random draws (Muthén & Asparouhov, 2010; see also Lynch, 2010). The Gelman-Rubin diagnostic (Gelman & Rubin, 1992; see also Gelman, Carlin, Stern, & Rubin, 2004), referred to as the potential scale reduction (PSR) factor, is often used to assess convergence-mixing. A PSR value close to 1 and below 1.1 is considered as evidence that convergence and adequate mixing have been achieved. Convergence and mixing refer to the degree to which the MCMC algorithm produces a Markov chain that “converges” to the appropriate posterior density (i.e., reaches a stationary distribution), and that “mixes” well throughout the support of the density” (Lynch, 2010, p. 132).

Model fit refers to assessing whether the model fits the data well enough to permit the drawing of inferences about the parameters (Lynch, 2010). One of the best approaches for examining model fit is posterior predictive distribution checking, introduced by Gelman, Meng, Stern, and Rubin (1996) and refined by Gelman et al., (2004). As implemented in Mplus (Muthén & Muthén, 1998–2012), a posterior predictive p-value (PPP) fit statistic is based on the commonly used likelihood-ratio chi-square test of an H0 model against an unrestricted H1 model (Muthén & Asparouhov, 2010). A low PPP value [e.g., .05 or .01 (see Asparouhov & Muthén, 2013)] indicates a poor fit, with values around 0.5 reflecting an excellent fit.

Attention deficit hyperactivity disorder: As reported in Table 2, four questions reflecting *DSM-IV* criteria for ADHD were included in the youth ADI interviews (Winters & Henly, 1993). Many of the youths in this study indicated the presence of one or more ADHD symptoms. Confirmatory factor analysis, using ML and Bayesian estimation, was used to assess how well a one-factor model for the four ADHD items fit the data (Muthén & Muthén, 1998–2012, version 7.11). As Table 3 shows, ML results indicated a good fit of the single factor model for ADHD to the data. Bayesian estimation also confirmed the existence of a one factor model, with each item being significantly loaded on the factor, and a good fit of the model to the data. Based on these results, an ADHD factor score was created for use in further analyses.

Anxiety: The youths also expressed anxiety about their futures, the safety of their parents, social phobia, and academics/peers. Confirmatory factor analysis of the four anxiety items indicated the items were significantly loaded on one factor. However, the distribution of these data did not meet the asymptotic distribution assumptions of ML, with a resulting poor model fit. On the other hand, Bayesian estimation confirmed the existence of a one-factor model. Based on these results, an anxiety factor score was created for use in further analyses.

Depression: As shown in Table 2, many youths reported experiencing symptoms of depression. Confirmatory factor analysis of the five depression items indicated they were significantly loaded on one factor. However, the distribution of these data did not meet the asymptotic distribution assumptions of ML, with a resulting poor model fit. On the other

hand, Bayesian estimation confirmed the existence of a one-factor model, with a good fit of the model to the data. Based on these results, a depression factor score was created for use in further analyses.

Mania-like symptoms: Finally, the youth reported problems with mania-like symptoms at baseline. Confirmatory factor analysis, using ML and Bayesian estimation, of the five mania-like items indicated a very good fit for a single factor model, with all items loading significantly on the factor. Bayesian estimation also confirmed the existence of a one factor model. Based on these results, a mania-like factor score was created for use in further analyses.

Analysis Strategy

As noted earlier, the goals of this study were to: (1) determine whether or not the factor structure of truant youths' mental health functioning was similar at the individual and school levels (middle vs. high), and (2) examine how individual- and school-level covariates affect truant youths' mental health functioning. To examine these goals, a two level CFA using Mplus version 7.11 (Muthén & Muthén, 1998–2012) was performed (Snijders & Bosker, 2012). The estimator for the CFA analysis was maximum likelihood with robust standard errors (MLR). The individual-level (i.e., within) part of the model involved a CFA of the four mental health functioning variables discussed earlier (i.e., ADHD, depression, anxiety, and mania-like symptoms). The two level CFA also assessed the factor structure of the youths' mental health functioning measures at the school-level (i.e., between) (Brown, 2006). The two-level CFA involved continuous factor indicators. Both the within and between levels of the model involved random intercepts. For the MLR estimation, in addition to the chi-square test of model fit, the CFI and RMSEA were used to assess model fit. The two level CFA model tested is shown in Figure 1. In the within part of the model, the filled in circle reflects random intercepts. The random intercepts are indicated by variables contained in circles in the between part of the model, since they represent continuous latent variables that vary across clusters.

Two-Level Confirmatory Factor Analysis Result

Table 4 presents the results of the estimated two-level CFA model. Results indicate an excellent fit of the model to the data (chi-square = 3.164, $df = 4$, $p = 0.531$; CFI = 1.000; RMSEA = 0.000). Each of the mental health variables was significantly loaded on the factor at the within level. (In an interim study, involving a CFA of the four mental health functioning variables among 183 truant youth in this study, a single mental health issues factor was also found at the within level [Dembo et al., 2013].)

At the between level, however, only ADHD and depression loaded significantly on the mental health functioning factor, suggesting no common factor existed among the four mental health functioning measures at the between level. Additional CFA analyses at the within level, specifying equal factor loadings, found the tau-equivalent model did not fit the data. (Due to space concerns, a table reporting these results has been omitted.)

Results also indicated the design effects (Muthén & Satorra, 1995) of the two-level analysis was low (e.g., 1.33 for depression, which had the largest intraclass correlation), mainly due to the relatively small average cluster size (4.76). Intraclass correlations for the four mental health functioning measures were: ADHD (0.072), mania-like symptoms (0.086), depression (0.087), and anxiety (0.050). However, for conceptual reasons, and in line with the exploratory nature of the study, the two-level model design was retained (Hayes, 2006).

Two Level Confirmatory Factor Analysis with Covariates

As noted earlier, a covariate analysis of the two-level CFA results was conducted. MLR estimation indicated a poor fit of the model to the data. However, Bayesian estimation indicated an acceptable model fit. The PSR value was 1.072. Although no PPP statistic was produced by the analysis, Kolmogorov-Smirnov tests of equality of the posterior parameter distributions across the different Monte Carlo Markov chains did not identify any problematic parameters (i.e., those with significantly low p-values).

The results are presented in Table 5. At the within level, younger aged youth, females, youth living in households with lower incomes, non-Hispanic youth, youth reporting less marijuana use at baseline, youth reporting they engaged in more sexual risk behaviors at baseline, and youth reporting their involvement in more delinquent behavior at baseline reported significantly more mental health issues.

Since the CFA identified no common mental health functioning factor at the between level, each of the mental health measures was regressed on whether the youth attended middle or high school. As the results indicate, youth attending middle schools reported significantly more ADHD symptoms, than those attending high schools at entry into the study. Possible reasons for this result are considered in the discussion section.

Discussion

This study underscores the importance of efforts to address the mental health needs of truant adolescents. Truant youth represent a segment of the youth population at risk of developing future social and economic difficulties, including school failure and involvement in the criminal justice system. A respectable body of literature has examined mental health issues among student populations in general, but fewer studies have examined mental health issues among truant youth in particular. This study utilized multilevel modeling, involving confirmatory factor and covariate analyses, to examine two research questions related to mental health functioning among the sample of truant youth. Although limited due to its exploratory nature, the present study revealed student-level and school-level differences in mental health problems and covariates among truant youth.

First, this study examined differences in the factor structure of truant youths' emotional/psychological functioning at the individual and school levels. Results indicated differences in the factor structure of mental health problems for the student-level and school-level. A single-factor model of mental health problems, comprised of ADHD, anxiety, depression, and mania-like symptoms, fit the data well at the student-level. That is, the truant youth in the sample could be described as possessing comorbid issues of mental health difficulties.

As mentioned, the psychological literature on school absenteeism generally emphasizes school refusers, not truants, suffer from mental health difficulties, since school refusers are thought to be motivated to absenteeism due to mental health issues. But research has found that truant youth also suffer from mental health problems (e.g., Hodges & Kim, 2000; Steinhausen et al., 2008), though the magnitude and nature of emotional problems among truant youths may differ from those among school refusers. Importantly, the data in this study do not indicate that the youths' school absenteeism was directly related to their mental health problems, only that the youths were truant and possessed mental health problems. As mentioned in the method section, the youths were recruited from a truancy center, but data were not available for frequency of absences from school for each youth in the study. Moreover, longitudinal data on both school attendance and mental health symptoms were not available in this study to permit examination of the causal relationship between mental health and absenteeism. Future studies should examine the nexus between mental health symptoms and absenteeism among truants, with a focus on collecting longitudinal data to determine causality. If youth are truant because of mental health related issues, schools should develop ways to identify and assist youth with resolving their mental health issues. If youth are truant and experience mental health problems but the two concepts are not causally related, schools should develop methods to identify and treat both issues separately.

At the school-level, the data did not fit a single-factor model of mental health problems. ADHD and depression were the only significant indicators in a single-factor model of poor mental health at the school-level. Since school-level was defined as either attending middle or high school, the findings suggest that there are structural differences in mental health functioning across middle and high school for the truant youth in this study. These differences will be discussed in more detail below. While the design effects for the two level analysis were small, the two level design was maintained to explore school-level differences in covariates on the mental health measures.

Second, this study examined how covariates for the adolescents and level of school affected truant youths' emotional/psychological functioning. Covariate analyses indicated that, at the within level, younger aged youth, girls, youth living in households with lower incomes, non-Hispanic youth, youth less involved in marijuana use at baseline, youth reporting they engaged in more sexual risk behaviors at baseline, and youth reporting more involvement in delinquent behavior at baseline reported significantly more mental health issues at their initial interviews. Finding that truant girls and youths with lower household incomes report more emotional/psychological problems than boys and youth with higher incomes, respectively, is consistent with the concept of relative deviance (see, for example, Dembo & Shern, 1982), which asserts that youth who are "deviant" from the norms of their social and cultural setting in their truancy are likely to reflect more emotional/mental difficulties, than youth who follow these norms. Since boys are, overall, more likely to be truant than girls, girls who become involved in truant behavior are likely to have more psychological issues. Relatedly, higher income families tend to support norms relating to school attendance and performance. Hence, truant youth from lower income families are more likely to be experiencing emotional/psychological issues. The findings that youth who are more involved in sexual risk behavior and delinquency report more emotional/psychological problems is consistent with the literature reviewed earlier, and with the problem behavior syndrome

work of Jessor and Jessor (1977), who found that youth psychosocial problems tend to be interrelated.

Regression analysis at the between (school) level indicated truant youth attending middle school at baseline reported significantly more ADHD issues, than youth attending high schools. Research indicates the transition from primary (elementary) to secondary (middle/junior and high schools) schools can be difficult for youth (Blyth et al., 1983; Eccles et al., 1993; Seidman et al., 1994). The expectations for students change from elementary school to middle school, with students in middle school expected to be more self-motivated and independent in their learning and teacher-student interactions being less personal and positive. Consequently, the transition from primary to secondary school can have a negative impact on students' self-esteem and mental health (Blyth et al., 1983; De Wit, Karioja, Rye, & Shain, 2011; Kuperminc et al., 2001; Seidman et al., 1994). Students with ADHD symptoms, in particular, may find the transition from primary to secondary school challenging because they are less likely to possess attention and organization skills that assist in a successful transition. These transitional difficulties have been shown, however, to improve over the course of middle school (Wigfield, Eccles, Mac Iver, Reuman, & Midgley, 1991), which may help explain the school-level differences found for ADHD problems. Additional research on truancy, mental health, and school level is needed. If further research confirms the results of this study that truant youths at the middle school level demonstrate significantly more ADHD problems than those in high school, this can influence policy. For example, a few studies have suggested that parental and social support/attachment may moderate the effects of school setting on mental health problems among students (e.g., Duchesne, Ratelle, Poitras, & Drouin, 2009; Wenz-Gross, Siperstein, Untch, & Widaman, 1997). Therefore, schools and truancy programs may wish to develop interventions that encourage and strengthen family and non-family support networks for youths with school attendance problems.

This study has several limitations. First, there were limitations due to the nature of the sample, which consisted of truant youth picked up by law enforcement or placed in a diversion program. Hence, the results of the study may not generalize to entire population of truant youth in the school the sample of youth attended. Second, our analyses involved cross-sectional data, preventing any statements regarding the direction of the reported relationships. At the same time, this exploratory study suggests that school level be considered a possible important factor in truant youth behavior problems and their mental health. Third, the participants in this study were voluntary. As such, there may be differences in this sample that make it difficult to generalize these findings to other non-voluntary samples. Hopefully, future research will further explore, and clarify these issues.

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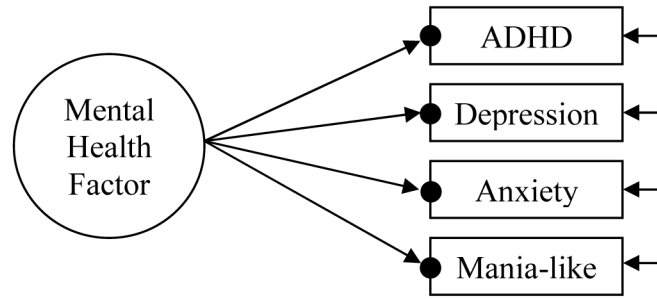
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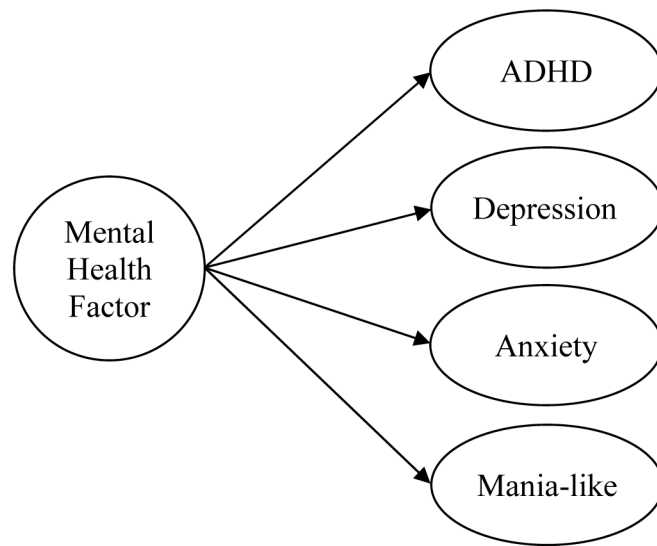
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Level 1: Within level



Level 2: Between level

Figure 1.
Two-Level Confirmatory Factor Analysis of Youths' Mental Health Issues

Table 1

Information of Youths and Family Covariates at Baseline (n = 300)

<i>Age:</i>	
11	1%
12	3%
13	11%
14	22%
15	37%
16	13%
17	11%
18*	<1%
	<u>98%</u>
<i>M</i> = 14.80 (<i>SD</i> = 1.30)	
<i>Family income range (n = 297):</i>	
\$5,000 or less	5%
\$5,001 to \$10,000	8%
\$10,001 to \$25,000	26%
\$25,001 to \$40,000	28%
\$40,001 to \$75,000	23%
\$75,001 or more	<u>10%</u>
	100%
<i>Self-reported total delinquency:</i>	
0	6%
1–4	22%
5–29	38%
30–54	12%
55–99	7%
100–199	7%
>200	<u>8%</u>
	100%
<i>Marijuana use for youth:</i>	
Denied use, urine test negative	7%
Denied use, urine test missing	<1%
Reported use 1–4 times, urine test negative/missing	17%
Reported use 5 or more times, urine test negative/missing	29%
Urine test positive	<u>46%</u>
	100%
<i>Gender:</i>	
Female	37%
Male	<u>63%</u>
	100%
<i>Race/ethnicity:</i>	

Asian	1%
African-American	26%
Hispanic	29%
Anglo	37%
Other	<u>7%</u>
	100%
<i>Youth lived with:</i>	
Birth mother and father	17%
Birth mother alone	33%
Birth mother and stepfather/boyfriend	23%
Birth mother and relative/friend	10%
Birth father alone	3%
Birth father and stepmother/girlfriend	4%
Adoptive parents	3%
Grandparent(s)	4%
Other arrangement	<u>3%</u>
	100%
<i>Sexual risk behavior (n = 299):</i>	
Sexual intercourse	67.0%
Sexual intercourse no condom use	33.3%
Sex with two or more people	29.7%
Sexually transmitted disease	2.7%
<i>Number of sexual risk behaviors:</i>	
0	32.4%
1	23.7%
2	23.7%
3	18.7%
4	<u>1.3%</u>
	99.8%

Note.

* Turned 18 after enrollment, but before baseline interview.

Table 2

Percent of Truant Youth Reporting Various Mental Health Issues (n = 299 or 300)

Mental Health Issue	Affirmative Response
<i>Attention Deficit Hyperactivity Disorder (ADHD):</i>	
Do you find that you are the type of person who often gets complaints from parents or teachers that you don't listen to instructions or direction?	56%
Do you frequently tend to act before thinking?	70%
Do you often have difficulty waiting for your turn during games or when doing things with other people your age?	32%
Do you often fidget and find it difficult to sit still?	52%
<i>Anxiety:</i>	
Do you worry a great deal when you are away from home that something bad might happen to your parents?	40%
Do you often refuse to go to school because you are afraid that something bad will happen to your parents or some other important person?	10%
Do you ever worry a lot about how well you are doing as a student or whether you have enough friends?	41%
Do you worry a great deal about how future events will turn out?	63%
<i>Depression:</i>	
Has there ever been a continuous 2 week time period during which you felt sad or down most of the time--as if you didn't care anymore about anything?	56%
Have you ever continuously felt like crying for several days in a row?	36%
Have you ever had any trouble sleeping that lasted for many days?	43%
Have you ever felt so down that you felt like ending your life?	24%
Have you ever actually attempted suicide?	8%
<i>Mania-Like:</i>	
Has there ever been a period of time of at least several days, during which time you were not using alcohol or other drugs, when you felt on top of the world -- as though you had special abilities or superhuman talents?	24%
During such a period, when you were not using alcohol or drugs, have you ever felt that you had tremendous energy, like that of a superperson?	34%
During such a period, when you were not using alcohol or drugs, did you ever feel as though your thoughts were racing?	38%
During such a period, when you were not using alcohol or drugs, did you ever feel that you could go for a long time period without sleep?	32%

Table 3
 Confirmatory Factor Analysis Results for Emotional or Psychological Functioning Scale

Variable	Maximum Likelihood					Bayesian Estimation		
	Chi-Square	df	p-value	CFI	TLI	RMSEA	PSR	PPP
ADHD	0.614	2	0.736	1.000	1.021	0.000	1.062	0.547
Anxiety	37.728	2	0.000	0.824	0.472	0.244	1.069	0.222
Depression	30.481	5	0.000	0.961	0.922	0.130	1.006	0.333
Mania-like	9.173	5	0.100	0.981	0.962	0.053	1.012	0.463

Note. ADHD = Attention Deficit hyperactivity Disorder. CFI = comparative fit index. TLI = Tucker-Lewis index. RMSEA = root mean square error of approximation. PSR = potential scale reduction. PPP = posterior predictive p-value.

Table 4

Two-Level Confirmatory Factor Analysis of Youths' Mental Health Issues (n = 281). MLR Estimation

Measures	Estimate	S.E.	Critical Ratio
<i>Within level:</i>			
Mental health factor BY:			
ADHD mean	1.000	0.000	---
Anxiety mean	1.246	0.569	2.192 *
Depression mean	2.987	0.772	3.868 ***
Mania-like mean	1.261	0.479	2.635 **
Variances			
Mental health factor	0.061	0.017	3.498 ***
Residual variances			
ADHD mean	0.165	0.023	7.278 ***
Anxiety mean	0.680	0.081	8.348 ***
Depression mean	1.143	0.261	4.377 ***
Mania-like mean	0.417	0.050	8.342 ***
<i>Between level:</i>			
Mental health factor BY:			
ADHD mean	1.000	0.000	---
Anxiety mean	0.743	2.667	0.279
Depression mean	3.021	1.034	2.922 **
Mania-like mean	1.509	2.219	0.680
Intercepts			
ADHD mean	0.009	0.039	0.230
Anxiety mean	-0.029	0.056	-0.529
Depression mean	-0.003	0.103	-0.028
Mania-like mean	0.043	0.054	0.792
Variances			
Mental health factor	0.017	0.018	0.928
Residual variances			
ADHD mean	0.001	0.022	0.050
Anxiety mean	0.015	0.026	0.593
Depression mean	0.005	0.302	0.015
Mania-like mean	0.003	0.060	0.052

Note. Chi-square = 3.164, df = 4, $p = 0.531$; RMSEA = 0.000; CFI = 1.000.

Two-tailed p -value:

* $p < .05$;

** $p < .01$;

*** $p < .001$.

Table 5

Two-Level Confirmatory Factor Analysis of Youths' Mental Health Issues with Covariates (n = 278). Bayesian Estimation

Covariate	Estimate	Posterior S.D.	One-tailed p-value
<i>Within level:</i>			
Age	-0.032	0.022	0.018
Gender (1 = female)	0.196	0.044	0.000
Family income	-0.032	0.017	0.028
Lives with mother	0.043	0.043	0.146
African American	-0.038	0.051	0.223
Hispanic	-0.086	0.046	0.025
Marijuana use at baseline	-0.041	0.021	0.021
Sexual risk behavior at baseline	0.063	0.019	0.000
Self-reported delinquency at baseline	0.129	0.030	0.000
<i>Between level:</i>			
ADHD regressed on middle vs. high school	0.143	0.073	0.026
Depression regressed on middle vs. high school	0.131	0.198	0.259
Anxiety regressed on middle vs. high school	-0.003	0.129	0.490
Mania-like regressed on middle vs. high school	0.085	0.109	0.221

Note. Middle school was coded 1, while high school was coded 0 for between level analyses. Potential Scale Reduction (PSR) = 1.07; Kolmogorov-Smirnov tests identified no problematic parameters.