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Sexual Risk Behavior among Male and Female Truant Youths: Exploratory, Multi-Group Latent Class Analysis

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Abstract

Little is known of sexual risk behaviors among truant youths across gender. This study utilized latent class analysis to examined heterogeneity of sexual risk behaviors across gender among a sample of 300 truant adolescents. Results revealed two latent subgroups within gender: low vs. high sexual risk behaviors. There were gender differences in baseline covariates of sexual risk behaviors, with male truants in higher risk group experiencing ADHD (attention deficit hyperactivity disorder) problems, and female truants in higher risk group experienced marijuana use and depression symptoms. African-American race was a significant covariate for high sexual risk behaviors for both genders. Service and practice implications of sexual risk issues of truant youth are discussed.

Keywords: Sexual risk; Truants; Truancy; Marijuana use; Mental health; Delinquency; STI

Introduction

In the United States, truancy is a serious problem that affects most school districts. While there is not a uniform definition of truancy, it is generally defined from a legal perspective as unauthorized, intentional absence from compulsory schooling. The lack of a uniform definition for truancy makes research on truancy statistics challenging [1,2]. It is estimated, however, that greater than 10 percent of students are truant on a daily basis from U.S. school districts, with higher rates in urban schools [3-5].

Truancy presents an important public health concern because it has been linked to the development of a variety of negative behaviors [5]. Truancy is associated with poor educational outcomes, including poor standardized test performance and high school dropout [6-9] which may impact employment opportunities [10,11]. Truancy is negatively associated with family functioning [12; 13] and mental health functioning [13-15]. Furthermore, truancy is linked with the development of deviant behavior, including substance use [16,17], juvenile delinquency [18-21], and adult criminal offending [22-24].

Sexually transmitted infections [STIs] are another significant public health concern among adolescents. Adolescents are at increased risk of contracting STDs and engaging in risky sexual practices. According to the Centers for Disease Control and Prevention [25], adolescents and youth adults between the ages of 15 and 24 contract half of new STDs. Women and racial minorities demonstrate increased infection rates for STDs, compared to men and non-minorities [25], though the differential depends on the specific disease. Risky sexual behaviors are associated with increased risk of STI infection [25-31], particularly among adolescents.

It is well established that risky sexual behaviors and other problem behaviors, such as delinquency and substance use, coexist in adolescence [32-36]. Many years ago, [37] reported associations between risky sexual behavior and problem behaviors of violence, delinquency, and substance use. Importantly for the present study, their study is among one of the only to specifically demonstrate an association between truancy and sexual risk behaviors. More recently, [38] conducted a parallel growth model that found long-term problems from childhood through adolescence with self-reported delinquency and substance use lead to increased involvement in risky sexual practices in adolescence. Studies have also linked mental health problems such as conduct disorder, attention difficulties, anxiety, depression, and suicidal thoughts to sexual risk behaviors [38-45] conducted a cluster analysis of various at-risk behaviors, including sexual risk behaviors, over time across gender. Their study suggests gender differences exist in risky behaviors that include sexual risk behaviors.

Limited research has examined gender differences in sexual risk behaviors. Studies suggest gender differences exist in sexual risk behaviors [46, 47]. Many studies, however, offer insight into gender differences by examining gender-specific samples, not comparing differences across gender. Among the limited studies to examine gender difference in sexual risk behaviors, [48] found female adolescents were more likely to report inconsistent condom use and less likely to report having a casual sexual partner than boys. There were no gender differences in reports of multiple sexual partners. Adolescent girls were also more likely to test positive for an STI than boys. Furthermore, in a study of homeless adolescents, Tavendale, Lightfoot, and Slocum found girls were more likely to report engaging in unprotected sex and being diagnosed with an STI than boys.

There is a lack of research examining the longitudinal relationship between gender and sexual risk behaviors among truant youths. The present study completed a longitudinal analysis of sexual risk behaviors in a sample of 300 truant youths. This study addresses gaps in the literature in several ways. First, this study contributes to the limited—almost non-existent—literature on sexual risk behaviors among truant

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youths. Second, it expands upon the limited, but growing, body of research examining gender differences in sexual risk behaviors. Finally, this study contributes to longitudinal research on sexual risk behaviors.

Latent class analysis was used across gender to examine variation and identify subgroups of youths who differed in their experiences of sexual risk behaviors over five waves of data. These subgroups were compared on a variety of socio-demographic and problem behaviors associated with risky sexual acts. Results indicated two latent classes best fit the data across gender. Among male, truant adolescents, attention difficulties was a significant covariate for the high sexual risk behavior group. Among female, truant adolescents, marijuana use and depression were significant covariates of the high sexual risk behavior group. For both males and females in the high risk behavior groups, being African American was a key covariate. Service and practice implications from the findings of this study are discussed.

Methods

Procedures

All study procedures were approved and monitored for ethics by the university Institutional Review Board [IRB]. Participants were involved in a Brief Intervention [BI] project for truant youth involved in substance use. They were recruited for the project from the local truancy center, a school-based center where truant youth are held during school hours, guidance counselors in the local school district, and a community diversion program. Project staff met with recruited youth and their parent[s]/guardian[s] to provide an overview of the project and inform them the services were free, voluntary, and delivered in-home. For eligible and interested participants, an in-home meeting was scheduled to discuss the project, complete consent and assent processes, and conduct separate baseline interviews with the youth and parent.

Following baseline interviews, participants were randomly assigned to one of three project service conditions: BI-youth only [BI-Y], BI-youth plus an additional parent individual session [BI-YP], or standard truancy services [STS]. Data were also collected for an 18-month follow-up period. The follow-up period began the day after the date of the youth's last participation in project services [i.e., the last intervention or STS session]. Follow-up interviews were conducted at 3-months, 6-months, 12-months, and 18-months. Each youth and his/her parent/guardian was paid $15 for completing each in-home, baseline and follow-up interview. Youth interviews took approximately 60 minutes to complete, while parent interviews took 30 minutes.

Participants

Participants resided within a large urban area in the southeastern U.S., and were identified by authorities as truant. Eligible truant youths met the following criteria: 11 to 17 years old; two or fewer misdemeanor arrests; alcohol or drug use, as determined by a screening instrument [Personal Experience Screening Questionnaire [49] or as reported by a school or truancy center social worker; and residence within a 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.

Intervention conditions

Although the present study did not test the efficacy of the BI on truant youth, it was important to control for the effects of treatment. The goal of the BI was to promote abstinence and prevent relapse among drug-using adolescents. Adapted from previous work, the BI incorporated elements of Motivational Interviewing, Rational-Emotive Therapy and Problem-Solving Therapy to develop adaptive beliefs and problem-solving skills to improve positive coping mechanisms [50, 51] via problem-solving skills and support from the environment [52, 53]. Youths assigned to the BI-Y condition were administered two BI sessions, without a parent session; while those assigned to the BI-YP condition were administered two BI sessions and their parents were administered a separate parent BI session.

Youths randomly assigned to the STS condition received the normal truancy services provided by the local school district, as well as a referral service overlay of three weekly, 60-minute visits by project staff. For the referral service overlay, research staff provided participating families, upon request, with referral information contained in a comprehensive county government-developed agency and service resource guide. No form of counseling or therapy was offered in the STS condition.

Measures

Youth and family covariates at baseline

Covariates at baseline interview for socio-demographic characteristics, youth marijuana use, self-reported delinquency, youth mental health issues, family experience of stressful/traumatic events, and assignment to the BI or STS groups were included in the analyses. Table 1 reports the distributions of the socio-demographic and family covariates in the sample for each gender group. Following is a description of these measures (Table1).

Socio-demographic measures

A number of socio-demographic covariates were used in this study: *age* (in number of years); race (1 = African American, 0 = other); and ethnicity (1 = Hispanic, 0 = other). Most of the youth in the study were male. They averaged 14.8 years in age at entry into the study, and were racially and ethnically diverse. One significant male-female difference was found in these measures. More female than male youth were Anglo race; whereas more male than female youth were African American.

Who youth was living with

Information was obtained from the youth and parent interviews regarding with whom the youth resided at baseline interview. Relatively few youths were living with both of their biological parents (17%). On the other hand, a third of the youths were living with their birth mother alone. Hence, *youth lives with mother* was a dichotomous variable reflecting whether (1) or not (0) the youth lived with their biological mother.

Family income

Parents were asked for information regarding their annual family income at baseline. Family income was an ordinal variable where 1 = less than $5,000, 2 = $5,001 to $10,000, 3 = $10,001 to $25,000, 4 = $25,001 to $40,000, 5 = $40,001 to $75,000, and 6 = more than $75,000. Overall, the families in the project had modest annual incomes.

Family experience of stressful/traumatic events

Parents were also asked at baseline to indicate whether or not the youth or his/her family ever experienced certain serious stressful or traumatic events. Specifically, parents were questioned about the following events: accidental injury requiring hospitalization, serious illness, death, divorce, eviction, unemployment of a parent, legal problems resulting in jail or detention, victimization of violence,

	Male (*n* = 188/189)	Female (*n* = 111/112)
Ethnicity Race of Youth***		
African American	32%	14%
Anglo	29%	51%
Asian	2%	--
Hispanic	27%	31%
Native American	--	1%
Other	10%	3%
	100%	100%
Annual Family Income		
$5,000 or less	5%	6%
$5,001 to $10,000	9%	7%
$10,001 to $25,000	26%	26%
$25,001 to $40,000	27%	30%
$40,001 to $75,000	26%	17%
More than $75,000	8%	14%
Youth Resided with whom:		
Birth mother and father	17%	16%
Birth mother alone	36%	30%
Birth mother and stepfather/ boyfriend	22%	24%
Birth mother and relative or friend	9%	12%
Birth father alone	1%	5%
Birth father and stepmother/ girlfriend	5%	3%
Birth father and relative or friend	--	1%
Adoptive parents	3%	3%
Grandparent(s)	5%	4%
Other relatives	2%	2%
Other arrangement	<1%	1%
	100%	101%
Age (Mean)	14.81 (SD = 1.35)	14.79 (SD = 1.23)
Average Number of Traumatic Events	2.93 (SD = 1.69)	3.10 (SD = 1.89)

Note. Total percentage may not be 100 due to rounding errors. Two-tailed *p*-values: *$p < .05$; **$p < .01$; ***$p < .001$

Table 1: Comparisons of Youth and Family Covariates at Baseline across Gender.

and any other (unspecified) traumatic event (e.g., youth being placed in foster care, not having a relationship with father, fighting with brothers and sisters, losing the opportunity to obtain a driver's license, separation from mother). A summary index was created for affirmative responses (1 = yes, 0 = no) to the nine items, such that higher scores indicate experience of multiple traumatic events. Large percentages of families reported one or more of these experiences. Overall, an average of 2.99 stressful/traumatic events were reported per family (SD = 1.76).

Self-reported delinquent behavior at baseline

Based on the work of Elliott and associates [54], self-reported delinquent behavior prior to baseline interviews was measured by asking how many times the youths engaged in each of 23 delinquent behaviors. Similar to Elliott et al., five summary indices of delinquent involvement (i.e., general theft, crimes against persons, index crimes, drug sales, and total delinquency) were initially developed, but correlations between the measure of total delinquency and the other four delinquency measures at baseline were sizable and statistically significant (mean correlation = .60). Therefore, only total delinquency was used in the present analyses.

The range of offenses for the total delinquency index was large, ranging from no activity to hundreds (in few cases thousands); hence, 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 [54]. Importantly, the skewness (-0.32) and kurtosis (0.38) of the log transformed measure of total delinquency were dramatically lower than those of the untransformed measure (6.23 and 46.71, respectively). There was no significant difference in reported past year delinquency at baseline across gender ($F[1, 298] = 0.12$, $p = .073$).

Mental health issues

Four mental health indicators were created from various indicators at baseline collected from responses to the Adolescent Diagnostic Interview (ADI) [55]. The ADI was 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. For each item in the ADI, youth not reporting the experience were coded as 0, those reporting the experience were coded as 1. The ADI has demonstrated strong reliability and validity [56, 57]. (Table 2) provides a frequency breakdown of the items comprising the measures of the four mental health problem domains included in this study: (1) ADHD (attention deficit hyperactivity disorder), (2) anxiety, (3) depression, and (4) mania-like. The table reports the distribution of affirmative responses to the ADI questions comprising these mental health measures. As can be seen, youth reported experiencing relatively high rates of emotional or psychological issues (Table2).

Marijuana use at baseline

Marijuana use at baseline was measured through self-report questions on the Adolescent Diagnostic Interview [58] and urine assay tests (UA). The ADI questions probed the use of 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 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 an ordinal measure of marijuana use at baseline. Marijuana use was coded into four categories: (1) marijuana use denied and UA negative (7%), missing due to reasons beyond the youth's control [e.g., incarcerated] (0.3%), or missing not due to reasons beyond the youth's control [e.g., participant refusal] (0.3%); (2) self-reported use one to four times, but UA missing or negative (17%); (3) self-reported use five or more times, but UA test missing or negative (29%); and (4) UA positive (46%; 98% with self-reported use). Table 3 reports prevalence rates for these four categories. No significant differences in marijuana use were found across gender (Table3).

Treatment effects

A measure for treatment effects was also included in analyses. The overall BI treatment effect was measured by a variable contrasting youth and families receiving BI services (BI-Y and BI-YP) versus those receiving standard truancy services (STS).

Mental Health Issue	Affirmative Response
Anxiety:	
1. Do you worry a great deal when you are away from home that something bad might happen to your parents?	40%
2. 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%
3. Do you ever worry a lot about how well you are doing as a student or whether you have enough friends?	41%
4. Do you worry a great deal about how future events will turn out?	63%
ADHD:	
1. 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%
2. Do you frequently tend to act before thinking?	70%
3. Do you often have difficulty waiting for your turn during games or when doing things with other people your age?	32%
4. Do you often fidget and find it difficult to sit still?	52%
Depression:	
1. 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%
2. Have you ever continuously felt like crying for several days in a row?	36%
3. Have you ever had any trouble sleeping that lasted for many days?	43%
4. Have you ever felt so down that you felt like ending your life?	24%
5. Have you ever actually attempted suicide?	8%
Mania-like:	
1. 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%
2. 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%
3. During such a period, when you were not using alcohol or drugs, did you ever feel as though your thoughts were racing?	38%
4. 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%
5. Has this kind of “high” feeling ever gotten you into trouble?	36%

Table 2: Percent of Truant Youth Who Reported Experiencing Mental Health Issues (n = 299/300).

Marijuana Use (Baseline)	Male (n = 189)	Female (n = 111)	Significance
Denied use and urine test negative/ missing	7%	9%	N.S.
Reported use 1-4 times and urine test negative/ missing	16%	19%	
Reported use 5 or more times and urine test negative/ missing	29%	30%	
Urine test positive	48%	42%	
	100%	100%	

Table 3: Comparison on Marijuana Use (Baseline) across Gender.

Sexual risk behavior

Measures of sexual risk behavior at baseline and at each follow-up interview were created using data collected from the youths with the POSIT HIV/STI Risk Behavior instrument. The POSIT 11-item HIV/STI risk scale was developed by the NOVA Research Company [59], and has demonstrated 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). In the current study, the internal consistency (Cronbach’s α) of the 11 items was 0.73.

Studies of risky sexual practices often utilize lack of condom use and number of sexual partners as measures of this concept [60-62]. This study used the following four indicators reflecting the youths’ involvement in sexual risk behaviors at each time point: (1) had sexual intercourse, (2) had sexual intercourse without using a condom, (3) had sex with two or more people, and (4) had a sexually transmitted disease.

Analysis strategy

This study completed latent class analysis (LCA) using Mplus version 7.3. [63]. LCA seeks to identify an underlying classification of entities (e.g., individuals) which are related to manifest indicators in probabilistic terms [64]. In particular, the latent class model is useful when studying a heterogeneous population. The use of latent class analysis in this study was exploratory in nature, i.e., without specification of hypotheses relating to the values of the conditional or latent class probabilities. The main purpose of the LCA analyses was to examine the heterogeneity, or variation, in numbers of sexual risk behaviors among the sample, and identify sexual risk behavior subgroups of youths across gender, assuming heterogeneity exists. Multi-group, “known class” latent class analysis was employed for this purpose. A secondary objective was to examine how the identified subgroups differentially related to the covariates noted earlier.

Since the issue of class enumeration or determining the appropriate number of subgroups for a study population, in LCA is unresolved, it is recommended multiple criteria be used to determine class enumeration [65]. In this study, good classification quality was established if: (1) entropy, an estimate of classification clarity, was close to one (2) the Bayesian information criterion (BIC) value was closest to zero. (The Vuong-Lo-Mendell-Rubin likelihood ratio test (LRT), Lo-Mendell-Rubin adjusted likelihood ratio test (aLRT), and bootstrap likelihood ratio test (bLRT) statistics could not be estimated with the known class procedure.) [65- 69] the substantive meaningfulness of LCA results.

Latent class analyses were performed across the female and male

groups [using the knownclass function in Mplus] on the sexual risk behavior summary scores for one to five latent classes. In the analyses, MLR estimation [maximum likelihood parameter estimates with standard errors and a chi-square statistic that are robust to non-normality and non-independence of observations] was used [63]. The Mplus feature for ML estimation of missing values was used to treat any missing data [63].

Following the LCA estimations, an additional analysis was performed. For each gender group, the latent categorical variable(s) were regressed on the baseline covariates and the treatment effect variable, using logistic regression [63]. (Figure 1) presents the model that was estimated (Figure 1).

Results

Factor analysis of mental health indicators

For each mental health item, youth not reporting the experience were coded as 0, those reporting the experience were coded as 1. Then, separate composite measures of each of the mental health problem domains were created using exploratory and confirmatory factor analyses (CFA) with maximum likelihood (ML) and Bayesian estimation procedures of the dummy coded items. CFA analyses of the mental health measures for each of the four domains indicated each domain was best represented by one factor [70-72]. The ADHD, anxiety, depression, and mania-like measures used in subsequent analyses were created by saving the factor scores.

The four mental health factors were compared across gender. Results indicated female youth reported higher rates of depression ($F[1, 298] = 49.30$, $p < .001$) and anxiety ($F[1, 298] = 7.69$, $p < .01$), than their male counterparts.

Analysis of the Sexual Risk Behavior Items

A summary measure was developed involving the four indicators, noted earlier, which reflected the youths' involvement in sexual risk behaviors at each time point: (1) had sexual intercourse, (2) had sexual intercourse without using a condom, (3) had sex with two or more people, and (4) had a sexually transmitted disease. Table 4 shows the percent of youths replying affirmatively to each sexual risk behavior item at each time point, for the combined sample and across gender. As can be seen, a large portion of youths in the truant sample reported participation in sexual intercourse and risky sexual behaviors (Table 4).

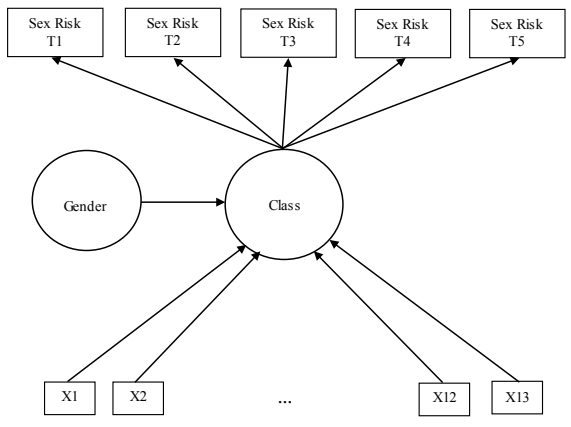

Figure 1: Multiple group latent class model with covariates. Gender serves as a known class for estimating the latent class analyses. The latent class is estimated for *n* classes comprised of the sexual risk behavior observed variables for the five time points. The latent categorical variable(s) are regressed on the covariates. All covariates (X1-X13) were measured at baseline. X1 = age. X2 = family income. X3 = who the youth lives with (mother). X4 = race (African American). X5 = ethnicity (Hispanic). X6 = family experience of traumatic events. X7 = marijuana use. X8 = self-reported delinquency. X9 = Attention Deficit-Hyperactivity Disorder (ADHD). X10 = depression. X11 = anxiety. X12 = mania-like. X13 = BI intervention. T1 = baseline. T2 = 3-month follow-up. T3 = 6-month follow-up. T4 = 12-month follow-up. T5 = 18-month follow-up.

As Table 4 indicates, there is a slow, gradual increase in the percent of youths reporting engagement in the sexual risk behaviors from 3-month to 18-month follow-up, and a corresponding, general decrease in the percent of youths reporting not engaging in any of these behaviors. Comparison of these results with those reported by the Centers of Disease Control [73], indicates a much higher prevalence of sexual intercourse among youths in the present study, than that reported by youths nationally (47%) or in the state (48%; 9th grade: 31%; 10th grade: 45%; 11th grade: 57%). This result is consistent with an expectation that truant youth engage in sexual risk behaviors at a higher rate than the general youth population. In addition, between 1% and 4% of the youths reported they ever had a sexually transmitted disease across the five time points. Low endorsement rates for the STI item at each time point led to the recoding of the sexual risk summary measure to include youths reporting all four sexual risk behaviors in the fourth category of the final ordinal measure used in analyses, together with youths reporting three risk behaviors. (Although sizable percentages of youth did not report engaging in one or more of the two sexual risk behaviors in (Table 4) it is important to note that the vast majority of youth reported having some sexual experience [e.g., sexual contact with another person] at each time point [baseline, 80%; 3-month follow-up, 72%; 6-month follow-up, 72%; 12-month follow-up, 76%; 18-month follow-up, 75%]). Analysis found no statistically significant difference in the number of sexual risk behaviors across gender at any time point.

Bivariate Relationships among the Variables in the Latent Class Analysis

Prior to the LCA, polychoric correlations were obtained among the five self-reported, sexual risk items. There were moderate to high relationships among the five variables for both male and female youth (female range: .432 to .775; male range: .570 to .755). Each relationship was significant at the $p < .01$ level (two-tailed test). (A table reporting these results has been omitted due to space concerns. A copy is available from the senior author upon request.)

Latent Class Analysis of the Sexual Risk Behavior Measures

LCA fit statistics Known class, multi-group LCA models were estimated for one to five latent classes, and comparison was made of the fit measure results of the various class solutions. As can be seen in Table 5, the two-class solution had the lowest BIC value, and the highest entropy value (.952). A five class solution could not be reliably estimated (Table 5).

A previous LCA of the sexual risk items for all youth combined indicated a three-class solution was a better fit to the data, than a two-class solution [16,19]. However, the entropy value for this solution was 0.823. The entropy value of the known class, multi-group LCA was 16% better, reflecting greater classification clarity. In fact, the entropy value of the two-class solution indicated near perfect classification; and it has a clear, meaningful interpretation.

The classification table based on class probabilities for most likely

	Follow-up period				
	Baseline	3-Month	6-Month	12-Month	18-Month
Sexual risk behaviors (overall):					
Sexual intercourse	67%	62%	62%	63%	63%
Sexual intercourse without using a condom	33%	28%	32%	34%	36%
Sex with two or more people	30%	32%	34%	34%	34%
Sexually transmitted disease (STD)	3%	1%	2%	3%	4%
Males:					
Total number of sexual risk behaviors reported:					
0	31%	36%	36%	35%	28%
1	26%	19%	17%	20%	19%
2	24%	28%	25%	22%	27%
3 or 4	18%	17%	22%	23%	26%
	99%	100%	100%	100%	100%
n	189	177	177	157	139
Significance	N.S.	N.S.	N.S.	N.S.	N.S.
Females:					
Total number of sexual risk behaviors reported:					
0	34%	39%	38%	22%	21%
1	19%	19%	22%	25%	19%
2	24%	26%	25%	34%	35%
3 or 4	23%	16%	15%	19%	25%
	100%	100%	100%	100%	100%
n	111	105	104	88	76
Significance	N.S.	N.S.	N.S.	N.S.	N.S.

Table 4: Reported Sexual Risk Behavior Combined and across Gender.

	Akaike (AIC)	Bayesian (BIC)	Sample Size Adjusted BIC	Entropy
1 Class	4033.07	4147.88	4049.57	--
2 Classes	**3594.11**	**3823.74**	**3627.11**	**.952**
3 Classes	3473.57	3825.43	3524.15	.915
4 Classes	3481.36	3951.74	3548.97	.915
5 Classes	Model could not be estimated			

Note. AIC = Akaike Information Criterion. BIC = Bayesian Information Criterion.

Table 5: Latent Class Analysis Fit Statistics (N = 300).

latent class membership by latent class indicated extremely high major diagonal values (.968 to .985), with very low off-diagonal values (highest value = .032). As Table 6 indicates, two subgroups were identified for the female (part A of Table 6) and male (part B of Table 6) youth. For females, the first class (1) reflected a low risk group (n = 69, 62.2% of youths); while the second class (2) represented a group high risk group (n = 42.37.8%). Similarly, for males, the first class (1) reflected a low risk group (n = 68, 36.0%); while the second class (2) reflected a high risk group (n = 121, 64.0%) (Table 6).

Inspection of the results in Table 6 reveals distinctions in latent class, probability scale results between the gender groups, especially for the high risk groups. Among high risk females, participation in two or more sexual risk behaviors was significantly related to the latent class solution. Among high risk males, with two exceptions, each number of reported sexual risk behaviors was significantly related to the probability scale results.

Female-Male Latent Class Comparisons on Baseline Covariates and Intervention

For each gender group, a regression analysis was performed to assess the influence of baseline covariates and the BI intervention in predicting membership in the high or low sexual risk behavior groups. As shown in Table 7, a number of significant covariate effects were found. Among males, youth in the high sexual risk behavior group were significantly more likely to report ADHD symptoms, less likely to report depression, and more likely to be African American, than low sexual risk behavior male youth. Among females, youth in the high sexual risk behavior group were significantly more likely to be involved in marijuana use, report depression, be African American, and have higher levels of family income, than low sexual risk behavior female youth. No significant Brief Intervention effects on sexual risk behavior class membership were found for either gender group (Table7).

Discussion

The present study utilized latent class analysis to identify subgroups of truant youth reporting sexual risk behaviors over five time points across gender. The results are both consist with the relevant literature and expand upon it. Specifically, the findings highlight that male youth are more involved in high risk sexual behavior, than females (64% versus 38%, respectively). At the same time, the findings indicate female youth involved in high risk sexual behavior are experiencing more of a negative syndrome of issues, than low sexual risk behavior females, with high sexual risk behavior females reporting more involvement in marijuana use and a higher level of depression symptoms. On the other hand, high sexual risk behavior males report less depression and more ADHD symptoms, than male youth who are less involved in sexual risk behavior. Hence, mental health issues are differentially related to both female and male youth who are more involved in sexual risk

A.	Females: Class 1			Females: Class 2		
	Low Risk (*n* = 69, 62.2%)			High Risk (*n* = 42, 37.8%)		
	Estimate	S.E.	Critical Ratio	Estimate	S.E.	Critical Ratio
Sexual risk, baseline:						
0	0.519	0.062	8.355***	0.050	0.043	1.145
1	0.271	0.055	4.952***	0.054	0.042	1.273
2	0.136	0.042	3.220***	0.408	0.078	5.209***
3 or 4	0.073	0.034	2.180*	0.489	0.083	5.866***
Sexual risk, 3-month:						
0	0.629	0.065	9.680***	0.000	0.000	0.000
1	0.228	0.057	3.992***	0.128	0.066	1.956+
2	0.142	0.045	3.185***	0.445	0.081	5.502***
3 or 4	0.000	0.000	0.000	0.427	0.083	5.158***
Sexual risk, 6-month:						
0	0.586	0.065	9.004***	0.035	0.034	1.024
1	0.307	0.058	5.255***	0.083	0.047	1.748+
2	0.090	0.039	2.331*	0.507	0.081	6.267***
3 or 4	0.016	0.016	1.004	0.375	0.080	4.686***
Sexual risk, 12-month:						
0	0.329	0.068	4.809***	0.053	0.039	1.359
1	0.423	0.068	6.236***	0.000	0.000	0.000
2	0.229	0.066	3.463***	0.503	0.091	5.509***
3 or 4	0.020	0.020	1.010	0.444	0.089	4.990***
Sexual risk, 18-month:						
0	0.350	0.076	4.594***	0.031	0.031	1.011
1	0.303	0.071	4.248***	0.031	0.031	1.011
2	0.270	0.072	3.762***	0.449	0.092	4.862***
3 or 4	0.076	0.047	1.642	0.489	0.093	5.272***

(continues on next page)

B.	Males: Class 1			Males: Class 2		
	Low Risk (*n* = 68, 36.0%)			High Risk (*n* = 121, 64.0%)		
	Estimate	S.E.	Critical Ratio	Estimate	S.E.	Critical Ratio
Sexual risk, baseline:						
0	0.792	0.075	10.525***	0.033	0.020	1.624
1	0.149	0.054	2.768**	0.331	0.045	7.306***
2	0.058	0.044	1.311	0.343	0.045	7.634***
3 or 4	0.000	0.000	0.000	0.293	0.046	6.323***
Sexual risk, 3-month:						
0	0.894	0.064	13.958***	0.044	0.028	1.582
1	0.086	0.053	1.623	0.253	0.045	5.641***
2	0.020	0.025	0.782	0.435	0.049	8.840***
3 or 4	0.000	0.000	0.000	0.268	0.045	5.886***
Sexual risk, 6-month:						
0	0.803	0.068	11.733***	0.106	0.035	3.055**
1	0.132	0.056	2.365*	0.191	0.042	4.598***
2	0.050	0.031	1.619	0.372	0.048	7.837***
3 or 4	0.014	0.017	0.863	0.331	0.049	6.743***
Sexual risk, 12-month:						
0	0.677	0.090	7.562***	0.171	0.038	4.460***
1	0.294	0.080	3.688***	0.144	0.048	3.009**
2	0.028	0.033	0.868	0.329	0.048	6.863***
3 or 4	0.000	0.000	0.000	0.355	0.054	6.583***
Sexual risk, 18-month:						
0	0.607	0.093	6.526***	0.093	0.032	2.909**
1	0.275	0.068	4.037***	0.138	0.043	3.203***
2	0.118	0.064	1.830+	0.356	0.054	6.599***
3 or 4	0.000	0.000	0.000	0.413	0.060	6.873***

Note. Two-tailed *p*-values: *$p < .05$; **$p < .01$; ***$p < .001$; +.10 > $p > .05$.

Table 6: Latent Class Analysis Results by Gender. Results in Probability Scale.

	Males			Females		
Baseline Covariates	Estimate	S.E.	Critical Ratio	Estimate	S.E.	Critical Ratio
Marijuana use	-0.394	0.498	-0.791	1.891	0.498	3.796***
Self-reported delinquency	-0.054	0.567	-0.095	0.953	0.567	1.680
ADHD	2.149	0.962	2.234*	0.017	0.962	0.018
Depression	-0.862	0.330	-2.612**	0.889	0.330	2.692**
Anxiety	-0.797	0.470	-1.696	0.613	0.470	1.304
Mania-like	0.332	0.578	0.575	-0.133	0.578	-0.231
Family traumatic events	0.023	0.212	0.107	0.360	0.212	1.693
Race (1 = African American)	2.354	1.112	2.118*	2.584	1.112	2.324*
Age	0.623	0.346	1.801	0.516	0.346	1.492
Family income	-0.090	0.365	-0.246	0.820	0.365	2.249*
Who youth lives with (1 = mother)	-0.635	0.933	-0.680	-0.409	0.934	-0.438
Ethnicity (1 = Hispanic)	1.228	1.063	1.155	0.510	1.064	0.479
Brief intervention	-0.536	0.843	-0.635	1.557	0.843	1.846

Note. Two-tailed *p*-values: *$p < .05$, **$p < .01$,***$p < .001$.

Table 7: Covariate Predictors of Latent Class Membership across Gender.

behavior, suggesting that STI prevention programs should develop a more nuanced approach in working with female and male at-risk youth. Prevention should include a strong mental health component. Much more needs to be understood regarding the role of mental health issues in youth involvement in sexual risk behavior, and the dynamics of these relationships. Future studies should explore the correlates of mental health problems on sexual risk behaviors, especially across gender.

Importantly, the findings indicate male and female, high sexual risk behavior youth are significantly more likely to be African American, than low sexual risk behavior male and female youth, respectively. These results are consistent with literature highlighting the increased burden minority communities carry in regard to this critical public health issue [73].

We believe the concept of relative deviance at least partially explains the male-female differences we identified across the gender-based latent construct of sexual risk. According to this view, persons who are more deviant from the norms of their social and cultural setting tend to exhibit more serious behavior problems. Our findings are consistent with those of several studies that have revealed higher psychological deficits and troubled backgrounds among female, compared to male, at-risk youth [74-78].

Further study of the data found little indication of a Brief Intervention effect on the youths' sexual risk behavior over time. This is not a surprising outcome, as the BI was not designed to target sexual risk behavior. However, given the significant relationships we found, consideration should be given to revising intervention protocols addressing truant youth substance use by including attention to the issues of ADHD and depression, as well as sexual risk behavior.

There are several limitations of this study that should be acknowledged. First, the nature of the sample limits the generalizability of the findings of this study. This study was limited to a small sample of truant youth in a large urban area in the southeastern U.S. Further, participating youths were enrolled through referrals from a truancy center where they were being held for truancy or school guidance counselors and diversion program staff who knew of the youth's truancy. Replication is needed to see if similar results are found in samples of truant and non-truant youth residing in different geographic and sociodemographic areas, and those selected through alternative processes. Second, the study was limited in scope in regard to the sexual risk behaviors and covariates that were included in analyses. Future research should examine the variation in a broader spectrum of sexual risk behaviors and other problem behaviors among truant youths. Finally, differences in covariates associated with the latent classes for the female and male youth were cross-sectional. Future research should also attempt to better understand the temporal relationships between family and youth characteristics, self-reported delinquency, mental health problems, and substance use in regard to sexual risk behavior.

Our results highlight an important focus for future research. When looking at at-risk populations such as truants and youths involved in the juvenile justice system, there is a need to examine variation in mental health problems and substance use, differentially among females and males. Unfortunately, many truancy programs and schools are less concerned with the mental health status of youths who fail to attend school. For example, McCluskey et al. [2004] evaluated a truancy intervention program and found only 6 percent of truants was referred to a social service agency by attendance officers implementing the program. Yet, research clearly shows many youth classified as truant may be suffering from one or more mental health problems [79-82]. If mental health problems and substance use issues are not identified and properly addressed, future problems among truant youth can be expected. Enlightened leadership is required to properly respond to this important need.

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