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HIV risk behavior and psychopathology among adolescents in court ordered treatment

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Abstract

Background—The confluence of drug use behaviors, sexual risk, and psychopathology may complicate human immunodeficiency virus (HIV) prevention intervention for adolescents engaging in substance use and criminal behavior. However, few studies have examined these risk associations.

Objective—This study identified HIV risk behavior subgroups among adolescents in court ordered substance abuse treatment and examined linkages with dimensions of internalizing and externalizing psychopathology.

Methods—Latent class analysis was used to identify subgroups on the basis of involvement in substance use proximal to sex, number of partners, and consistency of condom use.

Results—Participants (n = 301) were identified as demonstrating high, medium, or low levels of sexual risk behavior. Greater externalizing psychopathology distinguished the high risk class from the medium risk class and from the low risk class.

Conclusion—Detained youth with particularly serious oppositional-defiant behavioral characteristics, substance use, and sex risk behavior likely require intensive interventions that address the multiple systemic factors that contribute to the development and maintenance of this pattern.

Keywords

adolescent; HIV risk behavior; personality; internalizing; externalizing

Adolescents in the juvenile justice system present with a multitude of developmental, social, psychological and economic problems. Adolescent delinquency is linked with poor academic achievement, low educational expectations/aspirations, school dropout,

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Declaration of Interest

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confrontational acts, stealing, property damage, early sexual involvement and drug use [1]. Delinquency has been predicted by parental drug use, negligent and/or absent parental figures, family and neighborhood poverty [2,3], early childhood isolation, peer victimization, and both internalizing and externalizing pathology [4,5]. This pattern of deviant development, first revealed in childhood [6], may persist in adolescence and into adulthood [7,8]. Indeed, evidence of considerable developmental continuity exists in the broad higher order structure of phenotypic psychopathology. Caspi, et al. [9] demonstrated that a two dimension model, revealing internalizing and externalizing symptom patterns, that has received broad support in classification of childhood disorders, closely approximates the structure seen in numerous studies of adolescents and young adults [10, for a focused review see 11].

The stability of internalizing and externalizing psychopathology and linkage of these dimensions with substance use and sex risk behavior among adolescents involved in the juvenile justice system is of particular concern [12]. Adolescent substance abuse is a consistent predictor of substance dependence in young adulthood and beyond [7,13,14,15,16,17,18]. Sex risk behavior during adolescence is associated with adolescent pregnancy and parenthood which, in turn, has been linked with educational and occupational disparities into adulthood [19]. Risky sexual behavior is also linked to potentially fertility impairing STDs and human immunodeficiency virus (HIV) infection [20]. Indeed, there is evidence of elevated prevalence of HIV and STD infections among detained adolescents with over 1/3 reporting ever having an STD [21] and adolescents accounting for approximately 5% of HIV cases among incarcerated individuals of all age groups [22]. Importantly, nearly 50% of new sexually transmitted infections occur among adolescents and young adults when examining the population as a whole [23].

Teplin, Mericle, McClelland, & Abram [24] found that between 75 and 93% of adolescents in detention reported being sexually active with results varying by race/ethnicity and gender. Others have estimated even higher rates of sexual activity in this population [21,25]. A majority of adolescents in detention have also revealed regular substance use with one study showing over 50% using marijuana or alcohol at least once per week [25] and over 50% reporting marijuana use more than 3 times in the past 3 months [24].

Important linkages between sexual risk behaviors and substance use have been identified. Among adolescents on probation, more sexual activity has been reported among drinkers compared to non-drinkers [26]. A positive association has been found between days of marijuana use and number of recent unprotected sex acts among detained adolescents [27]. In this same sample, likelihood of unprotected sex was greater when marijuana was used proximal to sex than when marijuana was not used. Additionally, in a sample of detained African-American adolescents reporting about their first sexual experience, those that reported marijuana use had a higher likelihood of unprotected sex than those that did not report use [28]. Among detained adolescents, regular use of two or more substances has been linked with higher likelihood of inconsistent condom use, multiple sex partners, and trading sex relative to those not reporting multiple substance use [25]. Additionally, detainees reporting regular use of alcohol or other substances have a higher likelihood of inconsistent condom use than detainees not reporting such use [21]. Thus, there is evidence

that the elevated rates of substance use and risky sexual behavior among detained adolescents co-occur. It has been argued that underlying psychopathology may account for this coincidence [29].

Prior research has shown that internalizing and externalizing disorders are linked with adolescent delinquency, are persistent, and are associated with risky sexual and substance use behavior. However, it is also the case that there is considerable heterogeneity within this population. Vermeiren [5] for example, points out that there are variations in “prevalence and developmental significance of psychiatric pathology between adolescent limited offenders and life-course persistent offenders” (p. 277). There is a need to further clarify relationships between type and level of psychopathology and patterns of risk behavior most likely to result in adverse developmental consequences among high risk adolescents in juvenile detention.

This study examines associations between dimensions of internalizing and externalizing psychopathology and clinically distinct patterns of substance use and sex risk behavior among a sample of detained adolescents in substance abuse treatment. The Millon Adolescent Clinical Inventory (MACI) is commonly used with adolescents in correctional settings and analyses with this instrument consistently reveals factor analytically derived internalizing and externalizing dimensions of adolescent psychopathology [30,31]. In the current study, it was anticipated that patterns of internalizing and externalizing psychopathology would distinguish classes of substance use and sex risk behavior among detained adolescents. Higher levels of both internalizing and externalizing pathology were expected to be found in adolescent subgroups characterized by elevated substance use and sex risk in comparison with those revealing lower levels of such risk. The results of the study may provide information relevant to development and utilization of interventions tailored to theoretically and clinically meaningful subgroups defined on the basis of type and level of psychopathology and pattern of risk behavior.

Method

Participants were 301 inner city, predominantly minority, adolescents in a court mandated treatment for substance abuse and enrolled in a NIH-funded HIV prevention project (see Table 1 for demographics). This study was approved by the University of Miami Institutional Review Board. The sample approximated consecutive admissions between 1998 and 2000. Participants were excluded from the study only in cases where informed assent and/or consent of their parents (or legal guardians) was not obtained. No participants suffered from severe cognitive or psychiatric impairments (e.g., psychosis) that would have compromised their ability to complete the assessment. Participants were not paid for participation in the study.

All adolescents were fluent in spoken English. Most of the sample was male (73%); 17.3% reported race/ethnicity as White, 21.6% as African American, 34.2 % as Hispanic, and 26.9% as other racial/ethnic group. Age ranged from 13 to 18 years of age (mean= 15.7, SD=1.2). Participants reported having an eighth grade education on average (mean = 8.67, SD=1.27). They reported being ‘picked up’ by the police between zero and 100 times (mean

= 6.46, SD = 9.26) and the most common types of prior arrests were for assault (22%), burglary or larceny (21%), shoplifting (17%), and auto theft (17%). 17.3% reported never having been in jail while 7.3% spent less than 24 hours in jail during their longest stay. 21.6% reported confinement for between 2 days and 2 weeks, 21.3% for between 2 weeks and one month, and 31.9% for over a month during their longest stay. At project entry, they were administered measures of sexual risk behavior in addition to the Millon Adolescent Clinical Inventory (MACI). Measures of substance use were also used to provide descriptive information about severity of substance use among the sample. Assessments were administered individually by research staff whom assisted participants experiencing difficulties with understanding.

Instruments

The Millon Adolescent Clinical Inventory (MACI) is a self-report assessment of personality styles and clinical syndromes for individuals aged 13 to 19 with at least a 6th grade reading level [32]. The MACI consists of 160 items designed to tap methods of relating, behaving, thinking, and feeling and is organized by scales that reflect variants of, or precursors to, adult pathological personality and symptom patterns. The MACI is frequently used with youth involved in the justice system. Consistent with procedures described by Salekin [31], factor analysis of values derived from the 12 personality scales was performed to derive indices of internalizing and externalizing psychopathology. The factor analysis was completed using unweighted raw scores.

The Timeline Follow-Back method [33] was used to assess sex risk behavior in the 3 months prior to intake assessment. A calendar was used in the assessment process to help anchor participants' responses to memorable dates. The 3 month time period has been shown to be reliable in assessing sex behaviors [34]. A count was recorded for number of instances that sex occurred without a condom in vaginal, anal, and oral sex acts. Responses were reduced to dichotomous indicators, with the presence of risk behavior coded 1 and the absence coded 0. Variables for vaginal and anal sex acts were combined; one variable indicated if participants reported engaging in unprotected vaginal or anal sex in the past 3 months and another indicated if participants reported unprotected oral sex in the past 3 months. Additionally, participants were asked about the number of sexual partners they had in the past 3 months. Number of sex partners was also dichotomized by coding more than 1 sexual partner as risky and coding 1 or fewer sexual partners as less risky or not risky.

A Timeline Follow-Back method [33] was also used to assess substance use behaviors in the past 3 months, also a reliable frame of time for assessing substance use behaviors [34]. The number of substance use days in the past 3 months included counts for marijuana, alcohol, cocaine or crack, and other drugs. Additionally, participants were asked if sex occurred after the use of substances and whether or not a condom was used during those sexual events. The analysis included three dichotomous variables for each drug, capturing whether or not unprotected sex was reported after the use of marijuana, alcohol, and other drugs.

Analysis

LCA, a method of data reduction that allows for non-additive associations among risk behaviors, was used to identify latent classes of adolescents in substance abuse treatment with similar risk profiles. Specifically five binary indicators for risk behavior which occurred in the past 3 months were chosen for the LCA including: alcohol use during sexual encounter, marijuana use during sexual encounter, other drug use during sexual encounter, greater than 1 sexual partner, not using a condom during oral sex and not using a condom during vaginal or anal sex. In order to determine the model with the optimal number of classes, models were run with between 1 and 5 classes and evaluated. The model with the number of classes associated with minimum values of fit statistics including, Akaikes Information Criterion (AIC), Bayesian Information Criterion (BIC) and Sample Size Adjusted BIC (ABIC) was chosen [35]. Principal components analysis was used to identify dimensions of personality and psychopathology gauged by the MACI.

Complete data were available for all indicators of substance use and sex risk as well as gender, race and age. However, 46 of 301 participants had missing data on the two personality factor scores. Missing status was examined by indicators and complete correlates using univariate tests to evaluate the null hypothesis that missingness was completely at random. A stochastic regression imputation method was used to impute participant missing values on the personality factor scores using all indicators and correlates of interest as independent variables [36].

Results

Risk behavior was prevalent in this sample with 81% reporting sexual activity in the past 3 months and 43% reporting having more than 1 sexual partner during this period. 48.5% reported not using a condom during oral sex and 43.5% reported not using a condom during vaginal or anal sex in the past 3 months. 33.7%, 57.8% and 23.6% respectively, reported the use of alcohol, marijuana and other drugs during their last sexual encounter within the last 3 months. 84.4% reported marijuana use, 64.4% reported alcohol use, and 34.2% reported cocaine use in the 3 months prior to intake evaluation. The average number of days of marijuana use, alcohol use, and cocaine use respectively during this period was 34.0 (SD = 32), 7.8 (SD =14.3), and 4.5 (SD =14.8) days.

Principal components analysis was conducted using values obtained from the 12 personality scales of the Millon Adolescent Clinical Inventory. Results revealed that two components accounted for nearly 84% of the variance. Component 1 (inhibited/depressive) was defined by high positive (>.80) loadings on the Inhibited, Introversive, and Doleful scales and high negative loadings on the Dramatizing and Egotistical scales. Component 2 (oppositional-defiant) was characterized by high loadings (>.80) on the Forceful and Oppositional scales and high negative loadings on the Submissive and Conforming scales. Component scores were used in subsequent analysis and have a standardized scale or a mean of zero and a standard deviation of one.

An identified latent class model indicated that a three class solution was optimal. The number of classes was chosen using theoretical reasoning, fit statistics and practical

considerations. The fit statistic of BIC was lower for the 3-class (BIC=2159.374) compared to the 4-class model (BIC=2177.199) and similar to the 2-class model (BIC=2159.466). Also, the Lo-Mendel-Rubin chi-square indicated that a third class significantly added to the model. In addition to picking the model with good fit statistics, the three class model was chosen over the two class model because the three class model differentiated low, medium and high risk behavior profiles. The entropy value or measure of class stability for the 3 class model was approximately, 0.73.

The three class solution included a 'low risk behavior class' (class 1) consisting of 22% of the sample and included participants with near zero probabilities of risk behavior in the past three months. Class 2 (the high risk behavior class), consisting of 38% of the sample, had high probabilities of each of the 5 risk behaviors. Class 3, consisting of 33% of the sample, included individuals with low probabilities of being high on alcohol or other drugs during sex in the past 3 months but had moderate probabilities of marijuana use during sex, greater than 1 sexual partner and not using a condom in the past 3 months.

Simple multinomial regression models indicate that gender is not associated with risk behavior levels. For every 1 year increase in age, the odds of being in the high risk class (Class 2) versus the medium risk class increases by a factor of 1.34 (95% CI=1.02, 1.77). Participants reporting an African American race had 0.31 (95% CI: 0.10, 0.95) the odds of being in the high risk behavior (class 2) compared to the medium risk behavior class (class 3). For each standard deviation increase in oppositional-defiant patterns(component two), the odds of being in the high risk class versus the low risk class and the odds of being in the medium risk class versus the low risk class increases by a factor of 2.31 (95% CI=1.56, 3.41) and 1.85 (95% CI=1.30, 2.63), respectively. The same relationships are not apparent for risk behavior and component 1 (inhibited/depressive).

Multiple multinomial regression models indicate that age and gender are not associated with risk behavior levels. Participants reporting an African American race had 0.34 (95% CI: 0.12, 0.94) the odds of being in the high risk behavior (class 2) compared to the medium risk behavior class (class 3) after controlling for all other correlates. For each standard deviation increase in the oppositional-defiant component, the odds of being in the high risk class versus the low risk class and the odds of being in the medium risk class versus the low risk class increased by a factor of 2.11 (95% CI=1.47, 3.05) and 1.76 (95% CI=1.28, 2.43), respectively.

Discussion

This study identified clinically meaningful subgroups of detained adolescents that were characterized by low, medium, and high levels of sexual risk behavior. A high risk behavior class was identified that included individuals with substantial levels of involvement in alcohol, marijuana, or other drug use proximal to sexual encounters, having multiple partners, and not using condoms. A medium risk behavior class was identified with moderate probabilities of engaging in marijuana use proximal to sexual encounters, having multiple partners, and not using condoms during sexual encounters. Low probability of

sexual risk behavior and substance use proximal to sex was characteristic of the low risk behavior class.

Current findings support the linkage between substance use proximal to sex and other forms of sexual risk behavior [i.e., 27]. Castrucci & Martin [25] found that regular use of multiple substances was associated with higher likelihood of using condoms inconsistently and having multiple sex partners among a sample of incarcerated adolescents. In the current study, links between use of multiple substances proximal to sex, multiple partners, and unprotected sex characterized the high risk class. The pattern identified in the medium risk class in the current investigation is consistent with research [27,28] demonstrating a link between marijuana use, independent of use of other substances, and risky sexual behavior. Although current findings are consistent with those of a number of prior investigators in identifying high rates of sexual activity among adolescents involved with the justice system [21,24,25], we identified a meaningful low risk group characterized by little unprotected sex and little substance use proximal to sex.

The components derived from the MACI are comparable to internalizing and externalizing dimensions of personality/psychopathology identified in prior studies of adolescents in correctional settings [30,31]. These dimensions are also consistent with models that identify a higher order structure of psychopathology that includes internalizing and externalizing symptom patterns [9,10,11]. While clinically meaningful levels of both these dimensions of personality and psychopathology are present in the current sample, only the externalizing dimension was associated with membership in latent classes revealing elevated sex risk behavior. This finding is consistent with conceptualizations of substance use and risky sexual behaviors as components of a pattern of general deviance [1]. Internalizing personality/psychopathology was not associated with risk behavior class although prior research involving adolescents with an arrest history has linked depressive symptoms with substance use proximal to sex [37].

Conceptualizations of externalizing disorders often include impulsivity, substance use and sexual behavior [1,9,38]. One of the contributions of this study is that an index of externalizing psychopathology reflecting anger, opposition, defiance, and impulsivity is clearly linked with classes reflecting elevated sex risk behavior. In an earlier study that included about half of the court mandated substance using participants in the current study, together with participants drawn from a juvenile detention center, Dévieux et al. [38] found that those scoring high on an index of impulsivity, as compared with low scorers, reported more frequent marijuana and alcohol use in the last 3 months, more engagement in unprotected sex when high on alcohol and marijuana, higher perceived HIV infection susceptibility, less favorable sexual attitudes, more HIV anxiety, and less sexual self-efficacy.

Prior research has shown that among detained adolescents, African American males report more elevated sex risk behaviors than White males, while White females report more elevated sex risk behaviors than African American females [24]. In the current investigation, gender was not linked with risk class but African Americans demonstrated reduced risk for membership in the highest risk class. A sizeable proportion of the sample was female

(26.91%) and various racial/ethnic identities were represented which suggests the results can be generalized to several groups although the role of racial/ethnic identity in risk behavior class membership may require further examination.

Although our study demonstrates important linkages among substance use, risky sexual behavior, and externalizing psychopathology among adolescents in court mandated treatment, there are limitations worth noting. The present study relied largely on self-report measures. Studies examining the validity of adolescent offenders' reports of drug use are not uniformly encouraging [39,40]. Threats to validity include duration of recall period and drug abuse severity and related withdrawal effects influencing memory. Detention status may have contributed to amplification of socially desirable responses or intentional misrepresentation. Malow and associates [41] identify additional factors such as participant response style and interviewer characteristics as potentially distorting influences and suggest use of toxicological measures to assist in validation of self-reported drug use. Similarly, concerns about validity of self-reported sexual activity and protective behavior might be addressed by including measures of new sexually transmitted infections (STIs) in prospective studies involving reports of risk behavior over time. Validity of self-report data is enhanced when participants are informed their responses will be corroborated by other sources of information [39,41,42].

Identifying treatment implications associated with patterns of adolescent antisocial conduct, substance use, and related risk behavior is challenging. Longitudinal studies reveal considerable variability in the trajectories of problem behavior patterns and uncertainty regarding developmental outcomes. Although many adolescents substantially reduce antisocial activity as they transition into adulthood, a meaningful subgroup (i.e., chronic and violent offenders, those with co-occurring substance problems) show considerable persistence and less favorable trajectories [43,44,45].

Henggler and Sheidow [44] review evidence based treatments for conduct disorder and delinquency in adolescents that focus on important aspects of the youth's social ecology by strengthening family functioning, discouraging involvement in deviant peer networks, facilitating positive social network building, and enhancing youth school performance. Multisystemic therapy (MST) and multidimensional treatment foster care (MTFC) are identified as two treatment models that demonstrate meaningful and enduring decreases in antisocial behavior [46,47]. Both these approaches emphasize family structure and function - important foci in prevention research in adolescent HIV/STI risk. Families provide a critical developmental context for learning and evaluating sexual and interpersonal relationship behavior [48]. Parents play an important role as sex educators and can reinforce problem behavior prevention messages long after formal instruction ends. Further, MST and MTFC emphasize limiting exposure to high-risk networks that have been identified as a vulnerability factors for both substance abuse and sexual risk behavior. Enduring interaction with high-risk peers may often triggers relapse behavior and contribute to the decay function of risk reduction interventions [41,48].

In summary, current findings suggest a need to evaluate juveniles in detention for personality/psychopathology, risky sexual behavior, as well as substance use. Study findings

also support the suggestion that certain offending youth demonstrate patterns of multiple substance use and sexual risk behaviors justifying specialized interventions [26]. Detained youth with particularly serious antisocial conduct, substance use, and sex risk behaviors likely require interventions that address the broad social ecology in which these problems emerge and are maintained.

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Figure.
Probability of risk behavior by class.

Table 1

Characteristics of JARF Participants

Variable	N (%) or Mean (SD)
Age	15.67 (1.17)
Gender	
Male	220 (73.09)
Female	81 (26.91)
Race/Ethnicity	
White	52 (17.28)
African American	65 (21.59)
Hispanic	103 (34.22)
Other	81 (26.91)
Alcohol Use Proximal to Sex	
No	200 (66.45)
Yes	101 (33.55)
Marijuana Use Proximal to Sex	
No	127 (42.19)
Yes	174 (57.81)
Other Drugs Use Proximal to Sex	
No	230 (76.41)
Yes	71 (23.59)
Sexual Partners	
0–1	171 (56.81)
>1	130 (43.19)
Oral Sex Condom Use	
No	155 (51.50)
Yes	146 (48.50)
Anal/Vaginal Condom Use	
No	170 (56.48)
Yes	131 (43.52)

Note. N = 301.

Table 2

Fit Statistics for Latent Classes

(JAF) Fit statistics for Latent Classes (N=301)

Classes	Likelihood Replicated	Log Likelihood	# Parameters	Pearson χ^2 (df)	p-value	BIC	Entropy	Lo-Mendell-Rubin	Smallest Class: r.f.(f)
1	Yes	-1181.88	6	773.59 (57)	<.001	2397.996	--	--	--
2	Yes	-1042.64	13	91.29 (50)	<.001	2159.466	0.751	<.0001	0.49(146)
3	Yes	-1022.62	20	55.85 (43)	0.09	2159.374	0.734	0.0035	0.27 (81)
4	Yes	-1011.55	27	32.04 (36)	0.66	2177.199	0.719	0.0501	0.17(50)
5	Yes	-1006.47	34	21.85 (29)	0.83	2206.973	0.832	0.0204	.09 (27)

Note. N = 301

Table 3

Multiple Multinomial Regression Models for Risk Behaviors

Variable	OR	95% CI	AOR	95% CI
Age: Class 2 vs. Class 1	1.38	(1.00, 1.89)	1.23	(0.92, 1.65)
Age: Class 3 vs. Class 1	1.03	(0.75, 1.40)	1.02	(0.76, 1.36)
Age: Class 2 vs. Class 3	1.34	(1.02, 1.77)*	1.21	(0.94, 1.55)
Gender				
Male: Class 2 vs. Class 1	1.41	(0.63, 3.17)	1.27	(0.61, 2.64)
Male: Class 3 vs. Class 1	1.13	(0.50, 2.59)	1.19	(0.54, 2.58)
Male: Class 2 vs. Class 3	1.25	(0.60, 2.58)	1.07	(0.56, 2.07)
Race/Eth				
AA: Class 2 vs. Class 1	0.49	(0.14, 1.69)	0.47	(0.15, 1.48)
AA: Class 3 vs. Class 1	1.57	(0.47, 5.25)	1.40	(0.43, 4.50)
AA: Class 2 vs. Class 3	0.31	(0.10, 0.95)*	0.34	(0.12, 0.94)*
Hisp: Class 2 vs. Class 1	1.06	(0.38, 3.00)	0.93	(0.35, 2.47)
Hisp: Class 3 vs. Class 1	1.06	(0.34, 3.27)	0.99	(0.33, 3.02)
Hisp: Class 2 vs. Class 3	1.00	(0.38, 2.62)	0.94	(0.39, 2.29)
Other: Class 2 vs. Class 1	0.64	(0.22, 1.85)	0.64	(0.23, 1.74)
Other: Class 3 vs. Class 1	0.89	(0.29, 2.73)	0.86	(0.29, 2.59)
Other: Class 2 vs. Class 3	0.71	(0.27, 1.88)	0.74	(0.30, 1.84)
Component 1: Class 2 vs. Class 1	1.13	(0.79, 1.63)	1.05	(0.76, 1.47)
Component 1: Class 3 vs. Class 1	0.90	(0.62, 1.31)	0.93	(0.65, 1.33)
Component 1: Class 2 vs. Class 3	1.26	(0.89, 1.78)	1.14	(0.83, 1.55)
Component 2: Class 2 vs. Class 1	2.31	(1.56, 3.41)*	2.11	(1.47, 3.05)*
Component 2: Class 3 vs. Class 1	1.25	(0.86, 1.81)	1.20	(0.84, 1.72)
Component 2: Class 2 vs. Class 3	1.85	(1.30, 2.63)*	1.76	(1.28, 2.43)*

Note. N = 301. Unadjusted Odds Ratios (OR) with separate simple multinomial regressions for each variable, Adjusted Odds Ratio (AOR) for multiple multinomial regression analysis with all variables, and 95% Confidence Intervals (CI); African American (AA), Hispanic (Hisp), and other racial/ethnic group (Other); low risk class (Class 1), high risk class (Class 2), and medium risk class (Class 3); inhibited/depressive (Component 1) and oppositional/defiant/acting-out (Component 2).