

Psychometric Status and Clinical Utility of the MAYSI-2 with Girls and Boys in Juvenile
Detention Programs: Factor Structure, Subscale reliability, and Predictive Validity for Behavioral
Problems, Addiction Risk, and Suicidality Risk

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An estimated 2.4 million children and adolescents are involved in the justice system as a result of arrests each year, which comprises 17% of all arrests (Abram, Teplin, Charles, Longworth, McClelland, & Dulcan, 2004) and 16% of all violent crimes (Office of Juvenile Justice and Delinquency Prevention, 2002). In addition, more juveniles than ever before are incarcerated and more of them are serving sentences in adult prisons (Teplin, Abram, McClelland, Dulcan, & Mericle, 2002). For many youths, especially (but not limited to) those who already have psychological or emotional problems, juvenile justice involvement is not only stressful but places them at risk for serious psychiatric complications. Teplin and colleagues (2002) studied a representative sample of youth detainees in a large city, and found that approximately two in three males (66%) and three in four females (74%) met diagnostic criteria for one or more psychiatric disorders. Half of the males and almost half of the females met criteria for a substance use disorder. Garland and colleagues (2001) found that 52% of a sample of youths in juvenile justice programs met criteria for a psychiatric diagnosis, compared to the 54% rate found for youths in the child welfare system due to abuse or neglect. Behavioral and emotional problems among youth in the juvenile justice system tend to involve not one but several comorbid psychiatric disorders. In a separate juvenile detention sample, 46% of males and 57% of females had two or more diagnosable psychiatric disorders, and another 20% of males and 17% of females met criteria for one disorder (Abram, Teplin, McClelland, & Dulcan, 2003).

In the latter study, disruptive behavior disorders, affective disorders, and anxiety disorders all were prevalent, and girls were at higher risk than boys for all types of disorders. In community or clinical samples (Angold et al., 2003), girls tend to be at higher risk than boys for affective or anxiety disorders, while boys tend to be at higher risk than girls for externalizing

disorders. In juvenile justice settings, these differences appear to be largely erased, such that both girls and boys are more likely than not to have serious and complex mental health problems, which may complicate their apparent “bad behavior” (e.g. impulsivity, aggression, delinquency) and “problems with authority.”

Several serious risk factors are associated with psychopathology among youths in detention centers. Hayes (2004) cites suicide rates for children in detention as four times higher than for the general population. Suicides in correctional facilities are often found to be preventable, thus there is a strong focus on determining suicide risk upon admission (Metzner, 2003). Depression, decreased social connectedness, impulsivity and instability are important correlates with ideation and attempts (Rhode, Seely, & Mace, 1997). Sanislow, Grilo, Fehon, Axelrod, and McGlashan (2003) found that youths in detention had similar risk levels on measures of suicide risk, depression, drug abuse, and impulsivity as youths in inpatient psychiatric treatment. Screening of suicidality in juvenile detention and other correctional settings is driven by the system’s ultimate liability and has been advanced by litigation (Bonner, 2000). Screening of other risk factors is less immediately associated with liability for life-and-death issues, but is driven by the system’s objective of safely managing the behavior of youths and the environments in which they are detained or monitored for juvenile justice purposes.

Measurement of risk factors also is scientifically and clinically indicated, given the strong inter-relationships between delinquent behavior and drug abuse, (McClelland, Teplin, & Abram, 2004a), adolescent fatherhood (Unruh, Bullis, & Yovanoff, 2004), substance use and multiple substance use disorders (McClelland, Elkington, & Teplin, 2004b), and exposure to traumatic events with subsequent PTSD and other stress related disorders (Mahoney, Ford, Ko, &

Siegfried, 2004). In certain states such as Connecticut, screening at intake is a statutory mandate (Connecticut General Statutes, 2004).

By law, juveniles in detention centers are entitled to receive necessary mental health services (Grisso, 2000), yet most youths in juvenile justice systems have not been either screened or assessed for potential mental health concerns (MacKinnon-Lewis, Kaufman, & Frabutt, 2002). In most juvenile justice settings where screenings or assessments are conducted, there is no standardization regarding the process, instrumentation, procedures, and expertise of the assessors (Soler, 2002). However, the need for standardization around screening in the juvenile justice system is currently receiving greater attention (Wasserman, Jensen, Ko, Coccozza, Trupin, Angold, et. al., 2003; Hoge, 2002; Grisso & Underwood, 2004). Mental health services for these youth tend to be fragmented and based on a deficits-model as opposed to a strength-based model (Coccozza & Skowrya, 2000). Wasserman and colleagues (2002, 2003) therefore argue for reform by creating best practices in mental health screening and assessment. These changes that hinge on the development and application of psychometrically reliable and valid measures to assess internalizing as well as externalizing problems, and psychosocial strengths as well as deficits, in order to identify and individualize services for both currently impaired and high risk youths.

Screening measures assessing attitudes or personality characteristics that may lead to disciplinary problems (especially risk of violence) have been developed for adult correctional populations (Birmingham, Gray, Mason, & Grubin 2000; Cooke, 1998; Walters & Chlumsky, 1993), but screening measures that target psychiatric disorders are less often reported. Teplin and Swartz (1989) statistically derived a 14-item Referral Decision Scale (RDS) using discriminant function analyses from the Diagnostic Interview Schedule (DIS) (need ref) administered to 728 male jail detainees (ages 16-68 yrs). With this sample and in a replication

with 1,149 male prison inmates, the RDS subscales for depression, bipolar disorder, and schizophrenia had 79-.88 average sensitivity and .99 average specificity for predicting full DIS diagnoses. Hart, Roesch, Corrado and Cox (1993) provided an independent replication with 790 male pretrial detainees, reporting .98 negative predictive power but only .19 positive predictive power in relation to full DIS diagnoses. DiCataldo, Greer and Profit (1995) adjusted RDS items and cut-off scores to reduce the rate of false positives, and reported mixed evidence of predictive validity in relation to institutional data: RDS scores correlated with indices of initial adjustment problems but not with violence or disciplinary remand. McLearn and Ryba (2003) reported a comparable sensitivity level (.73) and higher specificity (.84), but low positive predictive power (.63) for the RDC with 95 male jail detainees (a significantly smaller sample).

Subsequent studies of jail detainees receiving specialized services for mental illness reported mixed evidence of convergent validity between the RDS and independent measures of bipolar disorder (Mean $r=.19$), schizophrenia (Mean $r=.29$), and depression (Mean $r=.42$) (Rogers, Sewell, Ulstad, Reinhardt, & Edwards 1995), and of sensitivity and negative predictive power (.71-.85) but low specificity and positive predictive power (.15-.35) in relation to clinician diagnoses (Veysey, Steadman, Morrissey, Johansen, & Beckstead, 1998). Thus, with general jail populations and with detainees already identified as mentally ill, when examined in relation to independent diagnostic or functional data sources other than the DIS, the RDS's specificity is consistently low (with one partial exception, where specificity was high but positive predictive power was low, McLearn & Ryba, 2003). With the exception of 10% of the Vesey et al. (1998) sample, the RDC has been evaluated only with male jail detainees. The RDC also does not address anxiety disorders.

Relatively brief (i.e., 21-36 item) screening instruments have shown promise when evaluated psychometrically with adult correctional populations, but over-reporting or over-identification (i.e., false positives) consistently appear to be a more serious artifact than under-reporting (i.e., false negatives) (see also Lewis, Simcox, & Berry, 2002). Boothby & Durham (1999) used the Beck Depression Inventory and found that 27% of incarcerated men and women had moderate to severe depressive symptoms, with first-time inmates and those in maximum security reporting more severe depression than recidivists or lower security prisoners. Smith and Borland (1999) assessed problems with mood, anxiety, and somatic distress and psychosocial functioning in 204 women prison inmates with the General Health Questionnaire (GHQ), identifying 52% as potential psychiatric “cases.” Anderson, Sestoft, Lillebaek, Gabrielson and Hemmingsen (2002) administered the 28-item GHQ with a random sample of 184 prisoners (aged 18-60 yrs) in Denmark, finding evidence of moderate sensitivity but weak specificity. The 36-item Holden Psychological Screening Inventory (HPSI) supplements three factor analytically-validated subscales for psychiatric (including anxiety, somatic, and psychotic), social, and depressive symptomatology with a validity index to detect faking and other response biases (Book, Knap, & Holden, 2001). Although evidence of convergent and discriminant validity have been reported for the HPSI, its predictive utility for identifying psychiatric disorders has not been reported (Book et al., 2001).

The MAYSI-2 is a 52-item self-report instrument that identifies potential mental health and substance abuse needs of youth in the juvenile justice system (Grisso, Barnum, Fletcher, Cauffman, & Peuschold, 2001). It was designed to screen youth within 24-48 hours of entry into that system for immediate intervention (e.g., suicidality), as well as for indicators of need for more comprehensive mental health assessment. Gender differences comparable to those reported

by Abram et al. (2003) were found in a study administering the MAYSI-2 to 18,000 new admissions to Pennsylvania juvenile detention centers. More females (81%) than males (70%) scored above the clinical cutoffs on at least one of five MAYSI-2 subscales: Alcohol/drug use, Angry-irritable, Depressed-anxious, Somatic complaints, and Suicidality (Cauffman, 2004). In addition, White youths scored higher than Hispanic youth, who in turn, scored higher than African-American youth on all subscales. Finally, older youths were more likely to score higher on the Alcohol/drug use subscale than younger youths, while younger youths scored higher on the Anger/irritable subscale than their older peers. These ethnocultural and age differences are consistent with clinical and research studies of mental health problems among youths in the juvenile justice system (Espelage, Cauffman, Broidy, Piquero, Mazerolle, & Steiner, 2003; Goldstein, Arnold, Weil, Mesiarik, Peuschold, Grisso, & Osman, 2003).

Additional studies of the MAYSI-2's psychometric properties are currently underway and its ability to identify youths at immediate risk of self-harm or harm to others or in need of intensive mental health assessment (Cruise, Colwell, Lyons, & Baker, 2004; Wasserman et al, 2004). The present study was designed to examine the factor structure of the MAYSI-2 in a representative sample derived from a mixture of urban, suburban, and rural milieus, upon entry to detention facilities, in order to replicate or suggest possible revisions to its current subscales.

METHOD

Participants

Study participants were 458 youths admitted within the prior 24-72 hours to one of three State of Connecticut juvenile detention centers. An initial sample of 918 youths were screened by detention facility staff between January-December 2003. Some youths had multiple admissions ($M=2.8$, $SD=1.8$, range 0-13). Removing the readmissions reduced the N to 758.

Missing or unlinked data from the measures resulted in a further reduction to the final $N=458$.

No differences were found between participants included in analyses and those excluded due to missing data on demographics (i.e., age, gender, ethnocultural background) or legal status,

Participating youths ranged in age from 10 to 17 years old ($M= 14.3$, $SD=1.0$), comparable to the age composition reported by statewide census reports for all youths in detention centers during the study period and subsequently. Participants' self-reported ethnicities also were comparable to those of census data for all detained youths, including: White, not Hispanic (44% of sample, versus 36% in detention facilities overall), Black (African-American and Caribbean American, 35% versus 39% in detention facilities overall), and Latino/Hispanic (20% of sample, versus 36% in detention facilities overall). The primary types of crime with which participants were charged were representative of the overall juvenile detention population in the state for nonviolent crimes (i.e., use of a weapon, physical or sexual assault, manslaughter, or murder) (58% for this sample, versus 60% in detention facilities overall), but youths charged with violent crimes were *under*-represented (16% for this sample, versus 33% in detention facilities overall, and youths charged with status offenses, on probation or technical violations were *over*- represented (36% for this sample, versus 6% in detention facilities overall).

Procedure and Measures

Screening with the Massachusetts Youth Screening Instrument – Version 2 (MAYSI-2), Suicidal Ideations Questionnaire (SIQ), The Adolescent Alcohol Involvement Scale (AAIS), and The Drug Abuse Screening Test for Adolescents (DAST-A) occurred at the time of intake, within 24-72 hours of admission to one of the three detention centers for youths in Connecticut. Screenings with the Structured Assessment of Violence Risk in Youth (SAVRY) were conducted

routinely by detention facility staff with all new admissions throughout the week, on a schedule dictated by each facility's logistics and policies.

Data were abstracted on a redacted basis to ensure anonymity from secure institutional electronic databases by a co-author (JC), according to an exempt protocol for the management of archival data approved by the institutional review boards of the Court Support Services Division (IRRC) and University of Connecticut Health Center (IRB).

Massachusetts Youth Screening Instrument, Version 2 (MAYSI-2; Grisso et al., 2001).

This 52-item self-report questionnaire is readable at the fifth grade level and takes approximately 10 minutes to administer (Grisso et al., 2001). Respondents answer "yes" or "no" to each item, depending on whether it is true for them "within the past few months" (Cauffman, 2004). Face valid items suggested by adolescent mental health experts and juvenile detention staff were refined in the MAYSI-2 based on psychometric studies of seven factor analytically-derived subscales: Alcohol/ Drug Use, Angry-Irritable, Depressed-Anxious, Somatic Complaints, Suicide Ideation, Thought Disturbance, and Traumatic Experiences. The MAYSI-2 shows evidence of internal consistency (subscale $\alpha = .61-.86$) and retest reliability (Grisso et al., 2001), convergent validity with the Child Behavior Checklist Youth Self Report and Millon Adolescent Clinical Inventory ($r_s = .35-.65$; Grisso et al., 2001); and criterion and predictive validity based on correctional system records identifying youths who had (a) prior mental health treatment, (b) post-detention placement in secure facilities, and (c) a low likelihood of receiving post-detention mental health services (Stewart & Trupin, 2003).

Structured Assessment of Violence Risk in Youth (SAVRY; Borum, Bartel, & Forth, 2000).

This 30-item rating scale is grounded in the structured professional judgement model of risk assessment (Douglas & Kropp, 2002; Douglas, Ogloff, & Hart, 2003), and identifies 24 risk

factors and six protective factors. The manual lists inter-rater reliability with correlations between .72 and .83; and predictive validity, when measured by indices of past violent behavior, ($R^2 = .18-.21$; Borum et al., 2000). Three domains of risk factors are rated: *Historical*, *Social/Contextual*, and *Individual*. Each item is rated as “low”, “moderate”, or “high”. *Protective factors* also are rated, either as “absent” or “present” (Borum et al., 2000). The risk evaluation concludes with the assignment of a Summary Risk Rating. While the SAVRY does not use “cutoff scores,” several studies demonstrate that SAVRY items and risk judgments can be rated reliably and are related to violent outcomes with psychometric performance equal to or better than that for other risk/needs instruments for juveniles (Borum, Bartel, & Forth, in press).

Suicidal Ideations Questionnaire (SIQ); Reynolds, 1987). This 15- or 30-item self-report questionnaire (depending on grade level) evaluates suicidal thinking in children and adolescents with demonstrated reliability and convergent and predictive validity. SIQ psychometrics for this sample ($M = 8.3$, $SD = 15.6$) were comparable to those for clinical samples (Reynolds, 1987).

Substance Abuse Risk. The *Drug Abuse Screening Test for Adolescents (DAST-A)* is a 27-item questionnaire on which respondents self-rate substance abuse problems on a continuum according to severity. The DAST-A has documented reliability and validity for the study sample's age group, and raw scores of greater than six have been shown to be predictive of a substance abuse diagnosis (Martino, Grilo, & Fehon, 2000). Psychometrics for this sample ($M = 4.0$, $SD = 5.1$) were comparable to those for high risk or clinical samples (Martino et al., 2000).

The *Adolescent Alcohol Involvement Scale (AAIS)*; Mayer & Filstead, 1979) is a 14 item scale on which respondents self-rate the extent to which alcohol use interferes with functioning in psychological, social, and family spheres. The psychometrics for this sample ($M = 18.9$, $SD = 20.3$) were consistent with those of high-risk or clinical samples (Mayer & Filstead, 1979).

Statistical Analyses

After initial review and cleaning of all data (i.e., elimination of extreme outliers and cases with invalid or missing data, SPSS (Version 12) was used to conduct a principal components analysis (PCA) with varimax orthogonal rotation, including all items from the MAYSI-2.

Internal consistency reliability was calculated with Cronbach's Alpha for the MAYSI-2 subscales. If Alpha was less than .60, alterations in sub-scale constituent items were made based on PCA component loadings. The correlation of scores derived from the empirical components with MAYSI-2 subscale scores were calculated to further test the replicability of the subscales.

Next, we examined the discriminant validity of the empirically derived components by conducting multivariate linear regressions controlling for demographics with each component score as dependent variable and the theoretically unrelated MAYSI subscales as independent variables. We tested the predictive validity of the empirically derived MAYSI component scores, controlling for demographics, in linear multivariate regressions with SAVRY behavioral risk scores, and in logistic regressions with high/low risk groupings identified by median-split distributions of the SIQ (suicide risk) and the DAST and AAIS risk scores (substance abuse risk). Finally, we further tested the predictive validity of empirically-derived MAYSI-2 components by conducting a k-means cluster analysis using the component scores to cluster participants in sub-groups with distinct profiles.

Results

Based on inspection of screen plots, a 6-factor PCA solution was identified as the optimal factor structure (Table 1). The six components tended to replicate the MAYSI-2 subscales (Table 2), with one major exception. Components including items reflecting Suicidal Ideation (component 1), Anger/Irritability (component 2), and Alcohol/Drug Use (component 3)

accounted for almost one third of the total variance. Components containing items reflecting Somatic Complaints (component 4), Thought Disturbance (component 5), and Trauma Exposure and Symptoms (component 6) accounted for 10% variance. The depression and anxiety subscale items did not constitute a separate component, but instead were interspersed among components representing traumatic stress, hopelessness and suicidality, anger, and somatic distress.

Cronbach's Alphas for the MAYSI-2 sub-scales confirmed adequate internal consistency reliability for Somatic Complaints (SC; .73), Depressed/Anxious (DA; .74), Suicide Ideation (SI; .88), Angry/Irritable (AI; .80), Alcohol/Drug Use (AD; .84). The Thought Disturbance sub-scale (TD; .59) and Traumatic experiences (TE; .58) subscales had weak internal consistency. An item (#21) reflecting excessive daydreaming was added to the Thought Disturbance subscale based upon the PCA loadings, improving Alpha to .61. Deleting item #46 (people talk about me) and adding items that load on the traumatic stress component (severe sleep problems, #14; bodily pain, #21), increased the Traumatic Experiences subscale Alpha to .68.

The PCA components were uncorrelated by design (i.e., Varimax rotation) to maximize component independence. In correlational analyses (Table 3), the thought disturbance and somatic problems components each appeared to be truly independent, with substantial correlations only with the corresponding MAYSI subscale. However, the traumatic stress, anger, hopelessness/suicidality, and substance abuse components each tended to correlate substantially with each other MAYSI-2 subscale. Thus, problems with traumatic stress, anger, suicidality, and substance abuse appeared to be more interrelated than distinct in this sample.

In multivariate linear regression analyses (Table 4), problems with substance abuse and anger were consistent predictors of behavioral risk on the SAVRY and were inversely related to the youth's protective factors score. Somatic complaints were positively related to protective

factors scores, suggesting that youths with better psychological and social resources may be more willing or able to recognize and acknowledge physical health problems than those with poorer resources. In multivariate logistic regression analyses, suicide risk was predicted by problems with anger, thought disturbance, substance abuse, somatic distress, and traumatic stress. Drug and alcohol abuse risk each was predicted by problems with anger and older age. African American youths were less likely to be at risk for drug abuse, and Hispanic youths were less likely to be at risk for alcohol abuse, compared to White youths.

Clinically-relevant sub-groups of youths could be identified with different MAYSI problem profiles (Table 6), including (1) denial of problems in all areas, (2) comorbid substance abuse, somatic problems, and suicidality, (3) anger problems, (4) thought disturbance, and (5) comorbid substance abuse and traumatic stress. Substance abuse problems were infrequently reported (i.e., a negative cluster center loading $>.40$) by youths in the anger problems cluster, and suicidality was infrequently reported by youths in the substance abuse/trauma cluster.

Analyses of Variance followed by post hoc Scheffe tests showed that the cluster groups differed in level of behavioral risk, with significantly higher historical ($F[4,482] = 5.0, p < .001$) and social/contextual risk ($F[4,482] = 2.5, p < .05$) for the comorbid SA/PTSD group than the minimizer group, and individual risk ($F[4,482] = 13.6, p < .001$) higher for the suicidality/SA and SA/trauma groups than the minimizer group (with highest risk for the comorbid SA/trauma group). Chi Square analyses ($df = 4$) demonstrated that the groups also differed in suicidality risk on the SIQ, both using the *a priori* risk cutoff score ($X^2 = 55.4, p < .001$) and a median split ($X^2 = 45.9, p < .001$), in substance abuse risk, both using the *a priori* risk cutoff score ($X^2 = 47.9, p < .001$) and a median split ($X^2 = 59.2, p < .001$), and in alcohol abuse risk, both using the *a priori* risk cutoff score ($X^2 = 55.4, p < .001$) and a median split ($X^2 = 35.2, p < .001$). The two clusters

with prominent MAYSI-2 addiction scores were likely (>90%) to be at risk for drug and alcohol abuse. Suicidality risk was most prevalent for the comorbid addiction, somatic problems, and suicidality/ hopelessness cluster, but also was prevalent for the thought disturbance cluster.

Discussion

For mental health and correctional professionals practicing in the field of juvenile justice, the study findings support the adoption or continued use of the MAYSI-2 as a primary intake screening instrument in detention centers. In our analyses, the Depression/Anxiety subscale did not appear to constitute a separate factor in this study, although as referenced above, correlations between the Depressed/Anxious scale in prior studies suggests high correlations between this scale and the Depressive Affect scale of the MACI, and the Anxious-Depressed scale of the YSR (Grisso, et. al, 2001). Thus, evaluation of clinical depression in this population should proceed cautiously and consider the possibility of false negatives. Certainly, depression is a consistent finding of juvenile detention centers, with a variety of reported incidences including 24% in South Carolina, (Atkins, Pumariega, Rogers, Montgomery, Nybro, Jeffers, & Sease, 1999); 17 to 19% in a Mississippi sample (Robertson, Dill, Husain, & Undesser, 2004); and 20% in Texas (Pliszka, Sherman, Barrow, & Irick, 2000). Although the numbers vary by methodology, mood disorders were higher than the general population in studies of offenders since 1980 (Ryan & Redding, 2004). The variable rates may reflect different types of measurement or consideration of a variety of symptom clusters in determining the presence or absence of depression. A further complication may be the nature of the Depressed-Anxious scale in which most questions tend to focus on the internalizing symptoms of depression. This view is consistent with evidence that internalizing disorders are less likely than externalizing disorders to be identified by the MAYSI-2 (Wasserman, et. al., 2004).

Commenting on the limitations of the MAYSI-2 in the manual, Grisso and Quinlan (2005) indicate that it should be seen not as a conclusive diagnostic tool, but as “providing an ‘alerting function’”, which will indicate the need for immediate psychiatric treatment or further assessment. Wasserman, et. al. (2004) suggest a defense against false negatives by endorsing a two-stage screening process which includes universal screening using more than one measure.

Adjustment of certain factor loading would lend itself to a more robust trauma scale. Currently no cutoffs are in place for the trauma scale. Grisso and Quinlan (2005) summarize prior studies that suggest that symptoms of irritability, poor concentration, and detachment load on factors pertaining to other problem areas. In the present study, removal of an item intended to reflect boys’ interpersonal hypervigilance and adding items reflecting pervasive bodily pain and sleep problems, produced a relatively internally consistent traumatic stress sub-scale. Suspiciousness or interpersonal sensitivity may be more related to true oppositionality or conduct disorder than to traumatic stress in this population (Ford et al., 2000). Sleep problems are a hallmark symptom of PTSD which, although possibly due to other disorders (e.g., depression) or conditions (e.g., hyperactivity, chronic stressors, physical illness), appears to be an important aspect of PTSD with youths in juvenile justice settings (Wolpaw et al., 2005). Pervasive pain is a frequent complaint among individuals who experience complex PTSD secondary to early childhood developmentally-adverse traumas (e.g., child abuse or neglect) (Ford, in press)—suggesting that screening for traumatic stress with youths in juvenile justice settings should include identification of basic self-regulation problems as well as anxiety.

Not surprisingly, participants with co-morbid substance use and PTSD were higher on SAVRY historical and environmental factors. Loeber & Farrington (2000) found that increased incidence of African-American referrals to juvenile court is a result of their exposure to greater

environmental risk factors, particularly the risks that accompany life in the inner city neighborhoods. Calvert (2002) found neighborhood disorganization to be a prime risk factor for violent delinquent behavior.

The fact that sub groups of youth can be identified is promising and not at all surprising. Prior work has found clusters according to low level of symptoms, high level of symptoms, and co-occurring substance abuse and mental health symptoms. The latter two groups were more likely to receive longer, more restrictive punishments, and less likely to have access to minimum security and transitional placements and services (Stewart & Trupin, 2003). In the present analyses, more specific clusters were identified based upon prominent self-reported problems with (a) substance abuse, physical health problems, and suicidality and hopelessness, (b) substance abuse and trauma problems, (c) anger problems, and (d) thought disturbance. The cluster reporting moderate levels of problems on the MAYSI-2 with comorbid addiction, physical health, and suicidality or hopelessness represented 15% of the sample and were found to be highly likely to be at risk for suicidality and drug or alcohol abuse on independent screening measures. The cluster reporting very high levels of addiction problems and moderate levels of traumatic stress symptoms on the MAYSI-2 also were highly likely to be at risk for drug and alcohol abuse, but not for suicidality. Thus, one in four youths in this sample fell into one of these two particularly high risk clusters.

Addiction may both lead to and be a means of coping with physical health problems, extreme affective distress, or traumatic stress problems (Ouimette & Brown, 2003). The finding of two distinct sub-groups of youths at high risk for substance abuse, one with severe somatic and affective complaints and the other with traumatic stress problems, suggests that physical health, affective, and traumatic stress problems all warrant careful attention in screening youths in

detention—not only because of the impairment that these problems may cause on their own, but moreover because of their association with high risk of potential further legal, health, and self-injury problems by these youths. The prominent denial of hopelessness and suicidality by youths who report traumatic stress problems and very high levels of substance abuse may reflect the numbing and detachment that can result from both substance abuse and post-traumatic stress disorder. These youths may be at risk for affective distress and suicidality if circumstances that reduce their denial and numbing occur (e.g., inability to obtain drugs or alcohol, distressing reminders of traumatic events that cannot be avoided, changes in diet, activity, or medication that increase levels of physical arousal or tension).

Anger problems also were strongly correlated with behavioral and suicide risk, but the results of the cluster analyses suggest that anger *per se* does not distinguish youths who are at the highest level of risk for either substance abuse or suicidality. Anger may be a marker for historical and current social/contextual stressors in these youths' lives, reflecting an understandable although potentially problematic response to socioeconomic, peer group, and familial conflict, deprivation, or adversity. Anger does not appear to directly place youths at risk for suicidality or substance abuse problems—rather, it appears that physical health problems, affective or post-traumatic distress are the most consistent sources of risk across the behavioral, addiction, and suicidality domains.

Replication and further elucidation of the nature and risks associated with sub-groups of youths in detention may have substantial implications for individualized treatment. To date, traumatic stress as a construct has received little attention in juvenile justice relative to other factors, although efforts are underway to address this. In one study, age of the individual and regional differences were found to be associated with differences on the Traumatic Experiences

subscale (Wasserman, et. al., 2004). The ability to identify a sub-group of youths with comorbid substance abuse and traumatic stress problems could be a basis for not only identifying youths at risk but for tailoring the approach taken to working with these youths in the detention center and for providing these youths with services that address traumatic stress as well as addiction and behavior problems.

In addition, youths who are at highest risk for suicidality may be identified through extreme high or low scores on the suicidality/hopelessness component of the MAYSI-2. Since they are at greater risk for behavioral and suicide risk, they would require close observation and special treatment planning unless determined otherwise by a clinician. Level of behavior risk then generates a plan by which interventions within and outside of a detention setting can be made with greater likelihood of success. Matching treatment to needs has been successful in improving both delinquent behaviors and psychopathology (Lyons, Griffin, Quintenz, Jenuwine, & Shasha, 2003) and makes good clinical sense.

The study has several limitations that should be taken into account in making inferences from its results. The sample, while ethnoculturally diverse, representing both genders, and drawing from rural and suburban as well as urban populations of youths, is limited to one northeastern state which may not be representative of all juvenile justice populations. No independent measures of risk were utilized (e.g., legal or institutional records of suicide attempts or violent behavior, medical records of health problems, child protective services or healthcare records of traumatic events), so the correspondence of self-reported risk on the SIQ, DAST, and AAIS to actual suicidality or substance abuse is not known. Trauma history was obtained on a few brief MAYSI-2 items which may not fully represent the nature or extent of youths' trauma exposure, and traumatic stress symptoms also were assayed by only a few items that did not

cover the full range of PTSD or complex PTSD symptomatology. The SAVRY, while providing a multi-source measure of risk, was completed by detention staff based upon variable sources and amounts of information, and the SAVRY ratings were not checked for reliability by independent raters in this study.

In the years since the publication of the second version, use of the MAYSI has grown dramatically. The results of the present study indicate that the MAYSI-2 subscales are generally psychometrically robust, but that empirically-based modifications may offer a basis for increasingly precise identification of the specific youths who are at highest risk in stressful juvenile correctional settings and for potentially tailoring the management of the milieu and the provision of services to youths with different specific types of behavioral and emotional risk and problems. Continued refinement of screening in relation to behavioral risk is necessary in order to make institutions safer, and services more available to the many youths in detention settings who have mental health needs.

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Table 1. Principal Components Analysis of MAYSI-2 Items, Varimax Orthogonal Rotation

Component	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	10.406	20.812	20.812	4.320	8.640	8.640
2	3.226	6.452	27.264	4.234	8.468	17.107
3	2.438	4.876	32.140	4.023	8.045	25.153
4	2.050	4.101	36.241	3.475	6.950	32.102
5	1.593	3.187	39.428	2.596	5.192	37.294
6	1.524	3.048	42.476	2.591	5.181	42.476
7	1.363	2.727	45.202			
8	1.294	2.587	47.789			
9	1.241	2.482	50.272			
10	1.123	2.245	52.517			
11	1.054	2.107	54.624			
12	1.016	2.031	56.655			

Table 2. Component Loadings, Principal Components Analysis of MAYSI-2 Items

		Rotated Component Matrix					
<u>MAYSI-2 Item</u>	<u>MAYSI-2 Subscale^A</u>	<u>PCA Component/Loading</u>					
		1	2	3	4	5	6
22 (Suicide Ideation)	SI	.783	.105	.217	.092	.173	.031
11 (Wished You Were Dead)	SI	.781	.081	.184	.146	.081	.067
16 (Life Not Worth Living)	SI	.776	.140	.099	.091	.102	.137
18 (Felt Like Hurting Self)	SI	.745	.148	.232	.170	.171	.007
47 (Given Up Hope)	DA	.673	.102	.143	.107	.206	.131
38 (Can't Do Anything Right)		.466	.320	.057	.284	.145	.068
17 (Felt Lonely)	DA	.451	.261	-.080	.184	.174	.267
34 (Don't Have Fun)	DA	.351	.225	.034	.104	.097	.163
2 (Lost temper)		-.045	.667	.146	.087	-.025	.027
39 (Frustrated Easily)	AI	.106	.644	.149	.232	-.030	-.069
6 (Easily Upset)	AI	.126	.589	.055	.264	-.046	.017
7 (Felt Like Getting Back)	AI	.110	.587	.144	-.061	.130	.134
35 (Felt Angry)	AI	.209	.581	.078	.078	.150	.205
13 (Too Many Bad Moods)	AI	.123	.565	.068	.203	.186	.140
42 (Stayed Mad)	AI	.043	.558	.036	.041	.168	.208
44 (Hurt or Broken Something)	AI	.184	.448	.219	.053	.059	.085
4 (Problems Concentrating)		.077	.399	.045	.323	.304	.037
5 (Enjoyed Fighting)		-.025	.396	.152	-.241	.371	.133
36 (Didn't Want to go to School)		.187	.385	.206	-.014	.155	-.029

15 (Too Tired)		.130	.326	.076	.288	.027	.265
41 (Hard to Feel Close)	DA	.224	.295	-.074	.127	-.107	.242
40 (Alcohol/Drugs Same Time)	AD	.090	.050	.727	.018	-.028	-.021
45 (So Drunk Couldn't Remember)	AD	.095	.081	.723	.092	.059	.090
23 (In Trouble When Drinking)	AD	.032	.120	.708	.055	.079	.076
37 (Drunk/High at School)	AD	.013	.010	.699	-.055	.017	.118
10 (Done Something Wish Hadn't)	AD	.176	.020	.639	.163	.044	.191
24 (Fighting When High)	AD	.099	.103	.608	.092	.080	.041
33 (Use Drugs to Feel Better)	AD	.270	.153	.602	.033	.113	.060
19 (Others Think Drink Too Much)	AD	.056	.122	.470	.085	.016	.102
27 (Felt Shaky)	SC	.120	.120	.068	.666	.072	-.042
30 (Felt Clammy)	SC	.086	.002	.138	.650	-.010	.048
29 (Short of Breath)	SC	.085	.075	.054	.581	.146	.215
28 (Heart Beat Fast)	SC	-.014	.135	.078	.576	.090	.015
31 (Stomach Upset)	SC	.138	.114	-.024	.544	.070	.189
3 (Nervous Kept from Doing)		.193	.232	-.059	.416	-.050	.299
43 (Bad Headaches)	SC	.191	.118	.077	.408	.236	.054
1 (Sleep Problems)		.244	.319	-.060	.373	.087	.156
14 (Nightmares)	DA	.089	.030	-.092	.342	.337	.308
9 (Seen Things Not There)	TD	.200	.021	-.003	.040	.687	.051
20 (Heard Voices)	TD	.239	-.002	.043	.202	.666	.107
8 (Really Jumpy)	AI	.038	.327	.028	.123	.453	.036
26 (Things Don't Seem Real)	TD	.174	.067	.144	.330	.381	.283

32 (Make Others Do by Thinking)	TD	.211	.173	.058	-.133	.379	.036
12 (Daydream Too Much)		.188	.241	.194	.251	.362	-.013
25 (Others Control Brain)	TD	.039	.053	.084	.160	.361	-.072
48 (Terrible Event)	TE	.098	.045	.153	.155	-.067	.669
51 (intrusive symptoms)	TE	.173	.118	.057	.264	.198	.565
49 (Danger, injury/death; Girls)	TE	.043	.150	.283	.061	-.022	.512
21 (Body Pain)	DA	.186	.140	-.013	.164	.338	.498
52 (Witness Injury/Death)	TE	-.036	.114	.171	-.073	-.032	.495
50 (Raped, Danger of Rape)	TE	.344	.030	.180	.074	.162	.395
46 (People talk about you; Boys)	TE	.153	.289	-.047	.180	.098	.299

Table 3. Pearson Correlations between MAYSI-2 Subscales and Empirically-Derived Components

	Empirically Derived Components					
	Anger Trauma	SA	Somatic	Suicide Risk	Psychosis	
MAYSI2 Anger/ Irritability Subscale	.889***	.159***	.184***	.163***	.181***	.141**
MAYSI2 Alcohol/ Drug Use Subscale	.139**	.959***	.073	.148**	.065	.108*
MAYSI2 Somatic Complaints Subscale	.154**	.093*	.869***	.155**	.156**	.117*
MAYSI2 Suicide Subscale	.140**	.199***	.147**	.910***	.180***	.093*
MAYSI2 Thought Disturbance Subscale	.098*	.112*	.214***	.280***	.766***	.173***
MAYSI2 Traumatic Experiences Subscale	.166***	.223***	.215***	.189***	.157***	.852***
MAYSI2 Depression Anxiety Subscale	.407***	.018	.318***	.462***	.194***	.511***

N= 487 * $p < .05$ ** $p < .01$ *** $p < .001$

Table 4. Linear Regression Analyses Examining MAYSI-2 Components as Predictors of Risk Indicators with Youths in Detention Facilities

	B	SE	Beta	t	p
<u>SAVRY Historical Risk</u>					
Race	-.002	.021	-.050	-1.11	.269
Age	.003	.017	.076	1.65	.099
Gender	-.000	.037	-.004	-0.08	.935
Assessor Race	.008	.032	.011	0.24	.814
Assessor Gender	.005	.035	.069	1.48	.140
Anger Component	.008	.017	.217	4.87	.000
Psychosis Component	.000	.017	.013	0.29	.769
Somatic Component	.000	.017	-.021	-0.48	.630
Suicide Component	.002	.017	.059	2.20	.032
Addiction Component	.005	.017	.123	2.16	.035
Trauma Component	.008	.017	.036	2.43	.017
<u>SAVRY Social/Contextual Risk</u>					
Race	.000	.022	-.058	0.24	.799
Age	.002	.017	.021	0.25	.799
Gender	.002	.038	-.088	-0.44	.662
Assessor Race	-.006	.033	.069	-1.86	.063
Assessor Gender	.005	.036	.069	1.45	.147
Anger Component	.004	.017	.106	2.34	.020
Psychosis Component	.000	.017	-.012	0.29	.789

	B	SE	Beta	t	p
Somatic Component	-.001	.017	-.025	-0.48	.575
Suicide Component	.002	.018	.018	1.30	.209
Addiction Component	.003	.017	.090	2.05	.044
Trauma Component	.001	.017	.018	0.49	.697
<u>SAVRY Individual Risk</u>					
Race	.004	.026	-.058	-1.39	.166
Age	.005	.020	.021	2.45	.014
Gender	-.005	.045	-.088	-1.18	.238
Assessor Race	.002	.036	.069	-0.63	.528
Assessor Gender	-.004	.032	.069	-0.92	.358
Anger Component	.115	.020	.106	5.76	.000
Psychosis Component	-.003	.020	-.012	0.13	.789
Somatic Component	-.007	.020	-.025	-0.37	.575
Suicide Component	.004	.021	.018	1.82	.069
Addiction Component	.135	.020	.090	6.62	.000
Trauma Component	-.007	.020	.018	0.34	.731

	B	SE	Beta	t	p
<u>SAVRY Protective Factors</u>					
Race	-0.002	.019	-.037	-0.79	.428
Age	-.001	.015	-.033	-0.69	.481
Gender	-.003	.033	-.037	-0.76	.445
Assessor Race	.000	.030	-.005	-0.09	.926
Assessor Gender	-.003	.031	-.054	-1.09	.277
Anger Component	-.004	.020	-.140	-2.98	.003
Psychosis Component	-.001	.015	-.039	-0.85	.338
Somatic Component	.004	.015	.117	2.70	.013
Suicide Component	.001	.015	-.037	-0.66	.509
Addiction Component	-.004	.015	-.130	-2.71	.007
Trauma Component	-.003	.015	-.010	-0.20	.839

Table 5. Logistic Regression Analyses Examining MAYSI-2 Components as Predictors of Risk Indicators with Youths in Detention Facilities

	<u>Wald <i>F</i></u>	<i>p</i>	<u><i>OR</i></u>	<u><i>95% CI</i></u>	
	<u>Suicide Ideation Questionnaire High Risk</u>				
Race: African American	0.461	.497	0.844	.517	-1.377
Race: Hispanic	2.936	.087	0.601	.335	-1.076
Race: Other	0.470	.493	0.523	.082	-3.330
Age	0.271	.603	0.945	.762	-1.171
Gender	3.311	.069	1.584	.965	-2.598
Assessor Race	0.051	.822	1.049	.691	-1.592
Assessor Gender	0.572	.449	1.188	.760	-1.857
Suicide Component	19.27	.000	2.227	1.558	-3.184
Anger Component	21.31	.000	1.668	1.342	-2.072
Addiction Component	5.732	.017	1.352	1.056	-1.731
Somatic Component	28.43	.000	1.908	1.652	-2.419
Psychosis Component	9.350	.002	1.531	1.165	-2.011
Trauma Component	5.214	.022	1.310	1.039	-1.652

	<u>Wald <i>F</i></u>	<i>p</i>	<u><i>OR</i></u>	<u><i>95% CI</i></u>	
<u>Adolescent Alcohol Use High Risk</u>					
Race: African American	3.166	.075	.664	.422	-1.043
Race: Hispanic	4.760	.029	.559	.331	-.943
Race: Other	.053	.818	1.236	.204	-7.505
Age	20.34	.000	1.572	1.291	-1.913
Gender	2.121	.145	1.392	.892	-2.172
Assessor Race	3.120	.077	1.414	.963	-2.077
Assessor Gender	.245	.620	.901	.598	-1.359
Suicide Component	.798	.372	1.100	.893	-1.354
Anger Component	8.510	.004	1.339	1.100	-1.629
Somatic Component	3.193	.074	1.198	.983	-1.46
Psychosis Component	115	.734	1.035	.849	-1.262
Trauma Component	.044	.834	.979	.803	-1.193

	<u>Wald <i>F</i></u>	<i>p</i>	<u><i>OR</i></u>	<u><i>95% CI</i></u>	
<u>Adolescent Drug Use High Risk</u>					
Race: African American	4.533	.033	.600	.375	-.960
Race: Hispanic	.065	.799	.930	.533	-1.623
Race: Other	1.465	.226	.341	.060	-1.945
Age	25.85	.000	1.694	1.383	-2.076
Gender	.482	.487	.850	.536	-1.346
Assessor Race	.070	.792	.948	.636	-1.413
Assessor Gender	.074	.786	.943	.615	-1.445
Suicide Component	.798	.372	1.100	.893	-1.354
Anger Component	16.67	.000	1.545	1.254	-1.905
Somatic Component	.114	.736	1.036	.843	-1.273
Psychosis Component	3.692	.055	1.430	.671	-1.004
Trauma Component	1.998	.157	1.162	.944	-1.430

Table 6. Cluster Analysis-derived Sub-groups with MAYSI-2 Component Profiles

	<u>Cluster</u>				
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
<i>N</i>	182	46	156	33	70
% Sample	37%	10%	31%	7%	15%
<hr/>					
	<u>Rotated Cluster Centers</u>				
Suicide Component	-.08386	.43295	-.26550	.23850	-.67663
Anger Component	-.89916	.22245	.85624	.28242	.15029
Alcohol Drug Component	-.38136	.70526	-.49501	-.01383	1.63776
Somatic Component	-.23646	.43608	.15399	.27541	-.14479
Psychosis Component	-.09901	.15449	-.36307	.60605	-.26355
Trauma Component	.01044	.00232	-.19215	-.07700	.43585
<hr/>					
	<u>Membership in Clusters by High Risk Individuals</u>				
Youths at High Suicidality Risk	45%	96%	65%	78%	58%
Youths Scoring > SIQ Median	35%	94%	56%	63%	52%
Youths at High Drug Abuse Risk	49%	83%	66%	50%	91%
Youths Scoring >DAST Median	43%	80%	55%	47%	91%
Youths at High Alcohol Use Risk	43%	78%	58%	59%	79%
Youths Scoring >AAIS Median	49%	83%	66%	50%	91%

Note: Cluster centers >.40 and high risk sub-groups with >75% membership in each cluster are shown in **bold print**.