

Psychometric Properties of the Massachusetts Youth Screening Inventory-Second Version
(MAYSI-2) among Latino Adolescent Offenders

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Abstract

The Massachusetts Youth Screening Inventory-Second Version (MAYSI-2; Grisso & Barnum, 2006) has been widely adopted by juvenile justice agencies to identify adolescents in the juvenile justice system who have a mental disorder. However, evidence of the ability of the MAYSI-2 to generalize across different ethnic groups is limited. Because Latinos are overrepresented in the juvenile justice system, we examined the psychometric properties of each subscale in a sample of 472 Latino juvenile offenders using confirmatory factor analyses (CFA), Pearson's correlation coefficients, and simple linear regressions. The CFA models suggest adequate fit for Latino youth, and the correlations and regressions show strong convergent validity with the K-SADS-PL for a number of MAYSI-2 subscales, lending support to the generalizability of the MAYSI-2 to Latino adolescents. These results may be particularly beneficial for juvenile justice system administrators who render mental health treatment recommendations for youth offenders of different ethnicities.

Keywords: MAYSI-2, factor analysis, Latinos, juvenile justice system, mental health screening

Psychometric Properties of the Massachusetts Youth Screening Inventory-Second Version
(MAYSI-2) Among Latino Adolescent Offenders

In the United States juvenile justice system, children and adolescents with a mental disorder are disproportionately represented (40-70% compared to 17-22% in the community; Cauffman & Grisso, 2005; Shufelt & Coccozza, 2006). Despite this, many young offenders have mental health problems that are unknown to the juvenile justice agencies that supervise them. Although the presence of mental health symptoms typically do not directly cause criminal justice involvement in youth (Schubert, Mulvey, & Glasheen, 2011) or adults (Peterson, Skeem, Kennealy, Bray, & Zvonkovic, 2014), these symptoms can become exacerbated and increase the likelihood of acting out while in custody or re-offending upon release (Ford, Chapman, Hawke, & Albert, 2007; Grisso, Vincent, & Seagrave, 2005; Hoeve, McReynolds, & Wasserman, 2014). As such, high-quality screening measures are essential to promptly and accurately identify juvenile offenders with mental illnesses upon entry into the justice system (Grisso, Barnum, Fletcher, Cauffman, Deuschlel, 2001).

The most widely used mental health screening tool in U.S. juvenile justice agencies is the Massachusetts Youth Screening Inventory-Second Version (MAYSI-2; Grisso, 2005, 2007). The creators of the MAYSI-2 intended for the measure to screen for mental, emotional, and behavioral disorders as well as suicide risk. Although there is evidence that the MAYSI-2 has good psychometric properties when used with diverse samples of offenders (e.g., Archer, Stredny, Mason, & Arnau, 2004), less is known about its properties among specific subgroups of offenders. This is important for groups like Latinos, who are disproportionately represented in the United States juvenile justice system (25% incarcerated compared to 19% in the community; Grisso, 2005; Saavedra, 2010; Desai et al., 2012) and whose proportion is rapidly increasing

(Puzzanchera, Sladky, & Kang, 2015). This group is also disadvantaged in the receipt of mental health treatment; in the community, Latino youth who exhibit mental health symptoms are significantly less likely to receive mental health services regardless of gender, age, or diagnosis (Hough et al., 2002; Katoaka, et al., 2002). To ensure that Latino youth are given every opportunity to receive mental health treatment in the juvenile justice system when treatment is needed, the present study sought to assess whether the widely used MAYSI-2 generalizes to this group by examining the factor structure and convergent validity of the MAYSI-2 among a sample of Latino adolescents.

Development of the MAYSI-2

The MAYSI-2 was designed to screen for characteristics and symptoms that may be indicative of disorders or problematic behavior in adolescents so these individuals may receive further assessment (Grisso et al., 2001). It is intended for use with both male and female adolescents, ranging in age from 12-17, from diverse ethnic backgrounds (Grisso et al., 2001). The measure consists of 52 items, seven primary subscales (six for girls) and three scoring categories: normal, caution (youth may require some further attention, scoring in the top 30-45% of average adolescents in the system), and warning (youth requires further attention and priority, scoring in the top 10% of average adolescents in the system). The subscales of the MAYSI-2 are: 1) Alcohol/Drug use; 2) Angry-Irritable; 3) Depressed-Anxious; 4) Somatic Complaints; 5) Suicide Ideation; 6) Traumatic Experiences (a non-clinical scale with no cut-off score associated); and 7) Thought Disturbance (only valid for juvenile boys; Grisso et al., 2001).

These MAYSI-2 subscales were developed using principal component analysis (PCA) and varimax rotation with Kaiser normalization in a sample of boys ($N = 868$) and girls ($N = 409$; 22% of the total sample was Latino) collected from eastern and central Massachusetts with two-

thirds of the cases being collected from detention centers (Grisso & Barnum, 2006). The MAYSI-2 developers conducted a second exploratory factor analysis using a sample of boys ($N = 3766$) and girls ($N = 238$; 50% of the total sample was Latino) who were committed to the California Youth Authority. Similar factors were revealed in this sample with a few exceptions. Four out of 9 items on the Depressed Anxious subscale only marginally loaded onto this scale for both boys and girls; and among girls, the Somatic Complaints subscale contained only 3 out of 6 items suggested by the prior study (Grisso, Barnum, Fletcher, Cauffman, & Peuschold, 2001). The factor analytic results suggest that the California sample provided evidence for stable psychometric properties of the MAYSI-2 as established by the Massachusetts sample (Grisso et al., 2001). Though the development study investigated psychometric properties separately by gender, no analyses were reported separately for ethnicity.

Grisso and colleagues (2001) also demonstrated the convergent validity of the MAYSI-2 by computing correlations between the Millon Adolescent Clinical Inventory (MACI) and Youth Self-Report (YSR) with MAYSI-2 subscale scores. The Alcohol/Drug use, Angry-Irritable, Depressed-Anxious, and Suicide Ideation subscales correlated meaningfully with conceptually relevant MACI scales (ranging from 0.35 to 0.65). In addition, Grisso and colleagues (2001) reported that the Angry-Irritable, Depressed-Anxious, Somatic Complaints, and Thought Disturbance (exclusively valid for boys) subscales all correlated meaningfully with their conceptually related YSR scales for both boys (ranging from 0.40 to 0.55) and girls (ranging from 0.40 to 0.60). Ultimately, Grisso and colleagues (2001) concluded that the MAYSI-2 scales assess clinically meaningful constructs and demonstrates good utility in screening youth entering the justice system.

Evidence of Validity of the MAYSI-2

Only a few studies have attempted to replicate the findings of the development study that investigated the factor structure of the MAYSI-2. Archer and colleagues (2004) conducted a factor analysis using PCA and varimax rotation with Kaiser normalization among a predominantly male and African American (75%; 1% Latino) sample of adolescents who were admitted into Virginia juvenile detention facilities. A largely consistent 7-factor solution for boys and a 6-factor solution for girls were reported; however, the factor loadings for Thought Disturbance, Depressed-Anxious, and Somatic Complaints subscales were not as strong as those reported by Grisso and colleagues (2001). Ford, Chapman, Pearson, Borum, and Wolpaw (2008) also conducted a PCA separately for boys and girls using a sample of juveniles (68% of the sample was boys; 23% of the sample was Latino). They reported a 6-factor solution rather than the 7-factor solution suggested by the MAYSI-2 manual. Items from the Depressed-Anxious subscale were distributed amongst the other identified subscales, and further refinement of this scale was recommended.

Other studies have examined convergent validity by investigating the extent to which youths' scores on the MAYSI-2 subscales correspond to alternate measures of conceptually related constructs. Archer and colleagues (2004) investigated the relationship between the MAYSI-2 subscales and self-reported symptoms from interviews with youth (e.g., suicidal ideation, substance use, and physical abuse). They found that higher Suicide Ideation subscale scores were associated with a higher reported number of prior suicide attempts and current suicidal ideation, and higher Alcohol/Drug use subscale scores were associated with a higher reported history of substance abuse. There were no significant differences in Traumatic Experiences subscale scores for youths' frequency of physical or sexual abuse. Following this,

Ford and colleagues (2008) used correlational results of youths' suicidality, violence, and alcohol/drug use problems and found evidence for utility of the MAYSI-2 subscales at detecting symptoms, with the exception of the Depressed-Anxious and Thought Disturbance subscales.

Archer and colleagues (2010) found that, for both boys and girls, the Alcohol/Drug use and Suicide Ideation subscale scores correlated highly with the conceptually related demographic variables (ranging from 63% to 84%), demonstrating good convergent validity. The Depressed-Anxious and Angry-Irritable subscales moderately correlated with conceptually relevant variables for girls (69% and 57% respectively). The Somatic Complaints, Traumatic Experiences, Depressed-Anxious (for boys only), Angry-Irritable (for boys only), and Thought Disturbance (exclusively valid for boys) subscale scores did not correlate well with the conceptually relevant variables (ranging from 0% to 43%). These results are similar to both Archer et al., (2004) and Ford et al., (2008) who reported good utility of all MAYSI-2 subscales with the exception of the Depressed-Anxious and Thought Disturbance subscales.

Though a broad range of validity evidence has been established for inferences made regarding the MAYSI-2 (e.g., discriminant, convergent validity), these studies demonstrate some inconsistent findings. A potential explanation for differences in findings across study site may be due to U.S. regional differences or a reflection of differences in the ethnic composition of the samples; for example, Grisso and colleagues' (2001) Massachusetts sample was predominantly (44%) European American (22% Latino) and their California sample was predominantly (50%) Latino. In comparison, Archer et al., (2004; 1% Latino), Archer et al., (2010; 4.3% Latino) and Ford et al., (2008; 23% Latino) used a sample of predominantly African American youth (i.e., 74%, 66.8%, 42% respectively). It is possible that the MAYSI-2 provides varied evidence of utility among youth of different ethnicities. A meta-analysis examining sex and race differences

on the MAYSI-2 revealed that European American youth were more likely than African American or Latino youth to report Suicide Ideation, Somatic Complaints, and Alcohol/Drug use, although these effects were small (Vincent et al., 2007). It is unknown whether these differences reflect real differences in levels of distress or potential limited generalizability of the MAYSI-2. The only known study to examine the MAYSI-2 specifically among Latinos *[redacted for the purpose of blind review]* found promising evidence of the measure's utility at identifying diagnosable mental illness among Latino youth using the cut off scores recommended by the manual. However, questions remain regarding the factor structure and convergent validity of the measure among this group (see Grisso et al., 2012).

Further examinations of the MAYSI-2 factor structure are needed to determine the extent to which these subscales are composed of items that together measure meaningful constructs in samples beyond those in the development study to establish cross-cultural validity and ensure a measure is equivalent across ethnic groups (e.g., Ben-Porath, 1990; Okazaki & Su, 1995). These analyses are especially important given the diverse youth who are involved in the justice system (e.g., Saavedra, 2010). In addition, more needs to be known about the extent to which youths' scores on MAYSI-2 subscales correspond to other measures of conceptually related constructs (e.g., suicidal attempts, physical abuse, and alcohol/drug use) among diverse groups. This will ensure that youth receive appropriate services so that mental health problems would not pose any barriers to treatment for criminogenic needs (see Grisso & Barnum, 2006).

The Present Study

Though many of the studies reported above include Latino adolescents in their samples, few studies report results separately by ethnicity, and when they do, only different patterns of scores are investigated. To contribute to and extend current research, we examined the

psychometric properties of the MAYSI-2 among a sample of Latino juvenile offenders from the Southwestern United States.

The present study has two aims. Our first aim assesses the factor structure of the MAYSI-2 by testing both the fit of each MAYSI-2 subscale and the factor loadings of each MAYSI-2 item for Latino juvenile offenders. This approach is most appropriate because specific MAYSI-2 subscale scores rather than a total score identify individuals in need of further assessment. We conducted analyses separately for Latino boys and Latina girls because the factor structure of the MAYSI-2 varies as a function of gender. Investigating the factor loadings for each item allows for the identification of specific items that may function differently among Latinos relative to European Americans. Our second aim investigates the convergent validity among Latino youth using data from the Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL; Kauffman, Birmaher, Brent, Rao, & Ryan, 1996). This allows us to examine whether the MAYSI-2 subscale scores accurately predict specific clinical symptoms in Latino youth.

Method

The current study is a secondary analysis of data collected in a larger study [*redacted for the purpose of blind review*] investigating the efficacy of the MAYSI-2 in identifying mental illness among juvenile offenders. The data stem from routine intake procedures in a juvenile justice agency, where intake officers administered the MAYSI-2 and other common intake measures (i.e., risk assessment tools). Mental health assessments using a diagnostic interview (see below) were conducted on behalf of the agency between May 2011 to December 2012 as part of an initiative to improve identification of mental illness among adolescents served by the

agency in its diversion programs. Assessments were scheduled by agency staff and conducted by trained interviewers in a private room within the agency in El Paso, Texas.

Participants

The majority of adolescents in the sample (85%) were assigned to diversion programs for first-time or low-risk offenders. Of the 627 juvenile offenders who were administered the MAYSI-2 during the study period, we selected all Latino offenders between the ages of 12 and 17 who had a valid MAYSI-2 for inclusion in the present study. Given the characteristics of the region where data were collected (El Paso, Texas), the vast majority of these offenders were of Mexican or Mexican American origin. Of the 494 Latino juveniles in the appropriate age range who completed the MAYSI-2, 22 questionnaires were either answered in Spanish or were not fully completed, thus excluded from the analyses. For those who completed multiple MAYSIs ($N = 30$), we used their first MAYSI-2 for our analyses as Grisso and Barnum (2000) have suggested that scores reported in follow-up MAYSI-2 measures may be a result of practice effects or adjustment to the detention center. This resulted in a sample of 472 juvenile offenders (319 boys and 153 girls) who were either arrested but not detained (67.1% of our sample), or detained (32.9% of our sample). An investigation of MAYSI-2 scores revealed no significant differences between these groups of youth. The ages of the sample ranged from 12 to 17 years ($M = 14.55$, $SD = 1.3$).

Measures

MAYSI-2. The MAYSI-2 is a 52-item self-report screening measure that can be administered either with a software program (MAYSIWARE) or a paper and pencil where youths circle “yes” or “no”. All but three individuals in our sample were administered the MAYSI-2 using a paper and pencil. In our sample, the MAYSI-2 demonstrated acceptable

internal consistency for most scales (alphas ranging from .61 to .86; mean inter-item estimates ranging from .20 to .61) with the exception of the Traumatic Experiences subscale (for boys), which had an alpha of .49 and a mean inter-item estimate of .16. Although statistically a lower internal consistency than the other subscales, the Traumatic Experiences subscale items are a list of experiences rather than items that correlate, and as such, this internal consistency is acceptable from a practical standpoint. See Table 1 for internal consistency reliability estimates.

[Insert Table 1]

According to the MAYSI-2 manual (Grisso & Barnum, 2006), the Alcohol/Drug use subscale (8 items) was designed to identify youth who were significantly involved in alcohol/drugs, with higher scores representing a potential substance abuse problem. The Angry-Irritable subscale (9 items) aimed to measure anger or proneness toward frustration with elevated scores demonstrating a possible risk of impulsive physical aggression. The Depressed-Anxious subscale (9 items) planned to identify characteristics of depression/anxiety in which high scores could illustrate an initial emotional response to the justice system or a clinically relevant issue. The Somatic Complaints subscale (6 items) asks youth about physical pain (e.g., frequent stomachaches or headaches), which can usually co-occur with other subscales of the MAYSI-2 (e.g., Depressed-Anxious scale). The Suicide Ideation subscale (5 items) asks youth about recent and current thoughts and behaviors without discussing past behavior. The Traumatic Experiences subscale (5 separate items for boys and girls) asks youth about their exposure to traumatic events. Finally, the Thought Disturbance subscale (5 items exclusively valid for boys) examines limitations in interpreting reality, with higher scores indicating a potential psychotic disorder such as schizophrenia (Grisso & Barnum, 2006).

Nine items are not assigned to any subscales. Nonetheless, these items have remained a part of the MAYSI-2 questionnaire due to clinical relevance and a potential benefit to future research in creating other screening measures (Grisso & Barnum, 2006). These nine items were excluded from the current study, as they do not belong to any specific scale of the MAYSI-2.

K-SADS-PL. The Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime Version (K-SADS-PL; Kauffman, Birmaher, Brent, Rao, & Ryan, 1996) is a widely-used diagnostic tool created for youth aged 6-18, and was designed to follow the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*, American Psychiatric Association, 2000) criteria for mental disorders. The K-SADS-PL is semi-structured interview (ranging from 35 minutes to 2.5 hours) that consists of an initial screening interview where the clinician is guided to ask youth about hallmark symptomology for each *DSM-IV-TR* mental disorder. If the youth reports a hallmark symptom during the screen interview at a clinical level, the clinician is directed to ask additional questions to determine whether the youth has enough symptoms to meet diagnosable DSM criteria (e.g., Major Depressive Disorder, Mood Disorders, Schizophrenia; Kauffman et al., 1996). On average, the MAYSI-2 and K-SADS-PL were conducted within 58.3 days (SD = 96.5) of each other. The interviewers were masters and doctoral graduate students who completed a 3-day training workshop prior to data collection. A licensed clinical psychologist and doctoral-level researcher administered the training program and provided clinical supervision for interviewers. Overall, interviewers in our study demonstrated high inter-rater reliability (a mean weighted kappa of .82); further detail on interviewer qualifications and training is described in *[redacted for the purpose of blind review]*.

The K-SADS-PL screening interview covers 19 *DSM-IV-TR* Axis I disorders from the following categories: Affective disorders (e.g., major depression), anxiety disorders (e.g., generalized anxiety disorder), behavioral disorders (e.g., conduct disorder), post-traumatic stress disorders (e.g., post-traumatic stress disorder), psychotic disorders (e.g., schizophrenia), substance abuse disorders (e.g., substance dependence), autistic disorders (e.g., autism), eating disorders (e.g., bulimia nervosa), and tic disorders. The present study used all items from every category of the screening interview except for autistic disorders, eating disorders, and tic disorders as these do not correspond to any of the MAYSI-2 subscales. Then, items for each type of disorder were matched with the corresponding MAYSI-2 subscale (e.g., psychotic disorder items were matched with MAYSI-2 subscale ‘Thought Disturbance’ and post-traumatic stress disorder questions were matched with MAYSI-2 subscale ‘Traumatic Experiences’).

Analytic Strategy

To determine the extent to which the subscales proposed by the MAYSI-2 fit the current data, a series of confirmatory factor analyses (CFA) were conducted using Mplus 5.0 (Muthen & Muthen, 1998-2012). The models we tested were informed by the original MAYSI-2 factor structure, which allowed us to test a parsimonious model with a fixed number of factors (Grisso & Barnum, 2006). In addition, it has been suggested that CFAs provide a strong evaluation of model fit across demographic groups (Brown, 2014). Mplus was selected because of the options it provides for analyzing categorical items effectively in a factor analysis (Muthen & Muthen, 1998-2012). Specifically, weighted least squares estimation (WLSMV) was used, as it is a robust estimator for categorical data (Brown, 2006).

All fit indices have strengths and weaknesses (Hu & Bentler, 1999). To protect against this, we reported absolute fit indices, as well as noncentrality-based indices for each model to

reach a representative portrayal. We reported the comparative fit index (CFI), root mean square error of approximation (RMSEA), and weighted root mean square residual (WRMR) for each model. CFI (Hu & Bentler, 1999) values range from 0 to 1 with higher values indicating a more adequate fit; a value of .9 or higher is considered to be a good fit. RMSEA values range from 0 to 1 with values between .05 and .08 indicating an adequate fit, and values below .05 indicating a good fit (Schreiber, Nora, Stage, Barlow, & King, 2006). Lastly, Hu and Bentler (1999) suggest a WRMR value smaller than .9 is a good fit.

Results

Aim 1: Factor Structure of the MAYSI-2 Among Latino Juvenile Offenders

As described earlier, the structure of the MAYSI-2 is different for boys (i.e., seven subscales) and girls (i.e., six subscales). See Table 2 for mean MAYSI-2 subscale scores separately by gender. Because the MAYSI-2 uses subscale scores rather than a total score, we addressed our first aim by assessing the model fit of each subscale separately for Latino boys and Latina girls. We found that all subscales had adequate fit for both Latino boys and Latina girls. As shown in Table 3, the CFI values are above .9, the WRMR values were all less than .9 (with the exception of the Alcohol/Drug use scale for Latina girls which was marginally above .9), and all RMSEA values indicated good fit. This suggests initial support that each of the MAYSI-2 subscales are functioning in a similar manner among Latinos as in previous research with other ethnic groups.

[Insert Table 2]

[Insert Table 3]

We also examined the factor loadings of each item of the MAYSI-2 on their respective subscale, separately for boys (see Table 4) and girls (see Table 5). Findings confirmed that the

Alcohol/Drug Use, Depressed-Anxious, Somatic Complaints, and Suicide Ideation items mapped onto their respective subscales consistently with those identified by Grisso et al., (2001). This was the case for both Latino boys and Latina girls.

Nonetheless, we found lower item factor loadings than those reported in the MAYSI-2 development study for three subscales (Grisso et al., 2001). For Latino boys, our results showed item 8 of the Angry-Irritable scale (“Have you been really jumpy or hyper?”) had a factor loading of .19 whereas Grisso and colleagues (2001) reported a stronger loading of .46. For Latina girls, our results revealed a factor loading of .26 for item 8, while Grisso et al., (2001) reported a factor loading of .42. In the Thought Disturbance scale (only valid for boys), item 25 (“Have other people been able to control your brain or your thoughts?”) had a factor loading of .27 compared to a higher factor loading of .50 reported in Grisso et al., (2001). Lastly, for Latino boys, we reported a .28 factor loading for item 46 (“Have people talked about you a lot when you’re not there?”) of the Traumatic Experiences scale, while Grisso and colleagues (2001) reported a slightly higher loading of .39. For Latina girls, the Traumatic Experience scale items were consistent with those reported by Grisso and colleagues (2001). Despite the relatively poor loading of certain items, these items were not removed from their respective subscales because all subscales still had adequate fit.

[Insert Table 4]

[Insert Table 5]

Aim 2: Convergent Validity; Association of MAYSI-2 Subscales with Similar Constructs

To address our second aim, convergent validity was tested using youths’ responses to questions from the semi-structured K-SADS-PL mental health screening interview. As mentioned in the method, items on the screening interview are clustered together by the type of

DSM-IV-TR disorder. Each clinical symptom on the K-SADS-PL screening interview was dichotomized to indicate the symptom being present or not present. Following this, sums were computed using the symptoms of DSM-IV-TR diagnoses. A series of simple linear regressions and Pearson's correlation coefficients were computed, separately for boys (Table 6) and girls (Table 7), to explore whether youths' scores on the MAYSI-2 scales would predict specific clinical symptoms reported on the K-SADS-PL in Latino youth.

[Insert Table 6]

[Insert Table 7]

Using Cohen's (1988) conventions, as shown, Pearson correlation coefficients indicated a significantly strong association between the Alcohol/Drug use subscale and substance abuse symptoms for both Latino boys (.61) and Latina girls (.68) as well as the Suicide Ideation subscale and self-injurious behavior symptoms for both Latino boys (.58) and Latina girls (.52). Though significant moderate associations were found for the Angry-Irritable subscale and ODD/ADHD symptoms for boys (.43) and girls (.34), significant moderate correlations for the Depressed-Anxious subscale and depression/dysthymia symptoms (.34), and the Traumatic Experiences subscale and post-traumatic event symptoms (.40) were only found among Latina girls. Conversely, Latino boys showed weak, but still significant, correlations for those respective scales (.25 and .29). The weakest, non-significant, correlations were found between Somatic Complaints subscale and separation anxiety symptoms for both boys (.07) and girls (.00).

Along with these correlations, we conducted a series of simple linear regression analyses to further test the relationship between MAYSI-2 subscale scores and K-SADS-PL reported symptoms. Most notable in the analyses, Alcohol/Drug use subscale scores explained the most

variance for both Latino boys and Latina girls who reported substance abuse symptoms on the K-SADS ($R^2 = 37\%$; 47% , respectively). The Suicide Ideation subscale scores explained a moderate amount of variance for both boys ($R^2 = 34\%$) and girls ($R^2 = 27\%$) who reported self-injurious behavior symptoms. The Angry-Irritable subscale explained a small, but still significant, amount of variance for both boys ($R^2 = 18\%$) and girls ($R^2 = 16\%$) who reported ODD/ADHD symptoms. As shown, other MAYSI-2 subscale scores rendered very small amounts of variance for both boys (R^2 ranging from 1% to 9%) and girls (R^2 ranging from 0% to 12%) in various clinical symptoms on the K-SADS screening interview.

Discussion

The current study investigated the factor structure and convergent validity of the MAYSI-2 among a sample of Latino youth. Though prior research has examined the psychometric properties of the MAYSI-2 among ethnically diverse samples comprised predominantly of African Americans and Caucasians (e.g., Archer et al., 2004; Archer et al., 2010; Ford et al., 2008; Grisso et al., 2001; *redacted for the purpose of blind review*), this study is the first to examine the measure's factor structure and convergent validity among Latino youth. Overall, our results provide promising evidence for the generalizability of the MAYSI-2 to Latino youth who are involved in the juvenile justice system.

Our assessment of the factor structure of the MAYSI-2 indicates that the subscales are measuring meaningful constructs among Latino youth. Specifically, our confirmatory factor analyses results were consistent with the original factor analysis reported by Grisso et al., (2001); our model fit indices indicated good fit. Looking at the individual factor loadings of the MAYSI-2 subscales, our results suggest that for both Latino boys and Latina girls, the factor loadings were highly consistent with the loadings reported by Grisso et al., (2001) for four

subscales: Alcohol/Drug use, Depressed-Anxious, Somatic Complaints, and Suicide Ideation subscales. Nonetheless, all seven subscales confirmed adequate fit, meaning that these subscale items are functioning in much the same way among Latino youth as they do in other ethnic groups. Although some prior research has reported an inconsistent factor structure of the MAYSI-2 in partially Latino samples (Archer et al., 2004; Ford et al., 2007; Grisso & Barnum, 2006), the MAYSI-2 fit the factor structure described in its manual well in our sample. Overall, these findings provide evidence for factorial validity of the MAYSI-2 among Latino juveniles, and are encouraging for the generalizability of the MAYSI-2 to Latino juveniles.

We examined the convergent validity of the MAYSI-2 for Latino youth using conceptually related symptoms assessed in the K-SADS-PL. Our results indicated that the subscales of the MAYSI-2 are, to a large degree, measuring the clinically relevant constructs they are designed to. This is important so juvenile justice staff can readily identify the type of referral Latino youth need based on their subscale scores. For example, we found evidence that the Suicide Ideation subscale relates meaningfully to suicidal thoughts, so elevations on this scale should alert staff to take the appropriate steps to ameliorate suicide risk. In contrast, some types of symptoms were weakly associated with relevant MAYSI-2 scales. For example, the weakest associations for both Latino boys and Latina girls were reported in the Somatic Complaints and Depressed-Anxious subscales. Twenge and Nolen-Hoeksema (2002) reported in their meta-analysis that Latino youth reported significantly more symptoms characteristic of depressive disorders than European American and African American youth. Although these weaker correlations were still significant, they may cause concern as symptoms such as those associated with depressive or anxiety disorders may not be accurately detected in Latino youth, resulting in false negatives. Despite that undetected depressive symptoms in Latino youth entering the justice system would

potentially decrease their likelihood for receiving the appropriate mental health assessments and treatments, the concern for false negatives are a broader issue with mental health screening measures, and are not specific to the MAYSI-2.

It is also possible that the weak associations reflect cultural differences concerning the acceptability of expressing mental health symptoms in Mexican and Mexican-American families. In Latino families, parents exhibit highly controlling behavior, requiring their children accept their demands and beliefs (Verala et al., 2004). Although these parenting styles relate to increased anxiety and higher somatization in children, Latino cultures view the expression of mental illness as shameful and oftentimes, labeling mental health symptoms as somatic symptoms is more culturally appropriate (Varela et al., 2004). These cultural differences may explain why we found high MAYSI-2 mean scores in the Depressed-Anxious and Somatic Complaints subscales, but weak associations in our analyses of convergent validity.

Overall, the current study reported greater clinically significant correlations for MAYSI-2 subscales and related *DSM-IV-TR* diagnoses compared to those reported by Archer et al., (2010). Specifically, to facilitate comparison, the current study followed Archer and colleagues (2010) and used a threshold of $r = .15$ to determine whether correlations were clinically significant (originally recommended by Graham, Ben-Porath, & McNulty, 1999). In the current study, clinical significance was reached in all correlations with the exception of the Somatic Complaints subscale and phobia symptoms for boys, and the Somatic Complaints subscale and separation anxiety symptoms, for boys and girls; however, Archer and colleagues (2010) did not reach clinical significance (i.e., $r = .15$) in a number of correlations (e.g., Angry-Irritable and ODD diagnoses; Angry-Irritable and ADHD diagnoses).

Our results are mostly consistent with previous research examining the factor structure and convergent validity of the MAYSI-2. In particular, though Grisso and colleagues (2001) found strong evidence of validity for the Alcohol/Drug use, Angry-Irritable, Depressed-Anxious, and Suicide Ideation subscales, Archer et al., (2004) and Archer et al., (2010) only found evidence of validity for the Alcohol/Drug use and Suicide Ideation subscales, which is largely consistent with the current study. In addition, Archer and colleagues (2010) reported that Somatic Complaints, Traumatic Experiences, and Thought Disturbance subscales did not correlate well with their conceptually relevant variables; our results also reported that the Somatic Complaints subscale did not correlate well. *[Redacted for the purpose of blind review]* tested the evidence of utility of the MAYSI-2 among a primarily Latino sample (87%) and found that the MAYSI-2 demonstrates good validity in identifying diagnosable mental disorders among Latino adolescents, particularly for Latina girls compared to Latino boys. The current study similarly found evidence of validity for the MAYSI-2 among Latino adolescents; however, there were no notable differences between Latino boys and Latina girls in terms of the MAYSI-2's ability to predict specific clinical symptoms using subscale scores.

These results have implications for both future research and clinical practice. From a research perspective, our results support the replicability of the 7-factor model (6-factor model for girls) of the MAYSI-2 across ethnic groups as Archer and colleagues (2004) concluded that the MAYSI-2 generalized to their predominant African American juvenile sample, and the present research reported that the MAYSI-2 generalized to our sample of Latino juveniles. These results may be particularly relevant for researchers interested in the generalizability of the MAYSI-2 among different ethnic groups, given that ethnic minorities are overrepresented in the juvenile justice system. Latinos, however, are a diverse group, and future research should assess:

1) the generalizability of the MAYSI-2 to different subgroups of Latino youth; and 2) whether the Spanish version of the MAYSI-2 translation is analogous to the English version MAYSI-2 among Latino youth, particularly a population outside the United States. In addition, future research should continue to examine the convergent validity of the MAYSI-2 among Latino youth, with specific attention to the Depressed-Anxious and Somatic Complaints subscales. Future research investigating the MAYSI-2 among different samples of Latino juveniles is especially important given that recent meta-analytic findings have suggested that there are racial/ethnic differences across sites among reported mental health symptoms for youth entering the justice system (Vincent et al., 2008).

From a clinical perspective, agencies administering the MAYSI-2 can be confident that the subscales of this screening measure will identify Latino youth who need further attention and that the MAYSI-2 is a reliable and valid measure to use with Latino juveniles entering the justice system. These results demonstrate preliminary evidence of generalizability and convergent validity, which can allow Latino youth to receive the required attention, increasing their likelihood of a reduction in aggression and risk, and thus increasing their prosocial development as contributing members of society, and increasing the safety of the public upon their reintegration into society.

This study had a few limitations that should be noted when interpreting the results. In a few instances, we assessed symptoms on the K-SADS-PL after the MAYSI-2 was administered which may have affected our results; it may be that some symptoms were not present in youth when the MAYSI-2 was completed. Though this limitation may have played a role in some of our weaker correlations, our stronger correlations were likely unaffected, as those symptoms (e.g., substance abuse) tend to be more stable. Schumacker and Lomax (2004) suggest that a

CFA sample size of 100-200 observations is recommended; while our male sample size ($N = 319$) was more than adequate, our female sample size ($N = 153$) was around the mid-point of what is recommended. In addition to this, our lack of evidence for convergent validity of the Somatic Complaints subscale could be due to a lack of power to detect clinically significant correlations. Specifically, our data showed a low base rate for the number of Latino youth who answered “yes” to certain symptoms for less common disorders (e.g., separation anxiety). This low base rate is consistent with studies investigating the prevalence of anxiety disorders; in particular, Costello, Egger, Copeland, Erkanli, and Angold (2011) conducted a meta-analysis and reported that 2.3 % and 1.9% of adolescents aged 13 to 18 suffer from separation anxiety disorder and generalized anxiety disorder, respectively. Future research with larger sample sizes of youth who experience symptoms that are screened using the Somatic Complaints subscale are necessary to determine the validity of the subscale in predicting clinical symptoms for Latino youth. It is also important to note that our sample consisted of Mexican American youth in the Southwestern United States, and it would be beneficial to examine the properties of the MAYSI-2 among other groups of Latino youth. Lastly, our sample was collected from one agency and this may limit the generalizability of the results. It would be of value to conduct further analyses of the psychometric properties of the MAYSI-2 with Latino samples from other agencies to further examine the validity and generalizability of the measure.

Despite the limitations of the current study, this study adds to the limited body of research investigating the generalizability and evidence of validity for the MAYSI-2 among different ethnic groups. Specifically, these results minimize the gap in literature concerning the applicability of the MAYSI-2 to Latino youth and extends previous research by conducting confirmatory factor analyses on the MAYSI-2 in a sample of a highly overrepresented ethnic

group in the justice system. These results show that the MAYSI-2 is a valid screening tool for youth entering the justice system, particularly demonstrating that the most widely used tool can reliably screen for mental illness among Latino youth specifically. It is important to efficiently and accurately screen youth with mental illnesses who are entering the justice system, so that they can receive appropriate mental health treatment. Without appropriate mental health treatment, justice involved youth may not respond to treatment of criminogenic needs as expected, subsequently increasing their potential for recidivating in the future, and decreasing their potential for successful reintegration back into society.

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