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Research Article

Psychometric Restudy Of A Brief Depression Measure For Justice Involved Youth.

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Abstract

Among the mental health risk concerns of justice involved youth are their levels of depression, which are often related to other current co-occurring mental health problems, such as PTSD, trauma and substance misuse, as well as to long term issues of depression and associated and negative outcomes. This study evaluated the psychometric properties of the eight-item CES-D depression instrument using a sample of newly arrested youth. The study sought to answer three research questions. (1) Do the CES-D eight items reflect a common factor, or latent variable? (2) Does a similar factor structure for the CES-D items exist among subgroups of youths based on gender and race? (3) Is there evidence supporting criterion-related validity of the depression factor? Overall CFA analysis, found statistical evidence in support of a single-factor model for the depression measure. Multigroup invariance analysis was used to address study gender-race group differences in the factor structure of the depression construct. Invariance of the factor structure was tested across male and female youth, and among nonBlack and Black youth. Fit measures comparing different translations of the depression factor model (i.e., configural, metric, and scalar models) supported invariance across the birth sex and race subgroups. Metric invariance was found among males and females; and scalar invariance was found among nonBlack and Black youth. These findings support the psychometric soundness of the eight-item CES-D measure for use among the diverse youths involved in this study. Additional covariate analysis found significant relationships between depression and a measure of Adverse Childhood Experiences in three of four regression analyses. Younger aged youth had higher rates of depression than older aged youth.

Keywords: Justice involved youth, depression screening, psychometric study of brief depression measure.

INTRODUCTION

Research has identified effective strategies for reducing recidivism, one of which is the application of the Risk-Need-Responsivity (RNR) model. Intensity of services provided should be directly related to reoffending risk levels and services should be tailored to address the criminogenic needs that drive delinquent behavior and responsive to barriers that may hinder service engagement (Andrews, Zinger, Hoge, et al., 1990; Bonta & Wormith, 2007).

Validated, objective risk assessment tools should apply the principles of RNR by identifying factors impacting risk level and treatment need (Schwalbe & Cutler, 2007). Some of these factors, such as demographics and history of offending, are static or unalterable. Others are dynamic factors that can be modified, reduced, or remediated, such as involvement with delinquent peers, substance use, and related mental health issues (Mulvey, 2005). Of the two categories, dynamic factors are recommended as the focus of intervention services because they can be modified (Andrews & Bonta, 2010; Kraemer, Kazdin, Offord, et al., 1997; Mulvey, 2005; also see Vincent, Chapman, & Cook, 2011). Contemporary risk assessment processes generally follow a two-phase process: initial screening and, if indicated, subsequent in-depth assessment (Botzet et al., 2012; Belenko et al., 2017).

Among the mental health risk concerns of justice-involved youth are their levels of depression, which are often related to other current co-occurring mental health problems, such as PTSD, trauma and substance misuse, as well as to long-term issues of depression and associated-

negative outcomes (Song & Lee, 2016; Kim, Pyo, Fava, et al., 2022; Kim, Choi,& Chae, 2022; Teplin, Potthoff, Aaby, et al., 2021). In particular, Teplin and her associates (2021) found among the Cook County, Illinois detained youth they studied that 15 years after detention, 52.3% of males and 30.9% of females still had a psychiatric disorder; the

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prevalence of psychiatric disorders was higher than in the general population; males were more likely to persist with a psychiatric disorder than females; and untreated traumas and other disorders make it harder to finish school, get a job, and stay out of jail. The study also found that males with depressive disorder at baseline were more likely than those without this disorder to have mood, anxiety, and alcohol use disorders 15 years later. Females with depressive disorders at baseline were more likely than those without to have nearly all disorders. The Center for Epidemiologic Studies Depression Scale (CES-D) is a widely used screening tool for depression (Radloff, 1977). The 20-item measure has been shown to have value as an acute index of acute depressive symptoms in a large number of studies involving community and institutionalized adult samples (e.g., Carleton, Thibodeau, Teale, et al., 2013; Husaini, Neff, Harrington, et al., 1980; Roberts &Vernon, 1983). Fewer studies of community samples of children and youths both in the United States (e.g., Crockett, Randall, Shen, et al., 2005; Radloff,1991) and in other countries (e.g., Edman, Danko, Andrade, et al., 1999; Poulin, Hand, & Boudreau, 2005; Tatar, Kayıran, Saltuko_glu, et al., 2013) have been completed. These studies generally found acceptable internal validity of the measure, although caution is advised when using the CES-D among American Indian adolescents (Manson, Ackerson, Dick, et al., 1990). In a meta-analysis of screening instruments for depression in samples of children and adolescents, Stockings, Degenhardt, Lee, et al., (2015) found the CES-D was one of the four most frequently used diagnostic tools for depressive symptoms among youths (along with the Children's Depression Inventory [Kovacs, 1984], the Beck Depression Inventory [Beck, Ward, Mendelson, et al., 1961], and the Reynolds Adolescent Depression Scale [Reynolds, 1986]); however, these studies used samples of youths who were not involved in the justice system.

In a number of situations, administration of the full 20-item CES-D may be impractical. Such situations may involve working with at-risk community populations, including individuals undergoing post-arrest screening procedures, and populations with shorter attention spans, such as the elderly and children and adolescents. For such groups, use of a shortened version of the CES-D to help guide referrals to community services is highly advantageous. Although studies involving the CES-D have used the full 20 items developed by Radloff (1977), some studies have used shortened versions of the instrument, most often the 12-item version (e.g., Poulin, Hand, & Boudreau, 2005).

Melchior, Huba, Brown, et al., (1993) assessed the psychometric properties of eight-item and four-item versions of the CES-D among community samples of women at high risk of contracting and transmitting HIV, and women in a residential drug treatment program. They found the eight-item and four-item measures correlated highly with the 20-item CES-D scale (eight-item measure r = .93; four-item measure r=.87). Other studies have also demonstrated similar validity and reliability for the eight-item version of the CES-D compared to the 20-item version among the elderly who, like children and adolescents, can suffer from shorter attention spans (Karim, Weisz, Bibi, et al., 2015; O'Halloran, Kenny, & King-Kallimanis, 2014). Since the shortened version of the CES-D possesses similar validity and reliability in assessing symptoms of depression as the lengthier instrument, use of the shortened version may be particularly advantageous for populations of youths involved in community interventions, where subjects' time and concentration are limited and study protocols may be complex (i.e., collecting data across multiple symptom domains, in addition to depression). A study of justice involved youth using the eight-item version of the CES-D (Dembo, Faber et al., 2018) found good psychometric (reliability and validity) properties for the instrument.

Depressed mood, a significant mental health issue among justice involved youth, is associated with several problem behaviors. There is a well-established correlation between depressed mood and conduct problems (e.g., conduct disorder and oppositional defiant disorder) during childhood and adolescence (e.g., Angold & Costello, 1993; Capaldi & Stoolmiller, 1999), which tends to become more prevalent during adolescence (e.g., Cohen, Cohen, Kasen, et al., 1993). Studies of youths involved in delinquency who enter the justice system have revealed high prevalence rates of depression and other mood disorders (e.g., Abram, Teplin, et al., 2003; Teplin, Abram, et al., 2005). For example, Teplin, Abram et al., (2002) found two-thirds of detained males and almost three-quarters of females met diagnostic criteria for one or more psychiatric disorders. Half of the males and females had a substance use disorder. Affective disorders were also prevalent, especially among females, with 20% meeting diagnostic criteria for a major depressive episode (Teplin. Abram, et al., 2002). Other studies have identified similar prevalence of depressive symptoms and substance use disorders (e.g., Domalanta, Risser, et al., 2003; Pliszka, Sherman, et al., 2000). Related research on justice-involved youths has identified an association between depression and sexual risk behavior (e.g., Teplin, Elkington et al., 2005), and a comorbidity in marijuana use and depression (e.g., Abram, Teplin, et al., 2003; Stein, Lebeau, et al., 2011). Moreover, longitudinal studies suggest early problems with both depression and delinquency can lead to difficulties with school success, substance use, continued depression and criminal offending in adulthood (e.g., Capaldi & Stoolmiller, 1999; Diamantopoulou, Verhulst, et al., 2011; Loeber, Pardini, et al., 2007; Marmorstein & Iacono, 2003). Johnson, Esposito-Smythers, et al., (2011) note that while research has improved our knowledge of "disruptive behavior disorders among

incarcerated youths, far less is known about the factors associated with depression and other internalizing symptoms in this population" (p. 1096).

We sought to reduce this knowledge gap by assessing the psychometric properties of the eight-item version of the CES-D among newly arrested youth. While the CES-D has demonstrated its usefulness as a screening tool among community and institutionalized samples, to our knowledge with one exception (Dembo, DiClemente, 2018), it has not been administered routinely to newly arrested youth. The present restudy of the psychometric properties of the eight-item CES-D used a justice-involved sample who participated in a public health intervention, which coordinated the efforts of a county health department with those of the intake facility for arrested juveniles in the jurisdiction.

The present analyses addressed three research questions. First, do the eight items reflect a common factor, or latent variable? To answer this question, confirmatory factor analysis (CFA) of the eight-item CES-D, originally developed by Melchior, Huba, Brown, et al.,(1993), was estimated on a sample of newly arrested male and female youths entering a community-based central intake facility in a southeastern U.S. city. Second, does a similar factor structure exist for the CES-D eight-item depression construct among subgroups of youths based on gender and race? To answer this question, multigroup confirmatory factor analyses (CFA) were estimated to explore differences in the factor structure of the CES-D depression construct across subgroups of the youths in the sample based on biological sex (female versus male) and race (Black versus NonBlack). Finally, third, is there evidence supporting the construct validity of the eight-item CES-D depression measure? As mentioned previously in this introduction, depression correlates with certain problems, such as childhood adverse experiences like trauma, especially among justice-involved youth. This study assessed the construct validity of the final eight-item CES-D depression construct by examining its relationship to youth biological sex, and ACES total score.

METHOD

Project setting: Juvenile assessment center (JAC) health coach services

As noted earlier, a previous study (Dembo, DiClemente, 2016), involved data collected in an innovative, comprehensive health coach service for youths entering a juvenile assessment center (JAC). The service, which involves a collaboration with the county health department, has three major goals:

1. The service offers HIV and STD evidence-based risk reduction information and education to youths using gender-appropriate and developmentally appropriate curricula.
2. The service performs analysis of youth provided urine specimens for recent drug use (via the enzyme multiplied immunoassay technique [EMIT] procedure), Aptima urine testing to identify STDs (Chlamydia and Gonorrhea) and swab mouth testing for HIV.
3. The service seeks to follow-up with STD and HIV positive youth, and promptly link them with appropriate treatment. Youth who screen high on the evidence-based depression inventory (CES-D; Melchior, Huba, et al., 1993), and whom urine testing reveals recent drug use are also are also linked to follow-up services. Health coaches are trained to follow a detailed data collection and service delivery protocol, including Department of Health's STD and HIV pretest and posttest counseling. Data collection and entry are routinely monitored for integrity and quality by the program manager (a coauthor of this article). Data were collected in accordance with the requirements the Institutional Review Board.

Participants

Participation in the health coach services for the present data occurred from September 3, 2024 to February 3, 2025. Following informed consent, 98 girls and 226 boys received health coach services. Twenty-five (7.7%) of the 324 youths entered the JAC more than once, during which occasion(s) they received additional health coach services. For youth with multiple entries, and since multiple entry cases were few in number, only health coach data collected during their first entry were used in the present study. Sociodemographic information (gender, age, race/ethnicity) was also available for all youth.

Participation in this service was voluntary. Florida public health law does not require youths 12 years and over to obtain parental consent for STD or HIV testing or treatment. The participation rate to receive health coach services was 71%. No information was available on nonpartcipating youth.

Measures of depression

The eight-item version of the widely used 20-item Center for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977), derived from the psychometric work of Melchior, Huba, Brown, et al., (1993), measured the following indications of depression.

"I felt I could not shake off the blues even with the help from my family and friends;"
"I felt sad";
"I felt depressed;"
"I thought my life had been a failure";
"I felt fearful";
"My sleep was restless";
"I felt lonely"; and
"I had crying spells."

The time frame used for these experiences was the past week. Each item was scored as follows: 0 -- less than one day,

1 – 1 to 2 days, 2 – 3 to 4 days, and 3 – 5 to 7 days.

Covariate Measures

Sociodemographic characteristics

Several demographic data were collected, including (a) age (in number of years); (b) birth gender (0 male, 1 female); and (c) information on the youths' race/ethnicity (1 African-American, 2 Hispanic, 3 White American, and 4 Other [one Asian youth received health coach services]. Since only 45 Hispanic youth (16 females, 29 males) received health coach services, we were unable to conduct separate, reliable multivariate psychometric analyses for this group. No routinely available data are collected on youth who declined to participate in health coach services.

We sought to assess the construct validity of the depression measure by examining the relationship between the youths' ACES (Adverse Childhood Experiences; Felitti, Anda, Nordenberg, et al., [1998]) total scores and their depression measure scores. The ACES questions (Appendix A.) asked about the following childhood experiences: 1. physical abuse, 2. sexual abuse, 3. emotional abuse, 4. physical neglect, 5. emotional neglect, 6. mental illness, 7. incarcerated household member, 8. mother treated violently, 9. substance use, and 10. parents being separated or divorced.

Strategy of Analysis

Descriptive data were analyzed using SPSS version 29.0.2.0 (IBM, 2022). Factor invariance testing and regression analyses were conducted using Mplus (Muthen & Muthen, 1998-2017).

RESULTS

Sample

Descriptive statistics for birth gender, race, ACES (our study covariate), and the depression items are provided in Table 1. There were more boys (69.8% to 30.2%) than girls in the study. The majority of the boys and girls self-identified as African-American (73.0% and 65.3%, respectively). The boys and girls in this study averaged 15.5 and 15.0 years of age, respectively. The girls (mean = 1.44, SD = 1.50) reported significantly higher total ACES scores, than the boys (mean = 1.01, SD = 0.99).

In regard to depression, the girls reported significantly higher levels of depression on four of the eight depression items, than the boys (felt sad, felt depressed, felt fearful, and had crying spells). Significantly, 22.1% of girls had a depression score of 7 or higher, a designated threshold score indicative of potentially needing clinical intervention (Brown, Sales, Swartzendrub, et al., 2014; Santor & Coyne, 1997), versus 12.8% for the boys.

Please place Table 1 about here

In regard to race, the majority of Black youth were male (Black=72.1%, NonBlack=64.2%), near in age to NonBlack youth (Black=15.4 years vs NonBlack=15.2 years), and with similar ACES average scores (Black=1.13, NonBlack=1.17). This covariate had similar scores on the individual depression items, with one exception. NonBlack youth reported a significantly higher rate of thinking their life was a failure (0.45), than Black youth (0.26).

Table 1. Demographic Characteristics and Major Variables

	Male	**Female**	**NonBlack**	**Black**
	(n=218-226)	(n=95-98)	(n=92-95)	(n=222-229)
Male	-----	-----	64.2%	72.1%
Female	-----	-----	35.8%	27.9%
Mean Age (SD)	15.50 (1.31)	15.01(1.54) **	15 .15(1.52)	15.43(1.34)
ACES--Total	1.01(0.99)	1.44(1.50) **	1.17(1.37)	1.13(1.10)
Depression Items:				
Could not shake off blues	0.15(0.56)	0.22(0.66)	0.22(0.63)	0.15(0.57)
Felt sad	0.44(0.86)	0.76(1.02) **	0.67(1.02)	0.48(0.87)
Felt depressed	0.29(0.80)	0.60(1.05) **	0.47(0.97)	0.35(0.86)
Thought my life a failure	0.26(0.73)	0.43(0.81)	0.45(0.86)	0.26(0.71) *
Felt fearful	0.14(0.48)	0.33(0.76) **	0.22(0.57)	0.19(0.59)
Sleep was restless	0.66(1.12)	0.67(1.07)	0.74(1.17)	0.63(1.08)
Felt lonely	0.34(0.84)	0.52(1.05)	0.50(0.99)	0.35(0.88)
Had crying spells	0.14(0.54)	0.55(0.91) ***	0.35(0.73)	0.23(0.68)
Depression Clinical Level	12.8%	22.1%*	18.5%	14.4%

*Two-Tailed p-values: * p<.05; ** p<..01; *** p< .001.*

Overall confirmatory factor analysis (CFA)

An overall, combined group CFA, using Bayesian estimation (Depaoli, 2021), was first conducted on the depression items.

Results indicated a one-factor model was consistent with the data (Potential Scale Reduction=1.03, Posterior Predictive p-value=0.468). Each of the depression items loaded significantly on the single factor. The standardized factor loadings ranged from 0.609 to 0.867). Additional results of this analysis are available from the senior author upon request.

Testing for Depression Measure Invariance

Measurement invariance analysis sought to identify whether the measured construct (e.g., depression) had the same meaning and statistical structure across different groups (Meredith, 1993). We separately conducted depression measurement invariance analyses for Male and Female youth, and for NonBlack and Black youth, using the alignment procedure developed by Asparouhov and Muthén (2014) and Muthén and Asparouhov (2018). Invariance testing involved model assessment for configural, metric, and scalar invariance. The alignment procedure was used to evaluate three models of increasingly stringent definitions of measurement invariance (McGrath, 2015). First, a configural model was estimated, where the same factor loadings were estimated in each group, but the factor loadings were estimated separately in each group. The configural model was the least restricted model, suggesting variance across the gender-race subgroups. Second, a metric model was estimated, where the factor loadings were assumed to be invariant across the groups, indicating the relationship between the factor and the observed variables was the same across the groups. Metric invariance permits multi-group comparisons of factor variances and covariances. The metric model was more constrained, or restricted, than the configural model. Finally, a scalar model was estimated, where equivalence in factor loadings and thresholds was specified. The scalar model reflected strong invariance and was the most restricted model. In evaluating the statistical results, the first decision is metric versus configural invariance, which determines the model to which scalar is compared. The results of this analysis, shown in **Table 2**, involved comparing restrictive translations of the factor model. This comparison was "step-up" from a simpler to a more complex model. The results of invariance model testing for male and female, and Black and NonBlack, are shown in Table 2.

Please place Table 2 about here

When comparing the different translations of the factor model, a significant chi-square difference means the model restriction worsens model fit. Using a level of significance of $p < .05$, the results in Table 2 comparing males and females indicate the metric model fits the data better than the configural model or the scalar model. These findings provide support for invariance in the metric factor model for depression across the two birth gender groups. The male-female metric analysis results are shown in Table 3.

Table 2. Depression Model Fit Invariance Information.

Male and Female Youth			
Model	**Number of Parameters**	**Loglikelihood**	
Configural	65	-1576.838	
Metric	58	-1579.080	
Scalar	35	-1600.391	
Models Compared	Degrees of Chi-Square	Freedom	P-Value
Metric against Configural	4.524	7	0.7178
Scalar against Configural	47.461	30	0.0224
Scalar against Metric	42.924	23	0.0071
NonBlack and Black Youth			
Configural	65	-1587.914	
Metric	58	-1592.158	
Scalar	35	-1601.725	
Metric against Configural	7.801	7	0.3505
Scalar against Configural	27.137	30	0.6161
Scalar against Metric	19.201	23	0.6895

Please place Table 3 about here

The results of invariance model testing for Black and NonBlack youth shown in Table 2 indicate a scalar invariance factor model best fits the data, as none of the chi-square model comparisons reach a level of significance of $p < .05$. The Black – NonBlack model comparison results are shown in Table 4.

Table 3. Metric Invariance Model for Boys and Girls.

	Two-Tailed			
	Estimate	**S.E. Est./S.E.**	**P-Value**	
Latent Class 1 (Boys) TOTDEPR BY				
DEP1	1.000	0.000	999.000	999.000
DEP2	1.219	0.298	4.096	0.000
DEP3	1.264	0.369	3.429	0.001
DEP4	0.877	0.207	4.238	0.000
DEP5	0.736	0.164	4.498	0.000
DEP6	0.578	0.143	4.036	0.000
DEP7	1.112	0.288	3.862	0.000
DEP8	0.906	0.231	3.924	0.000
Means				
TOTDEPR	0.000	0.000	999.000	999.000
Thresholds				
DEP1$1	4.256	0.644	6.606	0.000
DEP1$2	4.771	0.649	7.347	0.000
DEP1$3	6.193	0.861	7.196	0.000
DEP2$1	2.223	0.401	5.540	0.000
DEP2$2	3.728	0.511	7.291	0.000
DEP2$3	5.536	0.702	7.886	0.000
DEP3$1	3.937	0.613	6.417	0.000
DEP3$2	4.669	0.692	6.743	0.000
DEP3$3	5.624	0.816	6.889	0.000
DEP4$1	2.966	0.417	7.120	0.000
DEP4$2	3.977	0.488	8.151	0.000
DEP4$3	4.717	0.546	8.634	0.000
DEP5$1	3.279	0.437	7.498	0.000
DEP5$2	4.541	0.558	8.142	0.000
DEP5$3	6.069	0.782	7.757	0.000
DEP6$1	1.160	0.211	5.505	0.000
DEP6$2	1.696	0.227	7.463	0.000
DEP6$3	2.260	0.261	8.649	0.000
DEP7$1	3.239	0.512	6.331	0.000
DEP7$2	3.695	0.560	6.600	0.000
DEP7$3	5.028	0.635	7.923	0.000
DEP8$1	3.878	0.558	6.948	0.000
DEP8$2	4.993	0.615	8.123	0.000
DEP8$3	5.593	0.761	7.352	0.000
Variances				
TOTDEPR	5.753	2.243	2.565	0.010
Latent Class 2 (Girls) TOTDEPR BY				
DEP1	1.000	0.000	999.000	999.000
DEP2	1.219	0.298	4.096	0.000
DEP3	1.264	0.369	3.429	0.001
DEP4	0.877	0.207	4.238	0.000
DEP5	0.736	0.164	4.498	0.000
DEP6	0.578	0.143	4.036	0.000
DEP7	1.112	0.288	3.862	0.000
DEP8	0.906	0.231	3.924	0.000

Means				
TOTDEPR	0.000	0.000	999.000	999.000
Thresholds				
DEP1$1	3.299	0.592	5.575	0.000
DEP1$2	3.793	0.591	6.419	0.000
DEP1$3	5.874	0.914	6.428	0.000
DEP2$1	0.589	0.431	1.368	0.171
DEP2$2	2.386	0.527	4.530	0.000
DEP2$3	4.228	0.712	5.939	0.000
DEP3$1	2.058	0.542	3.800	0.000
DEP3$2	2.528	0.565	4.474	0.000
DEP3$3	4.373	0.847	5.163	0.000
DEP4$1	1.577	0.396	3.985	0.000
DEP4$2	2.749	0.426	6.454	0.000
DEP4$3	4.945	0.741	6.671	0.000
DEP5$1	2.053	0.380	5.401	0.000
DEP5$2	3.086	0.450	6.855	0.000
DEP5$3	4.193	0.646	6.488	0.000
DEP6$1	0.940	0.296	3.171	0.002
DEP6$2	1.470	0.310	4.738	0.000
DEP6$3	2.712	0.419	6.476	0.000
DEP7$1	2.340	0.527	4.439	0.000
DEP7$2	2.948	0.562	5.247	0.000
DEP7$3	3.526	0.685	5.148	0.000
DEP8$1	1.265	0.379	3.336	0.001
DEP8$2	2.485	0.462	5.375	0.000
DEP8$3	4.473	0.737	6.066	0.000
Variances				
TOTDEPR	5.007	2.394	2.091	0.037
Categorical Latent Variables				
Means				
G#1	0.835	0.123	6.798	0.000

Please place Table 4 about here

Construct Validity of the Depression Measure

We sought to assess the construct validity of the depression measure by examining the relationship between the youths' ACES total scores and their depression measure scores. The literature on this topic, noted earlier, has consistently indicated that childhood trauma experiences are related to later age mental health issues, particularly depression. Hence, we ran separate male-female analyses regressing our depression measure on the youths total ACES scores. The results are shown in Table 5.

Table 4. Scalar Invariance Model for Black and NonBlack Youth.

	Two-Tailed			
	Estimate	**S.E.**	**Est./S.E.**	**P-Value**
Latent Class 1 (NonBlack) TOTDEPR BY				
DEP1	1.000	0.000	999.000	999.000
DEP2	1.265	0.321	3.941	0.000
DEP3	1.331	0.413	3.222	0.001
DEP4	0.912	0.226	4.041	0.000
DEP5	0.779	0.185	4.222	0.000
DEP6	0.541	0.136	3.989	0.000

DEP7	1.107	0.300	3.691	0.000
DEP8	0.934	0.252	3.713	0.000
Means				
TOTDEPR	0.955	0.420	2.275	0.023
Thresholds				
DEP1$1	4.208	0.647	6.504	0.000
DEP1$2	4.709	0.652	7.224	0.000
DEP1$3	6.331	0.862	7.341	0.000
DEP2$1	2.102	0.396	5.309	0.000
DEP2$2	3.724	0.499	7.470	0.000
DEP2$3	5.549	0.644	8.621	0.000
DEP3$1	3.776	0.623	6.059	0.000
DEP3$2	4.391	0.678	6.480	0.000
DEP3$3	5.756	0.855	6.734	0.000
DEP4$1	2.799	0.381	7.349	0.000
DEP4$2	3.885	0.428	9.085	0.000
DEP4$3	5.086	0.533	9.540	0.000
DEP5$1	3.138	0.396	7.929	0.000
DEP5$2	DEP5$2	0.466	9.201	0.000
DEP5$3	5.560	0.577	9.636	0.000
DEP6$1	1.220	0.195	6.246	0.000
DEP6$2	1.743	0.207	8.436	0.000
DEP6$3	2.484	0.243	10.216	0.000
DEP7$1	3.249	0.502	6.477	0.000
DEP7$2	3.747	0.555	6.747	0.000
DEP7$3	4.753	0.615	7.723	0.000
DEP8$1	3.114	0.443	7.036	0.000
DEP8$2	4.189	4.189	7.985	0.000
DEP8$3	5.494	0.697	7.880	0.000
Variances				
TOTDEPR	4.336	1.900	2.282	0.022
Latent Class 2 (Black) TOTDEPR BY				
DEP1	1.000	0.000	999.000	999.000
DEP2	1.265	0.321	3.941	0.000
DEP3	1.331	0.413	3.222	0.001
DEP4	0.912	0.226	4.041	0.000
DEP5	0.779	0.185	4.222	0.000
DEP6	0.541	0.136	3.989	0.000
DEP7	1.107	0.300	3.691	0.000
DEP8	0.934	0.252	3.713	0.000
Means				
TOTDEPR	0.000	0.000	999.000	999.000
Thresholds				
DEP1$1	4.208	0.647	6.504	0.000
DEP1$2	4.709	0.652	7.224	0.000
DEP1$3	6.331	0.862	7.341	0.000
DEP2$1	2.102	0.396	5.309	0.000
DEP2$2	3.724	0.499	7.470	0.000
DEP2$3	5.549	0.644	8.621	0.000
DEP3$1	3.776	0.623	6.059	0.000

DEP3$2	4.391	0.678	6.480	0.000
DEP3$3	5.756	0.855	6.734	0.000
DEP4$1	2.799	0.381	7.349	0.000
DEP4$2	3.885	0.428	9.085	0.000
DEP4$3	DEP4$3	0.533	9.540	0.000
DEP5$1	3.138	0.396	7.929	0.000
DEP5$2	4.290	0.466	9.201	0.000
DEP5$3	5.560	0.577	9.636	0.000
DEP6$1	1.220	0.195	6.246	0.000
DEP6$2	1.743	0.207	8.436	0.000
DEP6$3	2.484	0.243	10.216	0.000
DEP7$1	3.249	0.502	6.477	0.000
DEP7$2	3.747	0.555	6.747	0.000
DEP7$3	4.753	0.615	7.723	0.000
DEP8$1	3.114	0.443	7.036	0.000
DEP8$2	4.189	0.525	7.985	0.000
DEP8$3	5.494	0.697	7.880	0.000
Variances				
TOTDEPR	5.929	2.691	2.203	0.028
Categorical Latent Variables				
Means				
G#1	-0.881	-0.881	-7.104	0.000

Please place Table 5 about here

As can be seen, for each gender group, there is a significant, positive relationship between total ACES scores and our depression measure. We ran a similar analysis for NonBlack and Black youth. Results in Table 5 indicate a significant, positive relationship was found between total ACES score and depression among Black youth.

Table 5. Relationship Between Depression and ACES for Male and Female and NonBlack and Black Youth.

Two tailed				
	Estimate	**S.E.**	**Est./S.E.**	**P-value**
Males				
Depression on				
ACES	0.718	0.226	3.171	0.002
Females				
Depression on				
ACES	0.470	0.208	2.258	0.024
NonBlack Youth				
Depression on				
ACES	0.353	0.243	1.456	0.145
Black Youth				
Depression on				
ACES	0.859	0.237	3.619	0.000

DISCUSSION

This study evaluated the psychometric properties of the eight-item CES-D depression instrument using a sample of newly arrested youth. The study sought to answer three research questions. (1) Do the CES-D eight items reflect a common factor, or latent variable? (2) Does a similar factor structure for the CES-D items exist among subgroups of youths based on gender and race? (3) Is there evidence supporting criterion-related validity of the depression factor? In regard to Research Question 1, as reflected in an overall CFA analysis, there is statistical evidence in support of a single-factor model for the eight-item CES-D depression measure. These findings offer support for the internal validity of the CES-D depression instrument and its use

among juvenile justice-involved youth. However, replication studies are needed to confirm this.

Multigroup invariance analysis was used to address Research Question 2 regarding gender-race group differences in the factor structure of the depression construct. Invariance of the factor was tested across male and female youth, and among nonBlack and Black youth. Fit measures comparing different translations of the depression factor model (i.e., configural, metric, and scalar models) supported invariance across the gender and race subgroups. Metric invariance was found among males and females; and scalar invariance was found among nonBlack and Black youth. These findings support the psychometric soundness of the eight-item CESD for use among the gender-diverse and ethnically diverse youths involved in this study.

Finally, covariate analysis to address Research Question 3, found significant relationships between depression and ACES in three of four regression analyses—an important convergence with the literature (Song & Lee, 2016; Kim, Pyo, Fava, et al., 2022; Kim, Choi, & Chae, 2022). As discussed earlier, research has found that girls experience higher levels of depression than boys. Our results are consistent with these previous findings (Song & Lee, 2016; Kim, Pyo, Fava, et al., 2022; Kim, Choi, & Chae, 2022).

At the same time, there are several limitations to our research. First, the regression analyses were conducted on cross-sectional data. Hence, no causal interpretations of our findings are possible. Second, we did not have a sufficient number of Hispanic youths to perform meaningful psychometric analyses of the depression data for them. Such analyses are planned for the future. Third, the results of the study may not generalize to male and female youths arrested in other jurisdictions, reflecting different sociodemographic and contextual circumstances. Future research should conduct similar studies in other jurisdictions.

We hope replication studies will be conducted on the shortened CES-D (Melchior, Huba, Brown, et al., 1993) involving Hispanic, White, and Black male and female youths in sufficient numbers in other jurisdictions. Our multigroup psychometric assessment of this measure among male and female Black and NonBlack youths supports its usefulness as a screening-triage tool among justice-involved youths—consistent with the RNR model. The concise nature and psychometric strength of the eight-item CES-D instrument make it ideal for use (a) in combination with additional and potentially numerous data collection instruments designed to measure multiple domains of risk and protective factors and (b) among adolescent populations who may have limited attention spans. The shortened CES-D may be ideal for use in juvenile assessment centers, other juvenile intake facilities, and coordinated community interventions that serve youths with comorbid mental health and other problems.

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Conflict of interest

The authors have no conflict of interest to report.

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