

# **DYNAMIC FACTORS AND THE ACCURACY AND VALIDITY OF THE ADOLESCENT CHEMICAL DEPENDENCY INVENTORY-CORRECTIONS VERSION II**

**Lisa Degiorgio Worthy  
Thomas University**

Risk assessment has been applied widely in corrections settings; however, the appropriateness and psychometric properties often are overlooked in decision making. Findings indicate that the ACDI-Corrections Version II juvenile assessment is a valid test that distinguishes between low risk and severe risk juvenile offenders. Moreover, the inclusion of dynamic factors (violence propensity, adjustment to incarceration, and stress management) enhanced the predictive capabilities of recidivism as measured by negative binomial regression. Receiver Operating Characteristic (ROC) and Area Under the Curve (AUC) analyses were conducted to examine accuracy of risk classification in predicting recidivism. These findings add to the existing literature on juvenile offender rates of reoffending, and clinical implications are provided.

Keywords: juvenile delinquency, risk assessment, ROC/AUC, validity, accuracy

In recent years, researchers have explored risk factors associated with juvenile offending and recidivism. Factors include personal characteristics, prior criminal history, institutional conduct, substance abuse, family characteristics, and social and environmental characteristics. Work in this area has developed a composite of offenders and those who are likely to reoffend. The profile of offenders is composed of static (gender, criminal history, and antisocial traits) and dynamic factors (substance abuse and education), which are amenable to change through treatment or intervention (Andrews & Bonta, 2010). Identifying salient risk factors can guide classification and rehabilitation decision making.

Longitudinal research suggests that most juveniles do not reoffend (Piquero, Brame, & Moffit, 2005) but a percentage of offenders will. With accurate identification of risk potential and factors associated with recidivism, appropriate interventions and treatments can be matched to meet the needs of an inmate. This is often referred to as the risk principle (Andrews & Bonta, 2010). The risk principle recommends that higher risk offenders receive higher intensity interventions; whereas, lower risk offenders receive lower intensity interventions. Risk principle represents the foundation upon which the ACDI-Corrections Version II was established. Previous research has demonstrated that treatment matched to juvenile offender risk is more effective than treatment that is not (Luong & Wormith, 2011; Mackenzie & Brame, 2001; Vincent, Guy, Gershenson, & McCabe, 2012).

---

Correspondence concerning this article should be addressed to Lisa Degiorgio, Division of Counseling, Thomas University, Thomasville, GA. E-mail: ldegorgio@thomasu.edu

The purpose of this study was to examine the validity of ACIDI-Corrections Version II as a juvenile screening instrument while simultaneously replicating earlier work on juvenile risk prediction (Lattimore, MacDonald, Piquero, Linster, & Visser, 2004; Trulson, DeLisi, & Marquart., 2011). It was expected that the ACIDI-Corrections Version II would differentiate between offenders who demonstrate low and severe risk. Moreover, it was hypothesized that assessment scores measuring dynamic factors would enhance prediction of juvenile offender rates of re-incarceration over static factors including personal characteristics and self-reported criminal history.

## METHODOLOGY

### *Participants*

There were 14,415 juvenile delinquents who completed the ACIDI-Corrections Version II from December 2001 through June 2013. Data were submitted by corrections, probation, and treatment staff across the United States who implemented the ACIDI-Corrections Version II as part of their juvenile screening or clinical intake procedures. A total of 75% of the offenders were male and 25% were female. The average age of offenders was 15. The majority of offenders, 57%, were African Americans, 34% were Caucasian, 5% were Hispanic, less than 1% were Asian and Native American, and approximately 2% of offenders selected Other, with no additional race or ethnicity information provided. Approximately 9% of offenders graduated 6<sup>th</sup> grade, 13% completed 7<sup>th</sup> grade, 22% completed 8<sup>th</sup> grade, 23% completed 9<sup>th</sup> grade, 11% completed 10<sup>th</sup> grade, 1% completed 11<sup>th</sup> grade, and less than 1% had completed some college.

### *Instruments*

The ACIDI-Corrections Version II is a self-report assessment developed to help meet the needs of juvenile corrections departments by assessing juvenile offenders' alcohol and drug abuse, adjustment, coping skills, and lethality. The ACIDI-Corrections Version II is comprehensive using a combination of static and dynamic factors that address seven areas associated with juvenile offender risk. The ACIDI-Corrections Version II consists of 140 items using true/false and multiple choice formats. The seven scales include: Truthfulness Scale, Alcohol Scale, Drug Scale, Adjustment Scale, Violence Scale, Distress Scale, and Stress Coping Abilities Scale. The ACIDI-Corrections Version II requires approximately 35 minutes for completion and is written at the 5<sup>th</sup> grade reading level. The ACIDI-Corrections Version II can be administered individually or in groups, and audio administration is available for offenders with learning disabilities. The ACIDI-Corrections Version II training manual recommends that test results be used in conjunction with a review of available records and experienced staff judgment. Each of the ACIDI-Corrections Version II scales is briefly described below; additional information can be found at [www.acdi-corrections-versionII.com](http://www.acdi-corrections-versionII.com).

**Truthfulness Scale.** The Truthfulness Scale consists of 21 true/false items that measure how truthful the juvenile offender was while completing the test. It identifies guarded and defensive juvenile offenders who attempt to minimize problems or attempt to “fake good.” All interview and self-report information is subject to the dangers of untrue answers due to defensiveness, guardedness, or deliberate falsification. This is of particular

concern in corrections where juvenile offenders often attempt to minimize their problems and/or concerns in an effort to obtain more favorable classification and disposition (Benedict & Lanyon, 1992; Piquero, Farrington, & Blumstein, 2003; Roberts & Wells, 2010).

**Alcohol and Drug Scales.** The Alcohol and Drug Scales measure juvenile offenders' admissions of alcohol or drug abuse problems, participation in previous substance abuse treatment, as well as plans for substance abuse treatment upon release from prison. Both scales consist of 18 items and use true/false and multiple choice formats. Substance abuse and dependency are prevalent among the juvenile offender populations (Lattimore et al., 2004). Substance abuse is recognized as a dynamic factor that is associated with recidivism risk and underscores the need for early identification when addressing prison-based treatment alternatives and post-incarceration rehabilitation.

**Violence Scale.** This scale measures the expression of anger and hostility through physical force. The Violence Scale consists of 21 true/false and multiple-choice items that assess the expression of physical force against another person. Early assessment, using measures of violence propensity, can provide information crucial to the development of interventions and management techniques to reduce violence during incarceration, as well as reduce the potential for violence after release.

**Adjustment Scale.** The environmental and emotional factors an offender must deal with include overcrowding, isolation for safety, victimization, as well as pre-incarceration factors, all of which can impact an offender's ability to successfully adjust to incarceration and life after release (Dhami, Ayton, & Loewenstein, 2007; Haney, 2002). This scale uses 25 true/false items and multiple choice items.

**Distress Scale.** The distress scale measures juvenile offenders discomfort, unhappiness, and pain, including indicators of internalizing anxiety, shame, and depression, as well as externalization of these emotions through physical problems including insomnia, fatigue, and restlessness. The Distress Scale contains 25 items and uses a true/false format that measures two symptom clusters, anxiety and depression. Merging of these symptom clusters is clear in the definition of dysphoria (American Psychiatric Association, 2000). It is important to measure the degree of severity of perceived distress because of its broad applicability to juvenile offenders' adjustment, intervention, and outcome.

**Stress Coping Abilities.** This scale consists of 29 items and uses a 4-point rating scale that assesses the juvenile offender's ability to effectively cope with tension, stress, and pressure. Exposure to stressors has been studied extensively as a cause of criminal behavior (Agnew, 1992; Eitle & Turner, 2003), with increased exposure to stress being linked to more violent forms of delinquency (Aseltine, Gore, & Gordon, 2000). The effect of stress exposure can be moderated by the ability to effectively cope (Agnew, 1992; Aseltine et al., 2000). The Stress Coping Abilities Scale identifies juvenile offenders who are not coping effectively with stress.

**Risk Ranges.** For each ACIDI-Corrections Version II scale respondents are classified into four risk ranges: Low Risk (zero to 39<sup>th</sup> percentile), Medium Risk (40<sup>th</sup> to 69<sup>th</sup> per-

centile), Problem Risk (70<sup>th</sup> to 89<sup>th</sup> percentile), and Severe Problem (90<sup>th</sup> to 100<sup>th</sup> percentile). Risk ranges represent degrees of severity and were established by converting raw scores to percentile scores using cumulative percentage distributions (Behavior Data Systems, 2012). Early instrument development included the use of content experts to confirm the proposed risk ranges. Data analyses, in combination with field reports from experienced evaluators, have confirmed that these percentile categories provide accurate identification of problem behavior (Behavior Data Systems, 2012).

In addition to establishing risk thresholds, the risk ranges serve an important role when interpreting Truthfulness Scale scores. A truthfulness concern is identified when a Truthfulness Scale score is at or above the Problem Risk range (70<sup>th</sup> percentile). These respondents are typically cautious, guarded, or defensive in their answers. Scores in the Problem Risk range should be interpreted cautiously. Severe problem scores on the Truthfulness Scale (90<sup>th</sup> percentile and above) invalidate all other scale scores. Invalid scores were removed from the sample ( $n=2,506$ ) for later analyses. Risk ranges (percentile scores) were used in the ROC/AUC analysis.

When completing the ACIDI-Corrections Version II, juvenile offenders provided information about their criminal and incarceration history. These variables included arrests, hearings, detentions, probation sentences, probation revocations, alcohol-related arrests, and drug-related arrests. The items were open-ended, which allowed juvenile offenders to enter a number; responses ranged from 0-35.

### ***Procedures***

Construct validity was established through use of contrast groups. This approach differentiates between juvenile offenders, who are known to have higher risk factors, and those known to have lower risk factors by comparing mean scale scores (DeVon et al., 2007). In this analysis, juvenile offenders with one arrest were categorized as first-time offenders, and juvenile offenders with two or more arrests were categorized as repeat offenders. It was anticipated that repeat offenders' mean scale scores would be higher than first-time juvenile offenders' mean scale scores, indicating more severe problems and risk. A total of 59% were first-time offenders and 41% were repeat offenders.

Regression was used for recidivism prediction; regression allows researchers to examine individual risk factors and all factors simultaneously. Number of probation revocations served as the outcome variable for this analysis. Revocations occur when offenders violate a condition or requirement of their supervision and are incarcerated. Moreover, recidivism is considered an indicator of "return on correctional investment" (p. 6) (PEW, April 2011).

Negative binomial regression was selected for use in this study because probation revocations are constrained to zero and are non-normally distributed; this violates assumptions of linear regression and requires use of a specialized statistic. In addition, negative binomial regression does not assume independence of future events like arrests and revocations (Trulson et al., 2011). Three separate binomial regression models were developed, one

for each set of predictor factors, to determine if the scale scores predicted recidivism beyond what is accounted for by demographic and criminal history characteristics (static factors).

Three sets of predictor variables included demographic characteristics, self-reported criminal history, and ACDI-Corrections Version II scale scores. Demographic variables included age, gender and race/ethnicity. Race/ethnicity was dummy coded for inclusion in the model. Age was selected as an offset variable to account for the increased time that an older juvenile may have had to accumulate a criminal history. Criminal history items included number of prior arrests, alcohol-related arrests, and drug-related arrests. To ensure validity of the criminal history sample, outlier scores, values identified above the 99<sup>th</sup> percentile, were removed ( $n = 763$ ). Scale scores made up the final set of predictor variables. The scales were divided by 10 to facilitate interpretation; thus, regression coefficients correspond to a 10% change in the given scale rather than a 1% change. Table 1 provides a summary of the predictor variables included in each analysis.

Table 1

	Min	Max	Mean	SD
<b>Demographic</b>				
Age	10	23	15.2	1.41
<b>Criminal history</b>				
Probation revocations	0	10	.20	.76
Arrests	0	13	1.90	1.90
Detentions	0	10	1.01	1.47
Alcohol-related arrests	0	3	.12	.37
Drug-related arrests	0	3	.24	.52
<b>Scales</b>				
Alcohol	0	99	21.25	28.86
Drug	0	99	37.41	33.73
Violence	0	99	48.12	27.20
Adjustment	0	99	46.02	25.82
Distress	0	99	54.62	26.89
Stress Coping Abilities	0	99	51.41	23.95

Criterion Variables and ACDI Corrections Version II Scales ( $n = 11, 909$ )

A correlation analysis and linear regression were conducted to ensure appropriateness of the model. As noted in Table 2, probation revocations were positively related to the criminal history items; coefficients ranged from .02 -.42, very small to medium effect sizes respectively. The relationships between probation revocations and scale scores also were statistically significant, showing weak to moderate relations with the scale scores (.13 – .24). Although highly correlated, regression still permits the examination of the individual variance for each predictor on probation revocations.

Table 2.  
Correlations

	Probation Revocations	Arrests	Alcohol Arrests	Drug Arrests	Alcohol Scale	Drug Scale	Violence Scale	Distress Scale	Adjustment Scale	Stress Coping Scale
Probation Revocations	1									
Arrests	.42**	1								
Alcohol arrests	.04**	.03**	1							
Drug arrests	.20**	.25**	.07**	1						
Alcohol Scale	.13**	.10**	.36**	.11**	1					
Drug Scale	.23**	.26**	.07**	.42**	.45**	1				
Violence Scale	.23**	.49**	-.15**	.07**	.13**	.27**	1			
Distress Scale	.21**	.21**	-.08**	.02	.15**	.22**	.46**	1		
Adjustment Scale	.19**	.19**	-.07**	.02*	.16**	.28**	.54**	.71**	1	
Stress Coping Scale	-.08**	-.10**	.09**	.02*	-.07**	-.16**	-.45**	-.67**	-.66**	1

Note. \*\* significant at  $p = .01$ ; \* significant at  $p = .05$

A second analysis was conducted to examine the multicollinearity of the predictor variables. As Fields (2009) noted, if predictor variables are highly correlated it is very challenging to examine the “unique estimates of the coefficients.... values become interchangeable,” (p.223) leading to a biased regression model. No multicollinearity concerns were identified in this process; thereby, permitting further regression analyses using the negative binomial approach.

Accuracy was assessed using ROC/AUC analyses. ROC analysis was selected because it simultaneously measures specificity and sensitivity of the assessment and is not influenced by low base rates (like reoffending). The AUC statistic conveys the probability that a randomly selected repeat offender would have a more deviant score than a randomly selected offender who has not reoffended (Craig & Beech, 2009). To facilitate this analysis a binary variable was created using probation revocations,  $0 = non\text{-}recidivist$ ;  $1 = recidivist$  and risk range percentiles for each scale were used.

### ***Analysis***

T-test analyses were used to examine offender group differences. Corrections were made for differences in variance, and the Bonferonni adjustment was applied to control for experimentwise alpha inflation.

Three negative binomial regression analyses were conducted to ensure that the addition of scale scores contributed to the overall fit of the model and prediction capabilities.

The first analysis was the baseline model, which included no predictor variables; the second analysis included the demographic variables and criminal history variables. The final analysis included all static factors used in the prior analysis and added ACIDI-Corrections Version II scale scores on the Alcohol Scale, Drug Scale, Violence Scale, Distress Scale, Adjustment Scale, and Stress Coping Abilities Scale. Due to the large number of variables included in the regression, the significance of the individual parameter estimates was based on a Bonferroni adjusted  $p$ -value of .004.

ROC/AUC analyses used risk classifications for each of the ACIDI-Corrections Version II scales, along with the new binary variable. Any finding with an AUC above .50 had predictive validity better than chance (50/50). Interpretation of AUC results varies depending on the needs of the test user but generally accepted clinical standards indicate 1.0 - .90 = excellent, .90 - .80 = good, .80 - .70 = fair, .70 - .60 = poor, and .60 - .50 = very poor. Fazel, Singh, Doll and Grann (2012) reported that AUC results for many criminal justice instruments are between .66 and .72.

## RESULTS

A comparison between the mean scores, using percentiles of the first-time offenders and repeat offenders, was conducted. For example, a score of 48.12 on the Violence Scale suggests that a person with this score was near the 48th percentile compared to other juveniles in the study. (Table 3) Repeat offenders had higher scale scores than first-time offenders;  $t$ -test results were statistically significant. Effect sizes using Cohen's  $d$  were calculated and ranged from about .02 - .7, representing small to large effects respectively. In the prediction study, the baseline model that included just the intercept was conducted which did not fit the data well,  $\chi^2(13140) = 30396.12, p < .001$ . Next, a model estimating the predictive effects of the demographic and criminal history factors was applied. This model fit the data better and represented a significant increase in fit beyond the baseline model,  $\chi^2_{diff}(7) = 3712.93, p < .001$ . Adding demographics and criminal history variables improved the prediction model.

Table 3

Scales	First Time Offenders	Repeat Offenders	$t$	df	$p$	$d$
Truthfulness	55.01	54.52	1.05	12402.2	.29	.02
Alcohol	21.95	27.94	-10.54	11549.0	.000	.19
Drug	32.43	49.64	-28.7	12101.7	.000	.50
Violence	42.26	60.32	-37.94	12373.5	.000	.66
Adjustment	52.69	59.34	-14.46	12869.3	.000	.25
Distress	43.67	52.32	-17.79	12645.4	.000	.31
Stress Coping Abilities	50.56	55.53	-11.31	12611.6	.000	.20

Mean Score Comparison and t-Test Results ( $n = 11, 909$ )

Finally, a third negative binomial regression was estimated to test the hypothesis that the addition of scale scores, representing dynamic factors, predicted probation revocations beyond the demographic and static factors examined. The model including the dynamic factors fit the data well,  $\chi^2(11883) = 4202.52, p = <.001$ , and resulted in a significant improvement in fit beyond the model including only the demographic and static factors,  $\chi^2_{\text{diff}}(6) = 69.94, p < .001$ . These results indicated that beyond demographic and static variables, scale scores, representing factors amenable to change are important for the prediction of probation revocations.

The results of the final model are presented in Table 4 and include regression coefficients ( $b$ ), the factor change in the expected revocation rate, and the percentage of change in expected revocations for a one unit change in the predictor variables. After controlling for demographic and criminal history characteristics, the number of probation revocations was significantly related to four of the six scales after applying Bonferroni correction.

Table 4

Negative Binomial Regression Model of Probation Revocations ( $n = 11, 909$ )

	$b$	Exp ( $b$ )	% Exp( $b$ )
Male (reference category)			
Female	-.08	.92	-7.70
Caucasian (reference category)			
African American*	-.03	.97	-2.96
Other*	1.18	3.26	225.44
Arrests	.41	1.04	50.68
Detentions*	.43	1.54	53.73
Alcohol related arrests	-.01	.994	-.60
Drug related arrests	.10	1.10	10.51
Alcohol Scale	-.07	.93	-7.25
Drug Scale	.02	1.01	2.02
Violence Scale*	.13	1.14	13.88
Distress Scale	.07	1.07	7.25
Adjustment Scale*	.75	2.12	111.70
Stress Coping Abilities Scale*	.04	1.04	4.08
Log likelihood	-5248.45		
$\chi^2$	163.2		

Note. \* $p < .001$

The results indicated that gender, race/ethnicity, as well as number of detentions, levels of violence, adjustment, and stress management, had a positive and statistically significant effect on probation revocations. With regard to race, juvenile offenders in the Other racial/ethnicity category were 225% more likely than Caucasian offenders to have probation revocations. Those with more detentions had a 53% increase in expected rates of probation revocations. Moreover, probation revocations rose 14% for every 10% increase in

violence propensity and violent behaviors. The largest predictor of probation revocations was adjustment to incarceration; juvenile offenders who reported adjusting poorly to incarceration had 112% increase in expected probation revocations. Poor stress management and coping abilities were associated with a 4% increase in expected probation revocations.

Results of the AUC analysis identified five of the seven scales above the .50 threshold; results are summarized in Figure 1. Truthfulness Risk (.48) and Stress Risk (.42) predicted revocations no better than chance. Alcohol Risk (.59), Drug Risk (.67), Violence Risk (.67), Distress Risk (.69), and Adjustment Risk (.67) predicted revocations better than chance. Craig and Beech (2009) assert that these AUC indices correspond to effect sizes ranging from small to medium respectively. Table 5 presents ROC sensitivity and specificity information along with positive and negative likelihood ratios (LR) at the 90<sup>th</sup> percentile, the Severe Problem threshold for scales with AUC at or above .65.

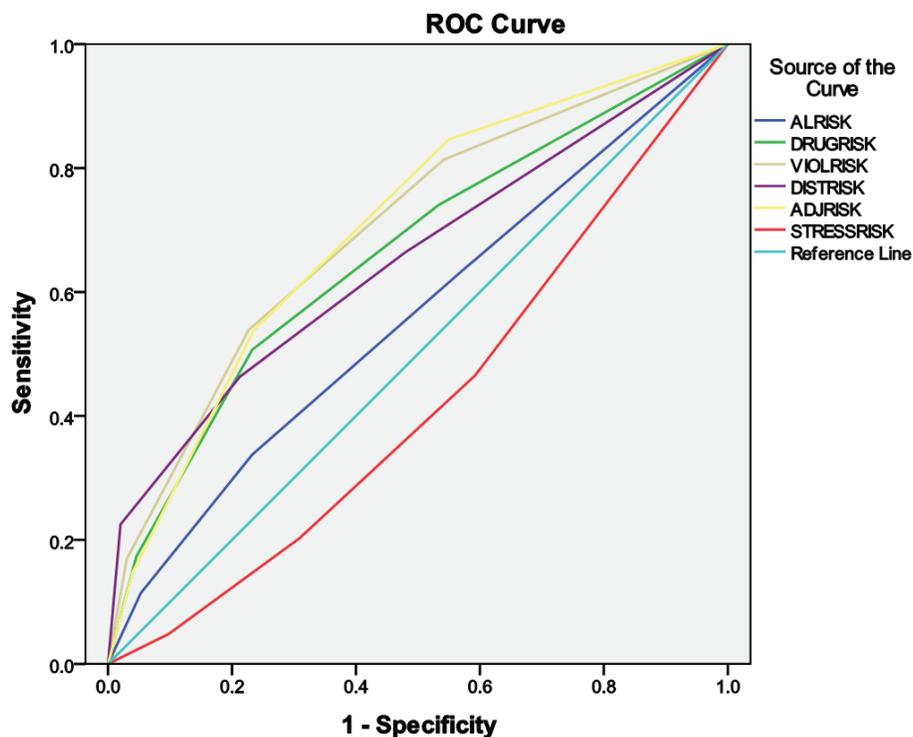


Figure 1. ROC for ACIDI-Corrections Version II risk classifications for each of the scales.

For all scales analyzed, Drug Scale, Violence Scale, Distress Scale, and Adjustment Scale, sensitivity percentages were at or below 20%. Practically interpreted, 2 out of 10 offenders who scored in the Severe Risk range had probation revocations. Specificity percentages were at 87% and above; about 9 out of 10 offenders who scored in the Low, Moderate and Problem Risk ranges did not have a probation revocation.

Table 5

ROC values for ACIDI-Corrections Version II

Scale	AUC	Sensitivity	Specificity	+LR	-LR
Drug	.67	13	95	2.64	.4
Violence	.67	18	92	2.25	.4
Distress	.69	18	89	1.64	.6
Adjustment	.67	20	87	1.53	.7

*Note.* Sensitivity = probability that a test result will be positive (Severe Risk range) when the offender has a probation revocation, expressed as percentage; Specificity = probability that a test result will be negative (Low Risk, Moderate Risk, Problem Risk ranges) when the offender has not no probation revocations, expressed as a percentage; Positive Likelihood Ratio = ratio between the probability of a positive score (Severe Risk) result given the presence of a probation revocation and the probability of a positive score (Severe Risk) given no probation revocation, Sensitivity/1-Specificity; Negative Likelihood Ratio = ratio between the probability of a negative test result (Low Risk, Moderate Risk, Problem Risk) with a probation revocation and the probability of a negative test (Low Risk, Moderate Risk, Problem Risk) with no probation revocation, 1-Specificity/Sensitivity.

## DISCUSSION

Findings in the current study indicate that the ACIDI-Corrections Version II juvenile assessment is a valid test that distinguishes between low risk and severe risk juvenile offenders<sup>1</sup>. Moreover, the inclusion of dynamic factors (violence, adjustment, stress management) in the ACIDI-Corrections Version II enhances the predictive capabilities of recidivism and identifies areas of offender needs, strengths and possible treatment targets. This study confirms the validity and reliability of the ACIDI-Corrections Version II and provides evaluators with a tool for assessing seven domains associated with juvenile risk.

Previous research has identified several factors associated with juvenile offender risk (DeLisi et al., 2010a; DeLisi et al., 2010b; Lattimore et al., 2004; Piquero et al., 2001; Trulson et al., 2011). Results in this study confirm and diverge from these earlier findings. With regard to static factors, in our study, female juvenile offenders were less likely to experience probation revocations, as were African-American juvenile offenders. Offenders categorized and self-identified as Other were more likely than Caucasian and African-American offenders to experience probation revocations.

Gender and race/ethnicity, while not grounds for revocation or release, are factors that deserve consideration by evaluators and corrections officials. Alegria, Carson, Gonclaves and Keefe(2011) found disparities in substance use treatment care and services among non-White adolescents in the larger population; with minority youth overrepresented in the juvenile justice system the situation is magnified (Belenko, Sprott, & Peterson, 2004). A study of California offenders found that non-White offenders received treatment

1 An early reviewer commented that a test would be more useful if it could distinguish between offenders defined as Problem Risk and Severe Problem. The author does not disagree and is an area for further exploration; however, as this was a validity study, the distinction between low risk and severe risk is meaningful.

and employment services that were matched poorly compared with the intensity of their needs. Consequently, for Black offenders, employment outcomes were poorer when compared to White offenders and were worse at the end of the study than at the beginning (Fosados, Evans, & Hser, 2007). Female juvenile offenders, who are more likely to experience a substance use disorder or mental health issue, are less likely to receive juvenile appropriate treatment or related services (Belenko et al., 2004). Offender needs are influenced by gender, race, and ethnicity and therefore should be factors when considering treatment options and related support services.

Prior criminal history also is considered a static factor. Among the criminal history items, number of detentions was the only item that was statistically significant in the model and accounted for a 53% increase in estimated probation revocations. This is consistent with other research that indicated juvenile offenders processed in the justice system were more likely to reoffend than offenders who were diverted from the justice system (Petrosino, Turpin-Petrosino, Guckenbug, 2010). While number of arrests was not statistically significant it is important to note that, as a predictor, it was associated with a 50% increase in estimated probation revocations and could be included as a useful predictor of probation revocations.

The ACDCI-Corrections Version II measures dynamic factors. Among the six ACDCI-Corrections Version II scales, only the Violence Scale, Adjustment Scale, and Stress Coping Abilities Scale were statistically significant in the model and were predictive of probation revocations. High propensity for violence, poor adjustment, and poor coping were predictive of probation revocations. Those juvenile offenders, who demonstrated problems and severe risk on these scales, had increased estimates of probation revocations. Inclusion of these dynamic factors improved predictive capabilities of the ACDCI-Corrections Version II, which has important clinical implications. Luong and Wormith (2011) found a 38% reduction in juvenile reconvictions when risk classification was appropriately matched and implemented to meet treatment needs. Research also has demonstrated that adherence to the risk principles can impact juvenile disposition outcomes, resource allocation, and juvenile recidivism rates (Vincent et al., 2012).

The accuracy results underscore the results of the negative binomial regression, five of the seven scales predicted revocations better than chance, as measured by area under curve (AUC), including violence risk and adjustment risk. Alcohol and drug risk performed better than chance at predicting probation revocations, but did not contribute to the overall model. Guardedness, denial, and problem minimization, as measured by the Truthfulness Scale, were not predictive of probation revocations. Contrary to the negative binomial model, stress management, as a predictor of revocations, performed poorer than chance. This finding may be related to interaction of variables in the model, but is worthy of further exploration.

The ACDCI-Corrections Version II has high specificity, indicating that individuals with lower risk are less likely to be assigned to inappropriately intense supervision or classification; however, sensitivity results revealed that the assessment is likely missing

offenders who pose severe risk. Specificity and sensitivity are influenced by the prevalence of revocations and the number of offenders without revocations was almost 10 times greater than those with revocations. Use of the likelihood ratios, which are not impacted by prevalence, revealed that at the Severe Risk threshold there is a small increase in the probability of probation revocations for the four scales examined.

### ***Limitations***

Despite the promising psychometric findings of the ACDI- Corrections Version II, there are some limitations related to this study including test administration, psychometric properties, and methodology. As noted earlier, the authors and test designers have limited knowledge or input into how the test is administered to offenders by the various corrections department or probation agencies. Inmate data was returned to the authors for analysis and interpretation. Corrections staff were provided general test administration guidelines as outlined in the training manual; however inconsistencies in test administration, security classification, and environment may impact results. Field research using the ACDI- Corrections Version II should include a description of administration procedures, as well as examine accuracy of risk prediction on recidivism rates. To this end, collaboration with agencies to examine long term test data would expand the existing knowledge of inmate recidivism and treatment planning. Moreover, it would aid in future accuracy studies.

A causal relationship between scale scores, recidivism rates, and treatment outcomes could not be established because the data collected were not longitudinal. Collecting longitudinal data is time and resource intensive; however, it may be worth considering as this type of methodology would provide the necessary data to test whether the ACDI- Corrections Version II could identify, at an individual level, which offenders had the greatest likelihood of committing offenses while in custody and upon release. While a limitation for this project, the collection of longitudinal data is an area for future research.

Finally, the methodological approach adopted by this study assumes the offender is unchanging and that prior criminal acts reflect a persistent state or criminal propensity. Moreover, this approach assumes that offenders will reoffend when released. While prior criminal history has demonstrated strong predictive abilities on recidivism (Andrews & Bonta, 2010), research demonstrates that pro-social activities, substance abuse treatment, and strong positive peer relationships can reduce reoffending rates. This reliance on a static dependent variable introduces bias into the study (Saltzman, Paternoster, Waldo, & Chiricos, 1982) and may lead to an overestimation of the relationship between the variables. For this reason, caution should be used when interpreting the results of this study or other studies which use this type of methodology.

### ***Conclusions***

The ACDI-Corrections Version II was developed to assess juvenile risk, as well as identify juvenile offender coping abilities, adjustment, and psychological needs. Risk assessments like the ACDI-Corrections Version II have demonstrated significant advantages over risk assessments that rely solely on interviews and clinical impressions (Andrews & Bonta, 2010). Moreover, the process of juvenile offender screening and initial classifica-

tion typically occurs in diagnostic centers with the administration of a “quick risk” assessment to aid in the initial incarceration decisions. These brief evaluations may be followed by more extensive and thorough evaluations to determine treatment options and rehabilitation recommendations (Christensen & Warwick, 2009). By including both static and dynamic factors in one assessment, the ACIDI-Corrections Version II provides an alternative to the use of multiple intake tests by probation, corrections, and treatment staff. This is particularly important when resources (budgetary, staff, facilities) are limited. The ACIDI-Corrections Version II provides insight into alcohol and drug use, antisocial tendencies, distress, and violence. By including static and dynamic factors, as well as risk and prosocial factors, a more complete profile of the juvenile offender emerges. Addressing risk and needs early can facilitate successful community reintegration for the juvenile offender, change trajectory of criminal behaviors, and enhance public safety (PEW, April 2011).

## REFERENCES

- Agnew, R. S. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, *30*, 47-87.
- Alegria, M., Carson, N. J., Gonclaves, M., & Keefe, K. (2011). Disparities in treatment for substance use disorder and co-occurring disorders for ethnic/racial minority youth [Abstract]. *Journal of the American Academy of Child & Adolescent Psychiatry*, *50*(1), 22-31.
- American Psychiatric Association. (2000). *Diagnostic and statistical manual*. (4<sup>th</sup> ed.) Washington, D.C.: American Psychiatric Publications.
- Andrews, D. A., & Bonta, J. (2010). *The psychology of criminal conduct* (5<sup>th</sup> ed.). New Providence, NJ: Lexis Nexis Group.
- Aseltine, R. H., Gore, S., & Gordon, J. (2000). Life stress, anger and anxiety, and delinquency: An empirical test of general strain theory. *Journal of Health and Social Behavior*, *41*(3), 256-275.
- Behavior Data Systems. (2012). *Adolescent Chemical Dependency Inventory-Corrections Version II*. Retrieved from [www.bdsd.com](http://www.bdsd.com)
- Belenko, S., Sprott, J. B., & Peterson, C. (2004). Drug and alcohol involvement among minority and female juvenile offenders: Treatment and policy issues [Abstract]. *Criminal Justice Policy Review*, *15*(1), 3-36.
- Benedict, L. W., & Lanyon, R. I. (1992). An analysis of deceptiveness: Incarcerated prisoners. *Journal of Addictions and Offender Counseling*, *13*, 23-31.
- Christensen, G. E., & Warwick, K. (2009). *Screening, assessment, treatment, timing, application*. The Transition from Jail to Community Project. Retrieved from <http://nicic.gov/Library/025535>.
- Craig, L. A., & Beech, A. (2009). Best practice in conducting actuarial risk assessments with adult sexual offenders. *Journal of Sexual Aggression*, *15*, 193-211. doi:10.1080/13552600902867847.
- Dhami, M. K., Ayton, P., & Loewenstein, G. (2007). Adaptation to prison: Indigenous or imported? *Criminal Justice and Behavior*, *34*, 1085-1100.
- DeLisi, M., Beaver, K. M., Vaughn, M. G., Trulson, C. R., Kosloski, A. E., Drury, A. J., & Wright, J. P. (2010a). Personality, gender, and self-control theory revisited: Results from a sample of institutionalized juvenile delinquents. *Applied Psychology in Criminal Justice*, *6*(1), 31-46.
- DeLisi, M., Caudill, J. W., Trulson, C. R., Marquart, J. W., Vaughn, M. G., & Beaver, K. M. (2010b). Angry inmates are violent inmates: A Poisson regression approach to youthful offenders. *Journal of Forensic Psychology Practice*, *10*, 419-439.
- DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., ... Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship*, *39* (2), 155-164.
- Eitle, D., & Turner, R. J. (2003). Stress exposure, race and young adult male crime. *The Sociological Quarterly*, *44*(2), 243-269.

- Fazel, S., Singh, J., Doll, H., & Grann, M. (2012). Use of risk assessment instruments to predict violence and antisocial behaviour in 73 samples involving 24,827 people: Systematic review and meta-analysis. *BMJ*, 345, e4692.
- Field, A. (2009). *Discovering statistics using SPSS* (3<sup>rd</sup> ed.). Los Angeles, CA: Sage Publications.
- Fosados, R. Evans, E., & Hser, Y. (2007). Ethnic differences in utilization of drug treatment services and outcomes among Proposition 36 offenders in California [Abstract]. *Journal of Substance Abuse and Treatment*, 33 (4), 391-399.
- Haney, C. (2002, January). The psychological impact of incarceration: Implications for post-prison adjustment. In United States Department of Health and Human Services, Urban Institute, *From prison to home: The effect of incarceration and reentry on children, families and community*. From Prison to Home Conference.
- Lattimore, P. K., MacDonald, J. M., Piquero, A. R., Linster, R. L., & Visser, C. A. (2004). Studying the characteristics of arrest frequency among paroled youthful offenders. *Journal of Research in Crime and Delinquency*, 41, 37-56.
- Luong, D. & Wormith, J. S. (2011). Applying risk/need assessment to probation practice and its impact on the recidivism of young offenders. *Criminal Justice and Behavior*, 38(12), 1177-1199.
- Mackenzie, D. L., & Brame, R. (2001). Community supervision, prosocial activities, and recidivism. *Justice Quarterly*, 18,(2), 429-448.
- Petrosino, A., Turpin-Petrosino, C., & Guckenburg, S. (2010). Formal system processing of juveniles: Effects on delinquency. *Campbell Systematic Reviews*, 2010(1), 1-88.
- PEW Center on the States. (April, 2011). *State of recidivism: The revolving door of America's prisons*. Retrieved from <http://www.pewcenteronthestates.org/publicsafety>
- Piquero, A., Blumstein, A., Brame, R., Haapanen, R., Mulvey, E. P., & Nagin, D. S. (2001). Assessing the impact of exposure time and incapacitation on longitudinal trajectories of criminal offending. *Journal of Adolescent Research*, 16, 54-74.
- Piquero, A. R., Brame, R., & Moffitt, T. E. (2005). Extending the study of continuity and change: Gender differences in the linkage between adolescent and adult offenders. *Journal of Quantitative Criminology*, 21(2), 219-243. doi:10.1007/s10940-005-2494-3
- Piquero, A., Farrington, D., & Blumstein, A. (2003). The criminal career paradigm In M. Tonry (Ed). *Crime and Justice*. Chicago, IL: University of Chicago Press.
- Roberts, J., & Wells, W. (2010). The validity of criminal justice contacts reported by inmates: A comparison of self-reported data with official prison records. *Journal of Criminal Justice*, 38, (5), 1031-1037. doi:10.1016/j.crimjus.2010.07.005
- Saltzman, L., Paternoster, R., Waldo, G. P., Chiricos, T. G. (1982). Deterrent and experiential effects: The problem of causal order in perceptual deterrence research. *Journal of Research in Crime and Delinquency*, 19(2), 172-189.
- Trulson, C. R., DeLisi, M., & Marquart, J. W. (2011). Institutional misconduct, delinquent background, and rearrest frequency among serious and violent delinquent offenders. *Crime & Delinquency*, 57, 709-731.
- Vincent, G. M., Guy, L. S., Gershenson, B. G., & McCabe, P. (2012). Does risk assessment make a difference? Results of implementing the SAVRY in juvenile probation. *Behavioral Sciences and Law*, 30, 384-405.

Received: 9/2013

Accepted: 9/2014

- Worthy, L. D. (2014). Predicting juvenile recidivism: Accuracy and validity of the Adolescent Chemical Dependency Inventory-Corrections Version II. [Electronic Version]. *Applied Psychology in Criminal Justice*, 10(2), 129 -142.