

*Journal of Offender Rehabilitation, Vol. 45(3/4), 2007. Pp. 85-108.*

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doi:10.1300/J076v45n03\_04

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## Assessing the Risk of Re-Offending for Juvenile Offenders Using the Youth Level of Service/Case Management Inventory

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**ABSTRACT** The purpose of the Youth Level of Service Case Management Inventory (YLS/CMI) is to assess, classify, and assist agencies with developing treatment and service plans according to the offender's criminogenic risk factors. Given the limited research in the predictive validity for this instrument, the current study attempts to examine this issue on a sample of 4,482 juveniles from Ohio who were given sentences in the community or to juvenile institutions. Results demonstrated the validity of the YLS/CMI in predicting recidivism for both settings. doi:10.1300/J076v45n03\_04 [Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <[docdelivery@haworthpress.com](mailto:docdelivery@haworthpress.com)> Website: <<http://www.HaworthPress.com>> © 2007 by The Haworth Press, Inc. All rights reserved.]

**KEYWORDS** Youth Level of Service/Case Management Inventory (YLS/CMI), predictive validity, criminogenic risk factors, recidivism

Based on the most recent national report from the Office of Juvenile Justice and Delinquency Prevention (Snyder & Sickmund, 2006), the overall arrest rate for youthful juveniles aged ten to thirteen declined from 1980 through 2003. While much of this reduction can be attributed

to decreases in the rates of property offenses, vandalism, and running away, there were substantial increases noted for juvenile offenders aged ten to seventeen for violent and drug-related crimes. Specifically, aggravated and simple assaults, and sex crimes were shown to have increased 91, 197, and 121 percent respectively during this same 24-year period. In addition, drug abuse crimes rose 105 percent along with an increase of 138 percent for weapons crimes (Snyder & Sickmund, 2006, p. 130). Even with the overall decrease in arrests, there has been an increase from 58 to 71 percent in the number of juveniles who have been processed through the juvenile courts during this same time period (Snyder & Sickmund, 2006). Given these reported increases in violent and drug-related arrests for juveniles as well as the increase in juvenile court referrals, the concern for the proper classification and treatment of youth in the United States is becoming evident.

A popular instrument used to classify juvenile offenders' risk, need, and responsivity factors found in various correctional, residential, and community settings is the Youth Level of Service/Case Management Inventory (YLS/CMI) (Hoge, 2001, 2002; Hoge & Andrews, 2002; Hoge, Andrews, & Leschied, 2002). Several studies have demonstrated the predictive validity or satisfactory reliability of the YLS/CMI, yet limitations noted in the research include small sample sizes (Catchpole & Gretton, 2003; Jung & Rawana, 1999; Schmidt, Hoge, & Gomes, 2005), a relatively short follow-up period for the recidivism measure (Catchpole & Gretton, 2003; Jung & Rawana, 1999), scoring the instrument retrospectively (Catchpole & Gretton; Marczyk, Heilburn, Lander, & DeMatteo, 2005), or limiting its applicability to one type of setting (Schmidt et al., 2005).

While appropriate warnings about the universal applicability of risk screening instruments and offender classification schemes found in correctional and judicial decision-making are noted (Clear & Gallagher, 1985; Smykla, 1986; Wright, Clear, & Dickson, 1984), a full departure from the use of such instruments is unlikely. Recognition for the importance of using standardized actuarial assessments rather than clinical judgments of offender risk are preferable and have been consistently reported in the literature (Bonta, Law, & Hanson, 1998; Gendreau, Goggin, & Papanozzi, 1996; Hanson & Bussier, 1998; Hoge, 2002; Mossman, 1994; Steadman, Silver, Monahan, Appelbaum, Clark-Robbins, Mulvey, Grisso, Roth, & Banks, 2000). As pointed out by Schmidt et al. (2005), research on the predictive validity of standardized instruments primarily focuses on adult offenders (Douglas & Kropp, 2002; Gendreau, Goggin, & Papanozzi, 1996; Kroner & Mills, 2001; Steadman et al.,

2000) rather than on youthful offending samples (Hoge, 2002; Hoge & Andrews, 1996; Krysik & LeCroy, 2002; Le Blanc, 1998). This study attempts to add to the limited body of knowledge for juvenile offenders risk/needs assessments as well as to address some of the previously mentioned limitations concerning the predictive validity of the YLS/CMI.

### **FRAMEWORK**

Originally based on Andrews and Bonta's (1995) standardized risk assessment for adult offenders, the Level of Service Inventory Revised (LSI-R), and an earlier version designed for youth called the Youth Level of Service Inventory (YLSI), the YLS/CMI was created to assess a juvenile offender's risk level and criminogenic needs (Hoge & Andrews, 2002; Hoge, Andrews, & Leschied, 2002). Unlike the earlier version of the YLSI, the YLS/CMI includes items to capture responsivity and incorporates a professional override (Hoge, 2001). By including these additional two principles, the learning styles and abilities of offenders can be matched or accounted for when assigning an individual to the appropriate types of treatment and program services (Andrews, Bonta, & Hoge, 1990).

Initially, the YLS/CMI was developed for probation officers to assist them in writing pre-disposition reports (Hoge, 2001). However, Hoge indicates that the instrument is appropriate for "all decision areas within the juvenile justice systems requiring an assessment of the youth's risk and need levels. This includes decisions relating to pretrial detention, preadjudicatory diversion, sentencing and, as well, institutional and community programming decisions" (2002, p. 28). Rather important to the juvenile justice system is attempting to predict future behavior. As posited by Hoge (2002), estimating a juvenile's criminogenic risk factors has several serious implications for actors in the criminal justice system or for those providing treatment to juveniles.

First, the decision to sentence a youth to an institution, a residential program or a community-based sentence (i.e., probation) is often based on the inferences that the juvenile will re-offend in the future (Hoge, 2002, p. 383). Second, variations in length of sentence and level of supervision or custody can be based on the level of criminogenic risk. Third, in a summary of the findings from several meta-analyses, the type of treatment and the intensity of services that a juvenile participates in should be determined by the individual's risk level. A variety of results can be demonstrated with two distinct methods of case classification. Higher

risk individuals in an intense treatment program often will show the best results than that of the lower risk individuals, suggesting that higher risk offenders should be targeted for correctional intervention (Gendreau, 1996). In addition, combining juveniles of various risk levels into the same treatment program has the potential of raising the risk levels of the lower risk individuals (Andrews et al., 1990; Lipsey & Wilson, 1998). Therefore, the YLS/CMI is intended for use by criminal justice practitioners in developing individual treatment plans and managing juvenile offender populations in various correctional settings (Andrews & Bonta, 1995, 1998; Bonta, 1996; Hoge, 2001; Latessa & Holsinger, 1998).

As previously mentioned, the YLS/CMI was derived from the adult-version, the LSI-R. Multiple reviews of the LSI-R suggest that the instrument has predictive validity and interrater reliability on a variety of offenders, sentencing placements, or correctional settings (Andrews, 1982; Andrews & Bonta, 1995; Andrews & Robinson, 1984; Bonta & Motiuk, 1985, 1987; Gendreau, Goggin, & Paparozzi, 1996; Gendreau, Little, & Goggin, 1996; Kroner & Mills, 2001; Lowenkamp, Holsinger, & Latessa, 2001). In addition, previous findings suggest that the LSI-R total risk score has been correlated with institutional violations (Bonta, 1989; Bonta & Motiuk, 1986). While findings from a study conducted by Dowdy, Lacy, and Unnithan (2002) on a sample of 149 male residents of a halfway house did not find in any of their analyses that the LSI had predictive validity; a meta-analysis of actuarial assessment instruments in predicting recidivism suggest that the LSI-R produced the highest correlations than that of other actuarial measures including the Salient Factor Score, the Wisconsin system and others (Gendreau, Little, & Goggin, 1996; Gendreau, Goggin, and Smith, 2002).

Similar to the LSI-R, the YLS/CMI has a 42-item scale that measures eight specific domains which tap into a juvenile offender's propensities for risk (Hoge & Andrews, 2002). Specifically, the eight dimensions of the YLS/CMI tap into a youthful offenders' criminogenic risk and needs associated with (1) prior and current offenses/adjudications, (2) family circumstances and parenting issues, (3) education and employment, (4) peer relations, (5) substance abuse, (6) leisure and recreation, (7) personality and behavior, and (8) attitudes and orientations. Multiple items are scored upon within each domain and each is recorded as one risk that is present or absent, thereby resulting in a total score ranging from 0 to 42. Four categories that summarize the risk and needs factors are based on an individual's total score. Juveniles that score from 0 to 8 are classified as low risk; scores from 9 to 22 are classified as moderate risk; scores from 23 to 34 are classified as high risk; and scores from 35 to 42 are classified

as very high risk. The inclusion of these eight measures into the instrument was based on a review of the research (Hoge, 2001), which maintains that these factors are correlated with juvenile delinquency (Farrington, 1997; Lipsey & Derzon, 1998; Loeber & Dishion, 1983).

### *Previous Research on Juveniles and Risk*

Specifically, there are several meta-analyses that have examined the criminogenic risk factors of juveniles which have indicated that the dimensions included in the YLS/CMI are strong predictors of recidivism in youth. First, a 1994 meta-analysis attempting to identify the primary risk factors predicting juvenile recidivism include delinquent peer associations, antisocial attitudes, misconduct problems, and a variety of other dynamic characteristics (Simourd & Andrews, 1994). Second, in a more recent meta-analysis examining the risk factors that predict juvenile recidivism, Cottle, Lee, and Heilburn (2001) indicated that offense history, associations with delinquent peers, issues of misconduct, problems with family relations, lack of involvement in prosocial activities, and non-severe pathologies were found to be strong predictors associated with offending behaviors. Not surprisingly, prior offense history, a static risk factor, was found to be the strongest indicator of future delinquency (Cottle et al., 2001).

As indicated by Andrews and colleagues (1990), it is the dynamic risk factors rather than the static, which can be targeted for change and should be the focus of treatment goals. Although, according to Gendreau, Goggin, and Pappozzi (1996), the most ideal predictors of future recidivism will include elements that are both static and dynamic (p. 66). Additionally, in a meta-analysis conducted by Gendreau, Little, and Goggin (1996), they found that a combination of dynamic and static risk factors were associated with recidivism as well as suggesting the importance of pro-criminal behavior as a juvenile in predicting future criminality. Reviews on the predictive validity of the YLS/CMI are limited and the debate on the predictive abilities of the individual domains of the YLS/CMI continues. A discussion of the research on the predictive validity of the YLS/CMI follows.

In a study comparing the predictive validity of three instruments examining recidivism on a group of juveniles, Catchpole and Gretton (2003) suggested that the YLS/CMI, as well as the Structured Assessment of Violence Risk in Youth (SAVRY) and the Psychopathy Checklist: Youth Version (PCL:YV) were all significantly related to risk for both violent and general recidivism. Specific to the YLS/CMI in their research, not

one of the 21 youths classified at the low and moderate risk levels were found to have violently recidivated, while 30 percent of the high to very high risk juveniles violently re-offended during the follow-up period. However, this study was limited by a one year follow-up period (with the exception of an additional 8 months for a small portion of the sample who received treatment) and included a sample size of only 74 juveniles. In addition, the risk-assessment instruments were coded retrospectively using file information for each offender. While it is argued by Catchpole and Gretton (2003) that the scoring of these assessments retrospectively is reliable, it should be noted that the intended guidelines for administering the YLS/CMI, which includes a semi-structured interview with the youth, were not followed.

In a recent archival study by Marczyk et al. (2005), assessments with the YLS/CMI along with the PCL:YV and the Massachusetts Youth Screening Instrument (MAYSI) were conducted to determine if adult courts would decertify a juvenile offender and return the youth to the juvenile justice system or keep the youth bound over in the adult criminal justice system. In particular, the YLS/CMI total score was a significant predictor of certification status. Further, juveniles who received higher total scores on the YLS/CMI were more likely to remain in the adult system. In comparison with the other two instruments, the authors suggest that the YLS/CMI had the most predictive utility (Marczyk et al., 2005, p. 289). In addition to conducting a retrospective assessment of juvenile offenders, other limitations include a relatively small sample size ( $N = 95$ ) and the potential for sampling bias, as the files were obtained by referral of the public defender's office (Marczyk et al., 2005).

Schmidt, Hoge, and Gomes (2005) examined the reliability and validity of the YLS/CMI from a sample of 107 youthful offenders who were under court referral for mental health evaluations. Findings revealed that higher total scores on the YLS/CMI were significantly correlated with increases in a juvenile's seriousness of the re-offense, increases in the number of new offenses and less time until the next offense is committed. It should be noted that while the male sample was found to be significantly associated with the recidivism measures, the female sample was not significant for any re-offense and the number of new offenses. Two strengths demonstrated from this study include the long follow-up period of 3.5 years and multiple recidivism measures; however the findings are restricted to a small sample size and the scope being limited to one type of setting.

It can be implied that youth given community sentences would typically differ from that of juvenile offenders placed in an institution.

According to Flores, Travis, and Latessa (2004), "youth committed to institutional or residential placements exhibit more serious delinquency or have greater treatment needs than those placed under probation supervision" (p. 15). However, while multiple sites were included in the analysis, it is important to note that Flores et al. (2004) had a smaller sample size ( $N = 1,674$ ) in comparison to the sample size in the current research ( $N = 4,482$ ) and a two-year follow-up period for recidivism.

Results indicating psychometric support for the YLS/CMI are detailed in the manual for the instrument (Hoge & Andrews, 2002), as well as in a study conducted by Jung and Rawana (1999). In particular, their findings were able to distinguish between the juveniles who did or did not re-offend (Jung & Rawana, 1999). In contrast to Schmidt et al. (2005), their study was also able to predict recidivism for both males and females as well as for ethnicity. Yet, limitations with their study include a relatively short follow-up period of six months and a smaller sample size ( $N = 263$ ).

To summarize, research on the classification and risk assessment of juveniles is limited in comparison to that of the adult offenders. Based on multiple reviews of the literature, factors associated to criminogenic risk and needs appear well established. Yet, given the relative infancy of the YLS/CMI, very few studies have explored the predictive validity of the instrument. Limitations in the previous research including assessment of the YLS/CMI using retrospective data, small sample sizes, short follow-up periods and limiting the scope of the analysis to one type of setting will be addressed in the current study.

### ***RESEARCH HYPOTHESES***

Given Hoge's (2001) claim that the YLS/CMI is relevant for case planning in a variety of settings (institutional and community), this study attempts to explore the predictive validity of the YLS/CMI for both types of placement as well as to identify if the instrument is more reliable in predicting outcome in either setting. Should the instrument have predictive utility in both settings, the YLS/CMI could become a more universal tool for risk assessment with at-risk juvenile populations. For purposes of this study, several research hypotheses are proposed to examine the predictive validity of the YLS/CMI for a sample of institutionalized and community-sentenced youth from Ohio. In response to the limitations noted in previous research, this investigation into the predictive validity of the YLS/CMI will include a longer follow-up period

(3.4 years) and a larger sample ( $N = 4,482$ ). In addition, the assessments used in the current research are based on an interview with the youth and a review of collateral information at the time of intake to the community or institutional setting. Research questions examined in this study are as follows:

1. Does the YLS/CMI have predictive validity for juvenile offenders?
2. Does the YLS/CMI have predictive validity for community-sentenced juvenile offenders?
3. Does the YLS/CMI have predictive validity for institutionally sentenced juvenile offenders?
4. Does the YLS/CMI have predictive validity for juvenile offenders regardless of sex or race?
5. Does the strength of the relationship between the total YLS/CMI score and outcome differ for the institutional- or the community-based juvenile offenders?

## METHODS

### *Sample*

Subjects included in this study are juvenile offenders from all 88 counties in the State of Ohio. Variations exist in the number of individuals from each county, as larger counties have more cases than that of the smaller populated counties. Of the 4,482 juveniles included in the sample, all received either an institutionally based sentence ( $N = 3,376$ ) or a community-based sentence ( $N = 1,106$ ). However, it should be noted that for the community-based sample, county representation was limited; therefore, assessment of the YLS/CMI across the counties for community-based offenders was additionally limited. Each juvenile was assessed on the YLS/CMI and expected variations were found in the risk and needs level categories assigned to each group. In addition, the sample included both males ( $N = 3,884$ ) and females ( $N = 598$ ) and had a racial composition of 52 percent white offenders and 47 percent non-white offenders. A majority of the total sample had prior adjudications ( $N = 3,039$ ) were in school or had graduated ( $N = 3,578$ ) and were not employed ( $N = 3,343$ ). Total YLS/CMI risk scores ranged from 1 to 41 with an average score for the entire sample of 21.48, indicating that overall the offenders in this sample were of moderate risk. However, it

should be noted that the modal value of 23 indicates that the overall sample would be classified as high risk. This should not be surprising, as the size of the institutionalized sample is larger than that of the community sample. As stated previously, youthful offenders that receive an institutionally based sentence are more likely to be involved with more serious forms of delinquency than that of a community-based juvenile delinquent (Flores et al., 2004).

### *Data*

Data for this study were obtained from a larger scale project conducted by the University of Cincinnati (see Lowenkamp & Latessa, 2005). Juveniles in this study included youth who were sentenced to a community-based program, as well as those sent to residential and institutional facilities.

### *Measures*

There were a total of two primary predictors included in this analysis. First, the total score for each youth on the instrument (labeled as YLS/MI score in the tables), was measured on a limited metric scale ranging from 0 to 42 and served as the primary independent variable in the analyses. It was considered beneficial to maintain the continuous scale in order to investigate if a small change in the raw total score would result in the overall score significantly predicting the outcome measure. Second, the risk level categories of the YLS/CMI were maintained to determine if these classifications would be significantly correlated with recidivism. These scores can be categorized into an ordinal scale identifying juveniles who are either at a low, moderate, high or very high risk of re-offending. While Multi-Health Systems, the publisher of the YLS/CMI, has indicated four different categories for risk levels based on an individual's total YLS/CMI score, it was evident given the differences between the community and institutionalized groups that three cutoff scores would provide a better fit for the total sample. Specifically, the low-risk group comprised scores ranging from 1 to 13, the moderate composite score was 14-22 and the high-risk category included 23 and above. Findings regarding the new cutoff scores and recidivism are discussed later.

Control variables examined in the current research include sentencing type, age, sex, and race. Previous research indicates that the YLS/CMI has predictive validity across sex, age, and race (see Flores et al., 2004).

In addition, the Flores et al. (2004) study controlled for the site by separating the groups and conducting logistic regression analyses individually. As mentioned above, it can be implied that youths given community sentences differ based on risk, from that of the institutionalized sample; therefore, it was necessary to separate the two groups. However, an analysis was conducted to determine if it was appropriate to disaggregate the two groups from the same sample. For the current study, age remained a continuous variable, sex was coded as 0 = males, 1 = females and race was coded 0 = whites and 1 = non-whites.<sup>1</sup> Each of these dichotomous controls is identified, within the tables, as category 1 to ease in the interpretation of the variable.

For purposes of this study, recidivism is defined as a youth who received any type of conviction or commitment post-release from their community or institutionalized sentence. Specifically, this variable was coded as 0 = no new conviction or commitment following release from the earlier sentence type and 1 = a post-release new conviction or commitment occurred for the juvenile.

### *Statistical Analysis*

For the goals in the current study, four separate types of analyses were conducted. First, to determine the effectiveness of the YLS/CMI risk level categories in predicting recidivism as it is measured here, correlations were calculated for the analysis between these categories of the YLS/CMI and recidivism. This test was conducted on the entire sample, as well as the separate groups, institutionalized and community-based youth.

Second, logistic regression analyses were conducted separately on the institutionalized and community groups in order to examine if the total risk scores of the juveniles in the separated groups significantly predicted the outcome measure. In addition, probabilities associated with individuals who are found to be at high risk in either or the two sentencing types are calculated. Third, we conduct the z-test recommended by Clogg, Petkova, and Haritou (1995) to assess if the magnitude of regression coefficients statistically differs between the institutionalized and community groups.

Fourth, the last analysis for the current study is to examine the strength of the predictive validity of the YLS/CMI and to assess if the instrument has a stronger predictive validity for the institutionalized group or the community-based group. Recent research has been assessing the predictive validity of this instrument using receiver operating characteristics,

or ROCs (Schmidt et al., 2005). Based on a summary of Rice and Harris' (1995) contentions that this method is quite useful in assessing the strength of predictive validity, the ROC curve will plot the ratios of the true positives to the false positives (Schmidt et al., 2005). Graphically depicted, a diagonal line across the graph indicates the area under the curve (AUC) of 50 percent, but the strength of prediction is reflected with a larger AUC value (Schmidt et al., 2005, p. 338). This analysis was done for the overall sample, as well as for the separate sentencing types.

## **RESULTS**

### ***Descriptive Statistics***

Descriptive statistics on all of the variables included in the analyses are found in Table 1. The average overall score on the YLS/CMI for the entire sample was 21.48, while the institutionalized and community-based samples averaged 23.08 and 16.60, respectively. To further describe the groups, means and standard deviations were also calculated for each of the eight domains in the YLS/CMI. As indicated in Table 1, the institutionalized group scored higher in each domain in comparison to the community-based group which suggests that the institutionalized group was a higher risk group than the community. In order to distinguish the differences in the means, an independent samples t-test was conducted which revealed in the Levene's test for equality of variances that only one domain, education and employment, was not significant ( $p = .627$ ). However, the t-test for equality of means suggested that there is a significant mean difference for each of the remaining seven risk categories and the overall risk score for each group.

For both groups, the majority were comprised of males. The average age of the juveniles for the overall sample was 17.29 years, but the institutionalized youth were an average age of 17.72 years, while the community-based youth had a mean age of 15.98 years. The racial composition of the total sample indicated that the majority of youth are white (52 percent); however, the institutionalized youth had slightly more non-white juveniles ( $N = 1,687$ ) than white ( $N = 1,658$ ). For the community-sentenced offenders, the majority of individuals were white ( $N = 673$ ) rather than non-white ( $N = 416$ ). In the overall sample, 51.2 percent of the offenders had recidivated. The rate of recidivism was

□ **Table 1: Descriptive Statistics**

Independent Variables	Entire Sample (N = 4,482)		Institutionalized (N = 3,376)		Community (N = 1,106)	
	Mean	SD	Mean	SD	Mean	SD
YLS/CMI Score (0-42)**	21.48	7.23	23.08	6.29	16.60	7.70
Criminal History**	2.63	1.48	2.97	1.29	1.60	1.54
Family/Parenting**	3.13	1.51	3.32	1.42	2.53	1.62
Education/Employment	3.18	1.82	3.31	1.80	2.78	1.85
Peers**	2.81	1.69	3.06	1.74	2.07	1.27
Substance Abuse**	2.52	1.38	2.84	1.14	1.54	1.56
Leisure**	1.87	.74	1.91	.66	1.73	.93
Personality*	3.34	1.78	3.57	1.71	2.63	1.81
Attitudes**	2.00	1.28	2.10	1.24	1.71	1.35
Female	.13	.34	.10	.30	.25	.43
Non-White	.47	.50	.50	.50	.38	.49
Age	17.29	1.64	17.72	1.40	15.98	1.59
Sentence Type <sup>1</sup>	.25	.43				
Dependent Variable						
Recidivism <sup>2</sup>	.49	.50	.53	.50	.36	.48

Significance for t-test:  
 \*\*p < .001.  
 \*p < .05.  
<sup>1</sup>The variable labeled sentence type was coded as 0 = institutionalized and 1 = community.  
<sup>2</sup>Recidivism was coded as 0 = offender did not recidivate and 1 = offender did recidivate.

53.1 percent for the institutionalized group and 35.5 percent for the community group.

### **Correlations**

Table 2 depicts the bivariate correlations between the YLS/CMI total score and the recidivism measure for the total sample, and then separately for the institutionalized and community groups. In addition, the 95 percent confidence intervals for  $r$  were also reported. Further, for the total sample and the two groups, each category was then further separated by sex, by

□ **Table 2: Correlations Between the Youth Level of Service/Case Management Inventory (YLS/CMI) and Outcome**

Outcome	Total Sample <sup>a</sup>	95% CI		Institutionalized <sup>b</sup>		95% CI		Community <sup>c</sup>		95% CI	
		Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper		
Commitment or Conviction	.196	.168	.223	.122	.155	.089	.180	.229	.173	.284	
Males	.201	.171	.230	.146	.180	.112	.185	.249	.185	.311	
Females	.167	.089	.243	.149	.253	.041	-.003	.115	-.003	.230	
Whites	.209	.170	.247	.151	.197	.104	.137	.210	.137	.281	
Non-Whites	.160	.119	.201	.096	.143	.049	.134	.227	.134	.316	
White Males	.227	.185	.268	.187	.235	.138	.159	.242	.159	.322	
White Females	.076	-.031	.181	-.051	.101	-.201	-.094	.059	-.094	.209	
Non-White Males	.149	.105	.193	.106	.155	.057	.117	.224	.117	.326	
Non-White Females	.276	.160	.385	.333	.466	.186	-.003	.190	-.003	.369	

<sup>a</sup>With the exception of White Females, all correlations are significant at the  $p \leq .01$ .

<sup>b</sup>With the exception of White Females, all correlations are significant at the  $p \leq .01$ .

<sup>c</sup>With the exception of Females and White Females, all correlations are significant at the  $p \leq .01$ .

race, and then by sex and race. As indicated in Table 2, with the exception of YLS/CMI total scores for all white females and then only females in the community sample, the correlations were all significant and in the expected direction.<sup>2</sup>

### *Percentage Recidivists*

Table 3 represents the differences in the percentage of recidivists and the  $\chi^2$  statistics between the adjusted YLS/CMI risk level categories and the outcome measure. Analyses indicate a significant relationship for the overall sample as well as for each group. As depicted in the total sample, the percentage recidivating in the high-risk category was 55.5. When comparing the high-risk group for the institutionalized and the community samples, the institutionalized group recidivated at 56 percent, while the community group recidivated at 51.6 percent. All differences were statistically significant.

### *Logistic Regression*

Given the cross-tabulations revealed that the adjusted categories for the YLS/CMI were significantly correlated with recidivism for the overall sample and each group, logistic regression analyses were conducted to reveal if the total score on the YLS/CMI could significantly predict recidivism. Included in both models were the three primary control variables: sex, race, and age. Sentencing type was controlled for by running logistic regression analyses separately for each group.

First, logistic regression analyses for the institutionalized group reveal that each variable significantly predicts recidivism. Several observations

<b>□ Table 3: Percentage of Recidivists by the Adjusted YLS/CMI Categories</b>			
YLS/CMI Categories	Total sample <sup>a</sup>	Institutionalized <sup>b</sup>	Community <sup>c</sup>
Low (1-13)	27.6	32.5	24.8
Moderate (14-22)	48.1	35.5	36.4
High (23-42)	55.5	56.0	51.6
<sup>a</sup> $\chi^2 = 158.688, p \leq .001.$ <sup>b</sup> $\chi^2 = 47.915, p \leq .001.$ <sup>c</sup> $\chi^2 = 49.937, p \leq .001.$			

can be made with respect to the values of B for the control variables, which suggest that recidivism is more likely to be predicted for youthful, male, and non-white offenders. Specifically, the values for Pseudo R<sup>2</sup> estimate a range of the proportion of variation explained in the dependent variable. For the institutional model, the range for the estimated proportion of variation explained in future recidivism is from 8.4 to 11.2 percent.

Second, logistic regression analyses for the community group suggests that the total YLS/CMI score, race and sex significantly predict recidivism. However, unlike the institutionalized group, age is not a significant predictor of the outcome measure. Based on the results, juveniles who are male and non-white are significantly more likely to recidivate. For the community sample, the range for the estimated proportion of variation explained in future recidivism is from 10.8 to 14.8 percent.

Upon examining the values of Exp (B) for both groups (institutionalized and community), race is found to be a stronger predictor of recidivism (1.99 and 1.69, respectively) than the total YLS/CMI score (1.052 and 1.062, respectively). Yet, it should be recognized that the values for the dichotomous measure, race, are limited to 0 and 1. As mentioned previously, the total YLS/CMI score was maintained as a limited metric (ranging from 0 to 42); therefore, it is appropriate as well as useful to demonstrate the probabilities (or the likelihood) for an outcome to occur.

Considering the institutional model, the probability of a juvenile recidivating who is a white male, age 17.72 years with an average YLS/CMI total score of 23.08 is approximately 43 percent. The probability is 56 percent for juvenile males who are non-white, and include the same mean values for age and total YLS/CMI score in the equation. Given these same mean values for age and total YLS/CMI score, the probability of recidivating for a white female is 19 percent, in contrast with 28 percent for black females. Upon examining the probabilities of the outcome occurring for the community-based model, the probability of a juvenile recidivating who is a white male, age 15.98 years with an average YLS/CMI score of 16.6 is 36 percent. For a non-white male, with the same average age and YLS/CMI score in the equation, the probability of the outcome occurring is 48 percent. With these same mean values, the probability of a white female recidivating in comparison with a non-white female is 15 and 23 percent, respectively.

### *Disaggregation of Sentencing Types*

As reported, both models based on sentencing type were found to be significant,  $p \leq .001$ , for the institutionalized group and the community

group. In order to justify the disaggregating of these groups nested within the same dataset, a comparison of the summed  $-2 \log$  likelihood values subtracted from the total sample was calculated. This remaining difference (28.09;  $df = 5$ ) would indicate that we were justified in separate analyses. Further, it was necessary to compare the parameter estimates of the two separate models. Following the proposed calculations of Clogg, Petkova, and Haritou (1995), we performed the  $z$ -tests to assess if the magnitude of the regression coefficients statistically differs between the institutionalized and community groups. These results were presented in the last column of Table 4. With respect to the total YLS/CMI scores, the two groups do not differ significantly ( $z = .71$ ). However, regarding the  $z$ -value for the constant term, there is a significant difference between these two sentencing types ( $z = 2.66$ ) which suggests that the YLS/CMI is a valid predictor for both the institutionalized group as well as the community sample.

### **ROC Analysis**

The last statistical analysis in the current study explores the ROC curve and specifically the value for the AUC. As previously explained, such an analysis will examine the strength of the predictive validity of the

□ **Table 4: Logistic Regression Models Predicting Recidivism for Each Sample**

Variable	Institutionalized		Community		z
	B	SE	B	SE	
YLS/CMI	.05*	.01	.06*	.01	-.71
Female	-1.46*	.14	-1.19*	.18	-1.18
Non-White	.69*	.07	.52*	.14	1.09
Age	-.16*	.02	-.05	.04	-2.46
Constant	1.58	.48	-.70	.71	2.66**

Institutionalized Sample: \* $p \leq .001$ ;  $-2 \log$  Likelihood = 4331.447;  $\chi^2 = 292.389$ ; Cox and Snell  $R^2 = .084$ ; Nagelkerke  $R^2 = .112$ .

Community Sample: \* $p \leq .001$ ;  $-2 \log$  Likelihood = 1292.590;  $\chi^2 = 124.363$ ; Cox and Snell  $R^2 = .108$ ; Nagelkerke  $R^2 = .148$ .

\*\* $p \leq .05$ .

YLS/CMI and to assess if the instrument has stronger predictive validity for the institutionalized group or the community-based group. Values higher than 50 percent for the AUC reveal a strong predictive validity for the YLS/CMI total score in predicting recidivism (Rice & Harris, 1995; Schmidt et al., 2005). Table 5 presents these results. For the overall sample, the AUC is .60, while the institutionalized group revealed an AUC of .56. For the community sample, the AUC is .64, which suggests that the predictive validity of the community sample is relatively strong. Given these findings, the YLS/CMI appears to have predictive validity for both disaggregated groups.

## *DISCUSSION*

A primary purpose of this study was to explore Hoge's contention that the YLS/CMI has predictive validity for both types of placement, institutional and community, as well as to identify if the instrument is more reliable in predicting outcome in either setting. In examining the effectiveness of the tool, the instrument should be able to assess a youth's risk level and demonstrate that the predictive validity towards future offending. Based on these findings, there appears to be significant support for the capability of the YLS/CMI to properly classify youth by risk level and to predict the likelihood for future recidivating. The following discussion section will separately address the research questions identified previously.

### *Does the YLS/CMI Have Predictive Validity for Juvenile Offenders?*

Based on the significant findings from the bivariate and the multivariate analyses as well as the ROC analysis, the total YLS/CMI score was significantly associated with the recidivism measure, thereby suggesting that the YLS/CMI has predictive validity for this sample. As previously mentioned, the ROC curve analysis demonstrated that the area under the curve was .60 for the total sample indicating that the predictive power is

□ <i>Table 5: ROC Analysis</i>			
	Total Sample	Institutionalized	Community
AUC Value	.60	.56	.64

in the moderate to large range (Rice and Harris, 1995). Further, for the total sample, the adjusted YLS/CMI risk classifications were significantly correlated with the outcome measure. Specifically, the juveniles who were categorized into the high risk level were more commonly shown to have recidivated. Similar to previous research, the YLS/CMI is capable of distinguishing youthful offenders into risk categories and then identifying youth that are more likely to engage in future offending (Schmidt et al., 2005). As such, these findings provide further empirical support that the YLS/CMI has predictive validity for juveniles and that developing adjusted cutoff scores for risk classification is useful for identifying youth who are at the highest risk to recidivate as well as to utilize the tool for targeting the higher risk youth for treatment and service delivery. These findings are very relevant for practitioners, as appropriate classification of youth is necessary for the selection and intensity of treatment and services for youth (Andrews et al., 1990; Andrews & Bonta, 1998; Hoge, 2001).

#### ***Does the YLS/CMI Have Predictive Validity for Community-Sentenced Juvenile Offenders?***

This study does provide support for Hoge's claim that the YLS/CMI has predictive validity for community-sentenced juvenile offenders. Previous research has suggested that juveniles who receive community sentences are at a lower risk of recidivism than those whose sentences are served within an institution (Flores et al., 2004). Specifically there are three findings that offer additional empirical evidence in this study. First, for each of the eight domains on the YLS/CMI, the community-based juveniles demonstrated less risk than the institutional youth. Second, the lower risk community-based offenders were less likely than the institutional group to receive a new commitment or a new conviction after release from supervision. Third, the total YLS/CMI score was found to be a significant predictor of recidivism for this group.

#### ***Does the YLS/CMI Have Predictive Validity for Institutionally Sentenced Juvenile Offenders?***

These findings indicate that the YLS/CMI scores for these institutionally sentenced youth are significantly correlated with future re-offending. In particular, those that were classified as the highest risk for recidivism were found to have the highest percentages of new commitments or convictions. Both the bivariate and multivariate analyses suggest that

the total YLS/CMI score was a significant predictor of recidivism for this group.

***Does the YLS/CMI Have Predictive Validity for Juvenile Offenders Regardless of Sex or Race?***

While there are two noted exceptions, the total YLS/CMI score is a significant predictor of future re-offending regardless of sex or race for the entire sample. The first exception to this interpretation would be for white females. For all white females in the entire sample, this correlation was not found to be significant. As expected these correlations were also not significant when examining the institutional and community-based youth separately. Second, for all females in the community-based sample, the correlation was not significant. Females comprised just 13 percent of the whole sample and white females made up only 7 percent. As a result of the smaller sample size of females and white females, further research examining the predictive validity of these two groups is needed regarding the predictive validity of the YLS/CMI on white females in any setting or on females given community-based sentences.

When examining the direction of the correlations for males, all were found to be in the expected direction, suggesting that as the risk level increases, so does the likelihood for future re-offending. Regardless of sentencing type, the YLS/CMI scores of males were found to demonstrate the predictive validity of the tool. In addition, when examining the relationship of white males and non-white males found in both settings, the YLS/CMI total score continued to be significantly correlated with recidivism. Therefore, given the results for this sample, the YLS/CMI does appear to have predictive validity for both white and non-white males found in either the community or an institutional setting.

***Does the Strength of the Relationship Between the Total YLS/CMI Score and Outcome Differ for the Institutional- or the Community-Based Juvenile Offenders?***

There appears to be some variation in the strength of the predictive validity of the YLS/CMI in the two setting types. While the ROC analysis demonstrated that the instrument has relatively strong predictive validity for juvenile offenders in both settings, the YLS/CMI performed slightly better with the community-based offenders. This may be in part due to the instrument being developed for community-sentenced youth. Yet, in

support of Hoge's claim that the YLS/CMI is an appropriate classification tool in a variety of correctional settings, the totality of the findings would suggest that the YLS/CMI appears to have predictive validity in predicting future offending for both the institutionally and community-based youth.

### *Limitations*

Several limitations in the current study are worth mentioning. First, there is only one outcome measure for recidivism included in this analysis. As posited by Cottle et al. (2001) and demonstrated by Schmidt and Hoge (2005), the evaluations of an instrument's effectiveness should be conducted on multiple outcome measures. In addition, the measure of recidivism originated from official data only. Therefore, it is possible that unreported criminality may exist and could potentially bias these findings. Future research in this area should consider multiple outcome measures and include self-reports as well as official data in assessing the predictive validity of the YLS/CMI. Second, the generalizability of this study is limited, given that the total sample of offenders in this study was not directly comparable to all youth in Ohio. However, it should be noted that given the total sample size ( $N = 4,482$ ) these findings are still relevant in assessing the predictive validity of the YLS/CMI. Third, it is possible that bias may have occurred when separating these two groups from the same dataset. Given the necessity of doing so in order to distinguish that these individual groups may vary by risk level according their sentencing type, it might be suggested that future research address this issue by separately collecting data for each group. Fourth, according to the YLS/CMI manual and scoring guide, the instrument is to be re-administered on youth in six month intervals, especially for youth participating in treatment. This information was not available in this dataset; however, future research should attempt to collect data that will include the scores of juveniles every six months to determine if treatment and services is demonstrating a reduction in the risk level for youth.

### *SUMMARY AND CONCLUSIONS*

To summarize, based on the consistent finding that the total score the YLS/CMI as well as the risk level categories for the overall score were significant in predicting future re-offending, support for Hoge's claim is evident in the current research. In addition, this study included several

strengths to address the previous limitations of former studies. First, the overall sample size was 4,482 and is the largest noted sample size in the reviewed research. Second, assessments on the YLS/CMI included the semi-structured interviews and review of information in a youth's file, rather than a retrospective scoring of the instrument with only a juvenile's records. Third, the follow-up period was relatively longer than past research, approximately 3.4 years, just slightly shorter than that of Schmidt et al. (2005), which had approximately a 3.5 year follow-up. Fourth, the current study included both institutionalized and community-sentenced youth, thereby not limiting the scope to only one setting.

A primary purpose of this study was to assess the predictive validity of the YLS/CMI on a sample of Ohio youth who received placement back in the community or within an institution. Multiple analyses revealed that the instrument demonstrates predictive validity for both groups and may be a stronger predictor for the community-sentenced offenders than that of the institutionalized group based on the findings from the ROC analysis. Moreover, the assessment was able to discriminate the adjusted risk level categorizations for the youth in both sentencing types. Support for Hoge's argument that the instrument is a valid predictor of recidivism in multiple settings was adequately demonstrated in the current study; however, given the previously discussed limitations, future research in this area is recommended.

## NOTES

1. The non-white category comprised individuals who are African American, Hispanic, Asian, and American Indian. African Americans made up the majority of this category.

2. It should be noted that there were only 333 white females in the entire sample with 167 white females in the institutionalized group and 166 in the community group. This finding should not be misinterpreted as though the YLS/CMI does not predict for community-sentenced females, or white females as a whole, rather, the small N may suggest that a larger sample is needed to determine if the YLS/CMI is a valid predictor for this group. As noted previously, the YLS/CMI has been able to predict recidivism for females (Jung & Rawana, 1999).

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doi:10.1300/J076v45n03\_04