Missouri Juvenile Risk Assessment

Re-Validation Report

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Foremost, however, we would like to extend our greatest appreciation to the judges, juvenile officers, and employees in the six circuits who graciously volunteered to implement the risk assessment and collect the necessary data. The effort carried out by juvenile office employees in the 10th, 11th, 12th, 19th, 20th, and 22nd Judicial Circuits will have long-standing impact. The study provides an actuarial risk assessment to be implemented statewide.

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EXECUTIVE SUMMARY

Introduction

In 1998, the Missouri Office of the State Courts Administrator (OSCA) developed a comprehensive juvenile offender classification system that included a risk assessment, a classification matrix based upon risk and most serious offense, and a needs assessment. The classification system was implemented in 11 counties and the city of St. Louis in March of 1999.[1] In July of 1999, a software product called J-TRAC, developed by the Office of State Courts Administrator to automate the classification system, was released to all of the participating implementation circuits. In December 2000, OSCA contracted with the National Council on Crime and Delinquency (NCCD) to conduct a second validation study of the risk assessment scale.

Methodology

The analysis presented in this report had two goals: 1) to assess the performance of the original risk assessment, and 2) to determine if changes to the risk assessment would improve its classification accuracy. To determine how effectively the existing risk assessment worked, NCCD examined the relationship between the existing risk classification and subsequent delinquency referrals. Subsequent analyses was conducted to determine whether or not alterations to the existing assessment could improve performance. These analyses included evaluating the existing risk items and cut points and developing an actuarial risk assessment using available data. These analyses involved both bivariate and multi-variate statistical

[1] Circuits 10, 11, 12, 19, 20, and 22 implemented the classification system.

techniques to examine the relationship between the risk items and the outcomes.[2] Data were analyzed for the total sample as well as subgroups defined by youths' ethnicity, gender, and geographic location.

The primary outcomes analyzed were subsequent referral (of any type) and adjudications. Subsequent referral was selected as a primary outcome measure because the 1998 validation study conducted by Dr. Leonard used this measure and retaining it provides a method of comparison. Subsequent adjudication was considered an important measure because court involvement indicates substantial evidence that the youth committed the alleged offense, and adjudication rates are less disparate across key subgroups.

Findings

An effective and valid risk assessment has progressively higher recidivism rates that correspond to each increase in risk classification level across multiple outcomes. Ideally, the rates between consecutive risk levels maximize the separation between the high and low risk groups, as well as between consecutive risk groups. The best way to assess the performance of the risk assessment versions, then, is to compare the separation between risk levels between the high and low risk groups and between consecutive groups.

The risk assessment currently in use by officers in participating circuits provided risk classifications that identify youth with significantly different rates of subsequent delinquency for most outcomes. However, analysis of the risk items and the cut points that define the risk classifications suggested that certain modifications could improve the classification accuracy of

[2] A variety of statistical methods could be used to conduct the analyses described. A prior study by Simon (1971) and an exhaustive study by Gottfredson and Gottfredson (1979), later confirmed by other researchers (see Wilbanks, 1985 and Benda, 1987), found that less precise methods of statistical evaluation (including bivariate analyses or least squares regression) often

the assessment. In addition, a full-scale re-examination of the relationships between the risk items officers observed at the time of the youth's referral and subsequent delinquency resulted in an alternative risk assessment that differed from the current one. The risk assessment versions presented in this report are:

1. The ***original risk assessment***: the risk assessment currently used by Missouri officers.

2. The ***original risk assessment with revised cut points***: the original risk assessment with no changes to the items but the revised cut points are defined as low risk, 0-4; moderate risk, 5-16; and high risk, 17 points or more.

3. The ***original risk assessment with re-weighted items***: the original risk assessment with item weights reduced for all risk items, and cut points altered relative to the new distribution of risk scores. To clarify, this version retains all risk items and choices per item on the original risk assessment, but changes the number of points assigned when an item is found true. These changes are reviewed in Appendix A.

4. The ***re-developed risk assessment***: the risk assessment that resulted from a complete multi-variate analysis of the data. This assessment includes many of the re-weighted items that are present in the previous version of the assessment, but includes additional changes. These additional changes are: a) replacing the current assault referral item to a yes/no item (dropping the separation between felony and misdemeanor assault referrals); b) collapsing moderate and severe school problems into one category for the school behavior item; c) similarly collapsing the parental management item; and d) eliminating the parents' criminality item. This assessment is also shown in Appendix A.

These versions of the risk assessment, as expected, resulted in slightly different distributions by risk level (see Table E1). When applied to all sampled youth, the original risk assessment classified 49.1% of the youth as low risk, 30.5% as moderate risk and 20.4% as high risk. In comparison, the other risk assessment versions classified a higher proportion of the sampled youth as moderate risk. The original risk assessment with revised cut points classified 57.2% of youth as moderate risk and 10.7% as high risk. The original risk assessment with

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produce the best overall result. These procedures were employed in this analysis.

revised cut points and re-weighted items similarly classified 62.8% of youth as moderate risk and 11.3% as high risk. The re-developed assessment classified 55.2% of the youth as moderate risk and 18.1% as high risk.

Table E1

Risk Level Distribution of Youth Classified by Risk Assessment Version

	Low Risk		Moderate Risk		High Risk		Total	
	N	%	N	%	N	%	N	%
1. Original Risk Assessment	1,429	**49.1%**	888	**30.5%**	594	**20.4%**	2,911	100.0%
2. Original Risk Assessment with Revised Cut Points	935	**32.1%**	1,664	**57.2%**	312	**10.7%**	2,911	100.0%
3. Original Risk Assessment with Re-Weighted Items[3]	753	**25.9%**	1,829	**62.8%**	329	**11.3%**	2,911	100.0%
4. Re-Developed Risk Assessment	776	**26.7%**	1,608	**55.2%**	527	**18.1%**	2,911	100.0%

Table E2 reviews the primary outcomes for each version of the risk assessment for the overall sample. The differences in re-referral and subsequent adjudication rates among youth classified as low risk versus high risk were greater for the altered versions of the risk assessment than for the original risk assessment.

For example, when the original risk assessment was applied, the re-referral rate for youth classified as high risk was 1.6 times greater than the rate for low risk youth (54.5% and 20.6%, respectively).[4] When the original risk assessment with revised cut points is applied, youth classified as low risk had a 15.7% re-referral rate, while 59.6% of high risk youth had a subsequent referral (2.8 times greater than that of low risk youth).

[3] This version also has, by necessity, revised cut points. For ease of reference, however, future tables will use the label "the original risk assessment with re-weighted items."

[4] This comparison (a percentage increase) is calculated by dividing the difference in rates by the lower rate. For example, the (high risk rate – low risk rate) is divided by the low risk rate. The purpose of this comparison is to enable comparisons of differences, while controlling for the lower rate. For example, the difference between low-moderate risk and moderate-high risk might both be 10%, but the relative increase would be very different.

When applying the original risk assessment with revised cut points and re-weighted items, 13.1% of youth classified as low risk and 60.2% of youth classified as high risk had a subsequent referral (3.6 times greater than that of low risk youth). Youth classified as low risk by applying the re-developed tool had a re-referral rate of 13.4%, while high risk youth had a re-referral rate of 57.9% (3.3 times greater than the rate for low risk youth).

Table E2

Findings by Risk Assessment Version

	Total N	% with Subsequent Referral	% with Subsequent Adjudication
Total Sample	2,911	**34.1%**	**8.6%**
1. Original Risk Assessment			
Low Risk	1,429	**20.6%**	**4.3%**
Moderate Risk	888	**42.2%**	**11.3%**
High Risk	594	**54.5%**	**14.6%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	**15.7%**	**3.0%**
Moderate Risk	1,664	**39.7%**	**10.5%**
High Risk	312	**59.6%**	**15.1%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	**13.1%**	**1.6%**
Moderate Risk	1,790	**38.7%**	**10.3%**
High Risk	329	**60.2%**	**15.5%**
4. Re-Developed Risk Assessment			
Low Risk	776	**13.4%**	**1.5%**
Moderate Risk	1,608	**36.4%**	**9.2%**
High Risk	527	**57.9%**	**16.9%**

The following is a summary of how the risk assessment versions compared:

- The original risk assessment did not distinguish well between moderate and high risk youth overall. In particular, there was little difference in recidivism rates between moderate and high risk females and between moderate and high risk non-white youth.

- For the total sample, the original risk assessment with re-weighted items and the re-developed assessment resulted in greater differentiation between low and moderate risk youth, and moderate and high risk youth than did the other risk assessment versions (see Table E3).

Table E3

Percentage Increase in Rates between Risk Levels by Risk Assessment Version

Risk Assessment Version	Subsequent Referral Outcome			Subsequent Adjudication Outcome		
	From Low to Moderate	From Moderate To High	From Low to High	From Low to Moderate	From Moderate to High	From Low to High
1. Original Risk Assessment	105%	29%	164%	163%	29%	240%
2. Original Risk Assessment with Revised Cut Points	153%	50%	280%	250%	44%	403%
3. Original Risk Assessment with Re-Weighted Items	195%	56%	356%	544%	50%	869%
4. Re-Developed Risk Assessment	172%	59%	332%	513%	84%	1,027%

Note: The data shown is percentage increase, calculated by dividing the difference in rates by the rate of the lower risk level. For example, the percentage increase from low to moderate is (low rate – moderate rate)/low rate.

- With regard to sample subgroups, the areas of concern were the amount of separation between moderate and high risk females, moderate and high risk youth of non-white ethnicities, and moderate and high risk urban youth. The re-developed risk assessment and the original risk assessment with re-weighted items had greater differentiation between moderate and high risk youth in these subgroups than did the other risk assessment versions. The re-developed risk assessment provided slightly greater differentiation than did the original risk assessment with re-weighted items.

In conclusion, the original risk assessment with re-weighted items and the re-developed risk assessment appear to have attained the best separation between risk levels. While both assessments achieved this regardless of the youth's gender, ethnicity, or area of residence, the re-developed assessment achieved slightly greater separation between moderate and high risk youth for females and youth of non-white ethnicity.

The decision about modifying the original risk assessment is, however, based both on research and policy. A number of policy issues affect risk assessment modifications:

- Changes to the risk assessment would need to be made in BANNER (the statewide information system), which could be expensive and/or delay the implementation of BANNER;

- Changes to the risk assessment may also need to be made to J-TRAC, unless those counties would use the original risk assessment until BANNER implementation; and
- Changes would need to be made to the manual (which may include changes to definitions), and those changes communicated to officers and other staff (through training or other means).

All of the altered risk assessment versions reviewed in this report are similar to the original risk assessment (see Appendix A); which may ease the burden of modifications, particularly those related to manual changes and communication of changes to staff.

The risk assessment committee decided by majority vote to adopt the original risk assessment with re-weighted items and revised cut points. Many committee members expressed that improvements in the classification ability produced by the risk assessment versions with re-weighted items (versions 3 and 4) warranted changing the original assessment. In addition, some members preferred to weigh the risk items according to their relationship with outcomes rather than relying upon the existing weights, which were determined by consensus. Many indicated, however, that the difference in performance between the risk assessment with re-weighted items and the redeveloped risk assessment was not substantial enough to justify eliminating the parent criminality item and collapsing some risk item options. The version of the risk assessment adopted by the committee does not collapse categories or eliminate any items, thus no changes to definitions are necessary.

I. INTRODUCTION

In 1998, the Missouri Office of the State Courts Administrator (OSCA) developed a comprehensive juvenile offender classification system that included a risk assessment, a classification matrix based upon risk and most serious offense, and a needs assessment. The classification system was implemented in 11 counties and the city of St. Louis in March of 1999.[5] In July of 1999, a software product called J-TRAC, developed by the Office of State Courts Administrator to automate the classification system, was released to all of the participating implementation circuits. In December 2000, OSCA contracted with the National Council on Crime and Delinquency (NCCD) to conduct a second validation study of the risk assessment scale.

II. BACKGROUND

In 1995, the Missouri General Assembly passed the Juvenile Crime and Crime Prevention Bill. The bill, which sought to establish a more comprehensive approach to juvenile justice in State of Missouri, included legislative mandates for OSCA to:

- Develop standardized assessment procedures for identifying juvenile offenders (subsection 5, section 1 of section 211.326 RSMo. and subsections 4 and 5 of section 211.141 RSMo. Supp. 1995), with assessment forms developed considering racial disparities in the juvenile justice system (section 2 of section 211.326 RSMo.).

- Develop a process to evaluate services and collect relevant outcome measure data (subsection 4, section 1 of section 211.326 RSMo. Supp 1995).

- Biennially review a sample of assessment and dispositions to recommend assessment and disposition equity throughout the state, including any evidence of racial disparity in certification (subsection 5 of section 211.141 RSMo. Supp 1995).

[5] Circuits 10, 11, 12, 19, 20, and 22 implemented the classification system.

Pursuant to the legislation, the OSCA developed, and is implementing statewide, the Missouri Juvenile Offender Classification System. The classification system uses a standardized risk assessment to classify youth according to their relative risk of re-offending, and a needs assessment to identify appropriate service interventions. The system also employs a classification matrix that guides case-management decision-making by linking offenders with different offense types and risk levels with a set of graduated sanctions.

The risk assessment was developed in 1998 using a consensus approach. A Risk Assessment Committee (RAC) comprised of juvenile justice professionals selected the risk items and their associated weights based on what they believed would best classify Missouri youth according to offense severity and the likelihood of reoffending. OSCA and the RAC contracted with Dr. Kimberly Leonard, a criminologist from the University of Missouri-St. Louis, to empirically validate the risk assessment by determining whether, or to what extent, there was a relationship between total risk score and recidivism. Recidivism was defined as any new delinquency referral following the risk assessment. Dr. Leonard's validation study also established cut-off scores to classify youth into low, moderate, or high risk categories. The complete classification system was subsequently implemented in the urban, rural, and suburban counties previously identified.

The primary purpose of risk assessment is to classify youth according to the relative likelihood that they will re-offend in the future. Youth assessed as high risk should, for instance, have a significantly higher rate of recidivism than their low risk counterparts. By identifying high risk youth, agencies can protect public safety while optimizing resource allocation by focusing on those youth that are most likely to re-offend. A risk assessment is helpful, however, only if it accurately classifies youth according to their likelihood of recidivism. To ensure that Missouri's risk assessment is classifying youth accurately, OSCA contracted with the National

Council on Crime and Delinquency (NCCD) to re-validate their existing risk assessment. This study reflects Missouri's ongoing commitment to implement an effective classification system and is consistent with the legislative requirement to periodically evaluate the effectiveness of the system.

In order to determine the classification accuracy of the Missouri Juvenile Offender Risk Assessment, NCCD:

1. Examined how well the original risk assessment classifies youth into low, moderate, and high risk groups by observing recidivism; and
2. Analyzed the available data to determine if alterations to the original risk assessment could improve its performance.

An advantage of revalidating Missouri's existing risk assessment after its field implementation is that juvenile officers scored risk factors such as substance abuse and parenting style under actual field conditions, which reduced the likelihood of observation bias.

III. RESEARCH METHODOLOGY

The research sample consisted of 2,911 youth for whom a risk assessment was completed between March and December 1999.[6] The following information was extracted for each case from the JTRAC database:

1. Demographic information including ethnicity, gender, and reporting circuit;
2. Data from the original risk assessment recorded by officers at the time of the sampled referral; and
3. Outcome data about subsequent referrals and adjudications.

[6] Risk assessments are completed for youth with referrals that meet the definition of legal sufficiency.

Outcome measures for each youth were tracked for a standardized 12-month period following the sampled referral and included any referrals, accepted referrals, petitioned referrals, violent offense referrals, and adjudications (petitions found true).

A. Sample Characteristics

Demographic characteristics of the youth at the time of their sampled referral are shown in Table 1. Two thirds of the youth were white (66.5%) and male (69.3%). The majority (55.9%) of youth in the sample were from an urban area,[7] with another 34.5% from rural counties (the remainder did not have a county or circuit indicated).

Table 1 also reviews the nature of the sampled referral. The most serious allegation for most referrals was a misdemeanor or class C&D felony (70.7%). Only 4.1% of the sampled referrals were for an A or B class felony.

[7] St. Louis and St. Charles (circuits 11 and 22) are classified as urban, while the remainder of the sampled circuits is classified as rural (circuits 10, 12, 19 and 20). Percentages are based upon the total sample (N = 2,911) rather than the sample with county indicated (i.e., cases with county missing are included in the denominator).

Table 1

Characteristics of Sampled Referral and Youth

Risk Assessment Item	N	%
Total Sample	**2,911**	**100.0%**
Gender		
Male	2,018	69.3%
Female	893	30.7%
Race		
White	1,935	66.5%
African American	915	31.4%
Hispanic	10	0.3%
American Indian	7	0.2%
Asian or Pacific Islander	5	0.2%
Other	31	1.1%
Missing	8	0.3%
Urban		
Rural	1,005	34.5%
Urban	1,626	55.9%
Missing	280	9.6%
Offense Severity		
Status and Municipal	733	25.2%
Misdemeanor, C&D Felony	2,057	70.7%
A&B Felony	119	4.1%
Missing	2	0.1%
Major Offense Type		
Status offense	650	22.3%
Court order violation	10	0.3%
Municipal charges	24	0.8%
Major law offenses	2,164	74.3%
Motor vehicle violence	14	0.5%
Hazardous driving	15	0.5%
Missing	34	1.2%

Table 2 shows the prevalence of the risk factors for the sampled youth, as indicated by the officer who completed the risk assessment at the time of the sampled referral. One-third (33.0%) of the youth were age 12 or under at the time of their first referral for a delinquency offense, and 50.3% had a prior referral. Less than one-fourth (21.3%) had a prior out-of-home placement, 16.0% were maltreated as a child, and 28.1% had a current substance use problem. Slightly more than half (51.0%) had school-related behavior problems.

Table 2

Sample Distribution of Risk Assessment Items

Risk Assessment Item	N	%
Total Sample	**2,911**	**100.0%**
Age at First Referral		
16	363	12.5%
13,14 or 15	1,586	54.5%
12 and under	962	33.0%
Prior Referrals		
None	1,446	49.7%
One or more	1,465	50.3%
Assault Referrals (Prior or Present)		
No prior or present assault referral	1,990	68.4%
One or more misdemeanor assault	704	24.2%
One or more felony assault	217	7.5%
History of Placement		
No prior out-of-home	2,290	78.7%
Prior out-of-home	621	21.3%
Peer Relationships		
Neutral influence	1,465	50.3%
Negative influence	1,240	42.6%
Strong negative influence	206	7.1%
History of Child Abuse/ Neglect		
No prior CA/N	2,444	84.0%
Prior CA/N history	467	16.0%
Substance Abuse		
No problem	2,094	71.9%
Moderate problem	744	25.6%
Severe dependence	73	2.5%
School Behavior Problems		
No or minor problems	1,426	49.0%
Moderate problems	1,149	39.5%
Severe problems	336	11.5%
Parental Management Style		
Positive management	1,678	57.6%
Moderately ineffective management	984	33.8%
Severely ineffective management	249	8.6%
Parents' Criminal History		
No prior incarceration	2,260	77.6%
Prior incarceration	651	22.4%

Table 3 shows the rates of recidivism for the overall sample and subgroups during the standardized 12-month follow-up period (i.e., base rates). For the entire sample, 34.1% of the youth had received a new referral of any type, 26.1% had an accepted referral of some type, 11.1% had a petitioned referral, 9.8% had a referral for a violent offense, and 8.6% had an adjudication (petition found true) subsequent to the sampled referral.

Table 3

Risk Re-Validation Sample Base Rates

Sample Group	N	Any Referral	Accepted Referral	Petitioned Referral	Violent Offense Referral	Adjudication
Sample	2,911	34.1%	26.1%	11.1%	9.8%	8.6%
White	1,935	27.7%	23.6%	7.9%	7.7%	7.3%
Non-White	968	47.1%	31.1%	17.4%	13.9%	10.8%
Rural	1,005	34.3%	30.3%	9.4%	9.5%	9.0%
Urban	1,626	33.8%	24.0%	12.6%	9.9%	8.8%
Male	2,018	38.2%	29.5%	13.3%	11.0%	10.2%
Female	893	25.1%	18.4%	6.2%	7.1%	4.8%

Note: All differences are significant with 95% confidence with two exceptions; the differences in re-referral (any referrals) and subsequent adjudications rates for urban vs. rural circuits is not significant.

Recidivism rates differ significantly, however, between groups defined by ethnicity and gender. For example, 27.7% of white youth had a delinquency referral in the follow-up period, while 47.1% of non-white youth had a subsequent referral. The difference between genders is less pronounced; 38.2% of males had a subsequent referral while 25.1% of females were referred.

It is easier to construct a risk assessment that classifies subgroups similarly when the base rates of the outcome measure are similar across groups. In comparing recidivism rates by ethnicity, the outcome of subsequent adjudications shows less difference between groups than other outcomes (a 3.5% difference between whites and non-whites). Males, however, had more

than twice the rate of subsequent adjudication than females (a 112% percentage increase).[8] The outcome of subsequent referral shows less disparity by gender; the re-referral rate for males is 52% greater than that of females (38.2% and 25.1% respectively).

Table 4 shows recidivism rates across the five outcome measures by circuit type and ethnicity. The proportions by ethnicity were not the same within geographic locations; urban areas had a greater proportion of non-white youth than did rural areas.[9] Given this, it is not unexpected that most recidivism rate differences between ethnic groups within rural circuits were not significant, and differences between ethnic groups within urban circuits were significant. Adjudication is the measure of recidivism most similar across circuit type and ethnicity. White youth in rural circuits had an adjudication rate of 9.1%, while non-white rural youth had a lower rate (5.6%). White urban youth had a true petition rate of 6.0%, and non-white urban youth had a rate of 12.4%, the highest of the four groups.

Table 4

Risk Re-Validation Sample Base Rates

Sample Subgroup		N	Any Referral	Accepted Referral	Petitioned Referral	Violent Offense Referral	Adjudication
Rural	White	909	33.7%	29.9%	9.6%	9.4%	9.1%
	Non-White	90	41.4%	34.4%	5.6%	11.1%	5.6%
Urban	White	906	22.0%	17.8%	6.7%	6.3%	6.0%
	Non-White	720	48.6%	31.8%	20.0%	14.4%	12.4%

Note: Differences between ethnic groups in the urban circuits are significant with 95% confidence. Differences between ethnic groups within rural circuits are not significant, with the exception of subsequent referrals (any referrals), which is significant at the .10 level. Total N size is 2,368 (missing data is 18.6% or 543 cases).

While the results from all five of the outcome measures were reviewed during the analyses, subsequent referral (of any type) and adjudications were the primary outcomes

[8] This comparison (a percentage increase) is calculated by dividing the difference in rates by the lower rate. For example, the (high risk rate – low risk rate) is divided by the low risk rate. The purpose of this is to compare differences while controlling for the lower rate. For example, the difference between low-moderate risk and moderate-high risk might both be 10%, but the relative increase would be very different.

[9] Of youth from an urban area, 55.7% were white while 44.3% were of another ethnicity. In contrast, 91% of youth from rural areas were white.

measures analyzed. Subsequent referral was selected as a primary outcome measure because the previous validation study conducted by Dr. Leonard used this measure, and retaining it provides a method of comparison. Subsequent adjudication was considered an important measure because court involvement indicates substantial evidence that the youth committed the alleged offense, and adjudication rates are less disparate across key subgroups.

B. Method of Analysis

The analysis presented in this report had two goals: 1) to assess the performance of the original risk assessment, and 2) to determine if changes to the extensive risk assessment would improve its classification accuracy. To determine how effectively the existing risk assessment worked, NCCD first examined the relationship between the existing risk classification and subsequent delinquency referrals. This analysis used cross tabulations between risk classifications and the five outcome measures previously mentioned for both the overall sample and for key subgroups based on gender, ethnicity, and type of residence (rural versus urban).

The second step in the analysis was to determine whether or not alterations made to the existing assessment could improve performance. This involved an extensive evaluation of risk items and their associated weights (the number of points received when an item was found true) relative to recidivism outcomes, and an evaluation of the efficacy of the cut points that classify youth as low, moderate or high risk.

The third step toward achieving the goals of the research involved constructing a revalidated actuarial risk assessment instrument. The revalidated instrument was developed by observing the actuarial relationship between youth and family characteristics observed at the time of the sample referral and subsequent delinquency referrals received for the youth overall

and for subgroups previously defined. This analysis involved both bivariate and multi-variate statistical techniques.[10]

IV. FINDINGS

An effective and valid risk assessment has progressively higher recidivism rates that correspond to each increase in risk classification level across multiple outcomes. Ideally, the rates between consecutive risk levels maximize the separation between the high and low risk groups, as well as between consecutive risk groups. In other words, each increase in risk level should correspond to an increase in recidivism, across outcomes, that is significantly greater. The best way to assess the performance of the risk assessment versions, then, is to compare the separation between risk levels:

1. between the low and high risk groups; and
2. between consecutive groups.

This comparison was made for the total sample as well as subgroups defined by youths' ethnicity, gender, and geographic location.

The risk assessment currently in use by officers in participating circuits provided risk classifications that identify youth with significantly different rates of subsequent delinquency for most outcomes. However, analysis of the risk items and the cut points that define the risk classifications suggested that certain modifications could improve the classification accuracy of the assessment. In addition, a full-scale re-examination of the relationships between the risk

[10] A variety of statistical methods could be used to conduct the analyses described. A prior study by Simon (1971) and an exhaustive study by Gottfredson and Gottfredson (1979), later confirmed by other researchers (see Wilbanks, 1985 and Benda, 1987), found that less precise methods of statistical evaluation (including bivariate analyses or least squares regression) often produce the best overall result. These procedures were employed in this analysis.

items officers observed at the time of the youth's referral and subsequent delinquency resulted in an alternative risk assessment that differed from the current one.

The following review of the findings compares the distribution and performance of the original risk assessment to alternative versions of the assessment derived from this analysis of the overall sample and for sample subgroups. The risk assessment versions presented are:

1. The ***original risk assessment***: the risk assessment currently used by Missouri officers.

2. The ***original risk assessment with revised cut points***: the original risk assessment with no changes to the items but the revised cut points are defined as low risk, 0-4; moderate risk, 5-16; and high risk, 17 points or more.

3. The ***original risk assessment with re-weighted items***: the original risk assessment with item weights reduced for all risk items, and cut points altered relative to the new distribution of risk scores. To clarify, this version retains all risk items and choices per item on the original risk assessment, but changes the number of points assigned when an item is found true. These changes are reviewed in Appendix A.

4. The ***re-developed risk assessment***: the risk assessment that resulted from a complete multi-variate analysis of the data. This assessment includes many of the re-weighted items that are present in the previous version of the assessment, but includes additional changes. These additional changes are: a) replacing the current assault referral item to a yes/no item (dropping the separation between felony and misdemeanor assault referrals); b) collapsing moderate and severe school problems into one category for the school behavior item; c) similarly collapsing the parental management item; and d) eliminating the parents' criminality item. This assessment is also shown in Appendix A.

A. Risk Assessment Classification Findings for the Overall Sample

These versions of the risk assessment, as expected, resulted in slightly different distributions by risk level (see Table 5). When applied to all sampled youth, the original risk assessment classified 49.1% of the youth as low risk, 30.5% as moderate risk and 20.4% as high risk. In comparison, the other risk assessment versions classified a higher proportion of the sampled youth as moderate risk. The original risk assessment with revised cut points classified

57.2% of youth as moderate risk and 10.7% as high risk. The original risk assessment with revised cut points and re-weighted items similarly classified 62.8% of youth as moderate risk and 11.3% as high risk. The re-developed assessment classified 55.2% of the youth as moderate risk and 18.1% as high risk.

Table 5

Risk Level Distribution by Risk Assessment Version

	Low Risk		Moderate Risk		High Risk		Total	
	N	%	N	%	N	%	N	%
1. Original Risk Assessment	1,429	**49.1%**	888	**30.5%**	594	**20.4%**	2,911	100.0%
2. Original Risk Assessment with Revised Cut Points	935	**32.1%**	1,664	**57.2%**	312	**10.7%**	2,911	100.0%
3. Original Risk Assessment with Re-Weighted Items[11]	753	**25.9%**	1,829	**62.8%**	329	**11.3%**	2,911	100.0%
4. Re-Developed Risk Assessment	776	**26.7%**	1,608	**55.2%**	527	**18.1%**	2,911	100.0%

The following tables review the five outcomes by the version of the risk assessment for the overall sample. Table 6 and Figure 1 show that when the original risk assessment is applied, youth classified as low risk had a re-referral rate of 20.6%, youth classified as moderate risk had a re-referral rate of 42.2%, and 54.5% of youth classified as high risk had a subsequent referral. The re-referral rate for high risk youth was 1.6 times greater than the rate for low risk youth.[12]

The differences in re-referral rates among youth classified at each risk level were greater for the altered versions of the risk assessment. When the original risk assessment with revised cut points is applied, youth classified as low risk had a 15.7% re-referral rate, while 59.6% of high risk youth had a subsequent referral (2.8 times greater than that of low risk youth). When applying the original risk assessment with revised cut points and re-weighted items, 13.1% of

[11] This version also has, by necessity, revised cut points. For ease of reference, however, future tables will use the label 'the Original Risk Assessment with Re-Weighted Items.'

[12] This comparison (a percentage increase) is calculated by dividing the difference in rates by the lower rate. For example, the (high risk rate – low risk rate) is divided by the low risk rate. The purpose of this comparison is to enable comparisons of differences, while controlling for the lower rate. For example, the difference between low-moderate risk and moderate-high risk

youth classified as low risk and 60.2% of youth classified as high risk had a subsequent referral (3.6 times greater than that of low risk youth). Youth classified as low risk by applying the re-developed tool had a re-referral rate of 13.4%, while high risk youth had a re-referral rate of 57.9% (3.3 times greater than the rate for low risk youth).

Table 6

Findings for Subsequent Referral by Risk Assessment Version

		Subsequent Referral	
	Total N	**N**	**%**
Total Sample	2,911	997	**35.5%**
1. Original Risk Assessment			
Low Risk	1,429	295	**20.6%**
Moderate Risk	888	375	**42.2%**
High Risk	594	324	**54.5%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	147	**15.7%**
Moderate Risk	1,664	661	**39.7%**
High Risk	312	186	**59.6%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	104	**13.1%**
Moderate Risk	1,790	692	**38.7%**
High Risk	329	198	**60.2%**
4. Re-Developed Risk Assessment			
Low Risk	776	104	**13.4%**
Moderate Risk	1,608	585	**36.4%**
High Risk	527	305	**57.9%**

might both be 10%, but the percentage increase would be very different.

Figure 1

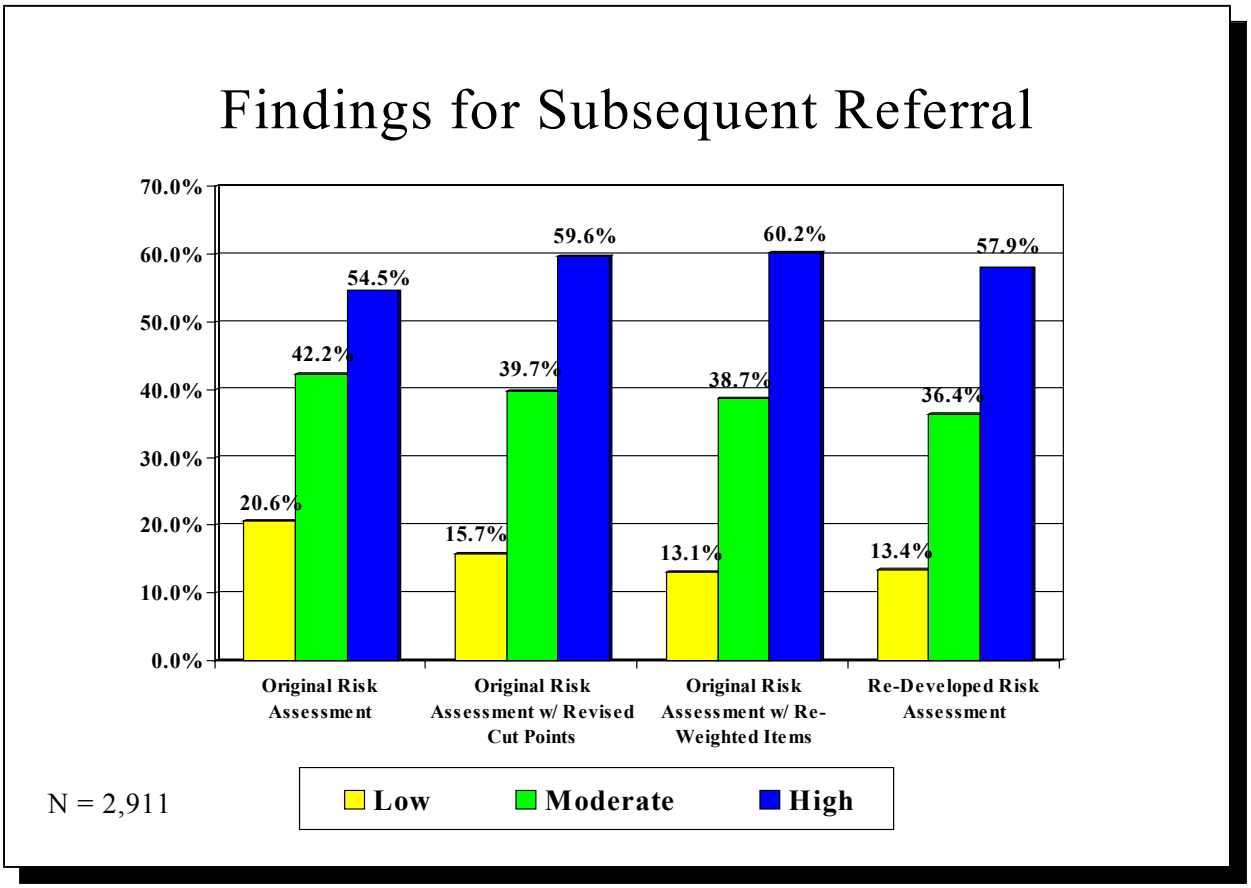
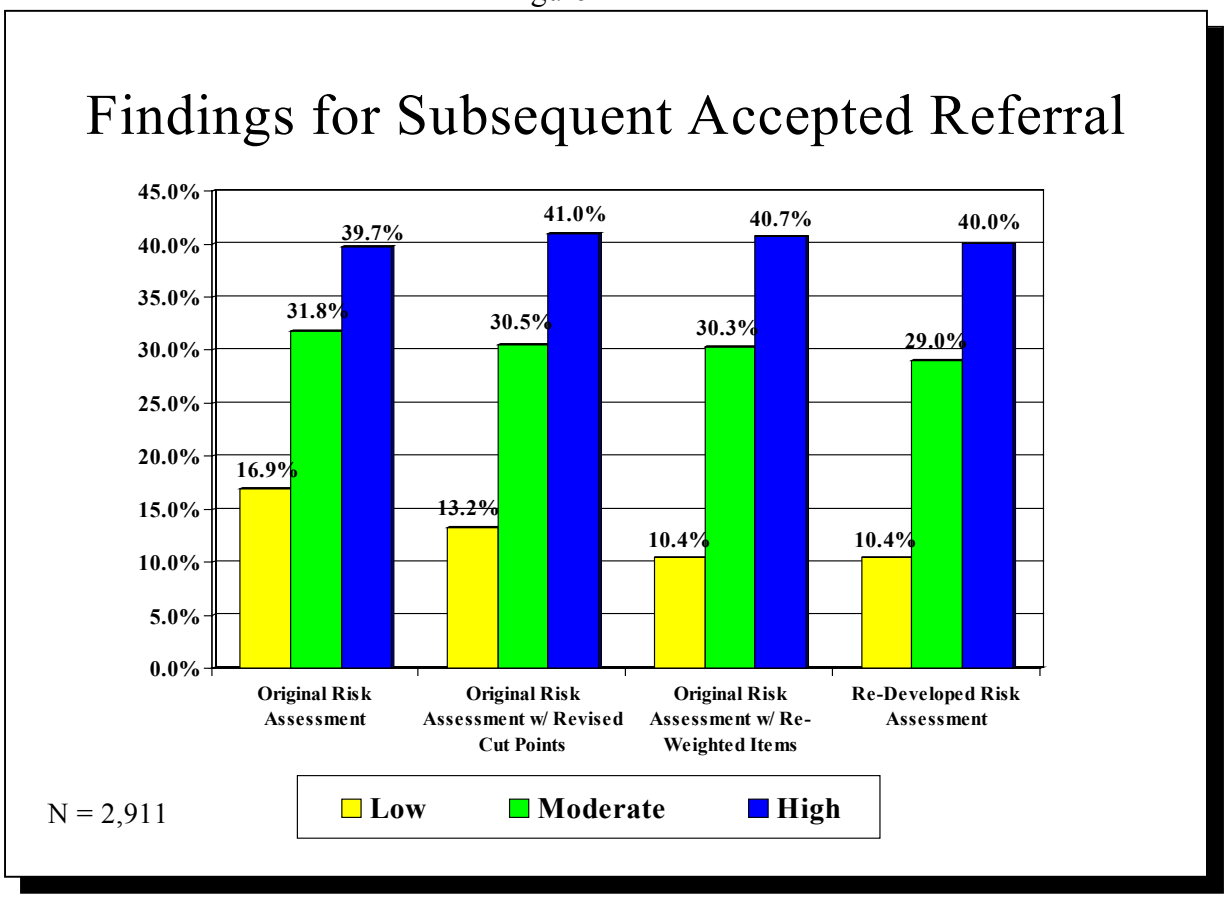


Table 7 and Figure 2 similarly compare classification findings when the outcome is referrals accepted for investigation. Using the original risk assessment, 16.9% of low risk youth had a subsequent accepted referral in the follow-up period compared to 39.7% of high risk youth. For the original risk assessment with revised cut points, corresponding outcome rates were 13.2% and 41.0%. Both the original risk assessment with re-weighted items and the re-developed risk assessment showed a greater difference in re-referral rates between low and high risk youth when compared to those the other two assessment versions (10.4% and 40.7% for the original risk assessment with re-weighted items; 10.4% and 40.0% for the re-developed assessment).

Table 7 Findings for Subsequent Accepted Referral by Risk Assessment Version			
		Subsequent Accepted Referral	
	Total N	N	%
Total Sample	**2,911**	**759**	**26.1%**
1. Original Risk Assessment			
Low Risk	1,429	241	**16.9%**
Moderate Risk	888	282	**31.8%**
High Risk	594	236	**39.7%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	123	**13.2%**
Moderate Risk	1,664	508	**30.5%**
High Risk	312	128	**41.0%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	82	**10.4%**
Moderate Risk	1,790	543	**30.3%**
High Risk	329	134	**40.7%**
4. Re-Developed Risk Assessment			
Low Risk	776	81	**10.4%**
Moderate Risk	1,608	467	**29.0%**
High Risk	527	211	**40.0%**

Figure 2



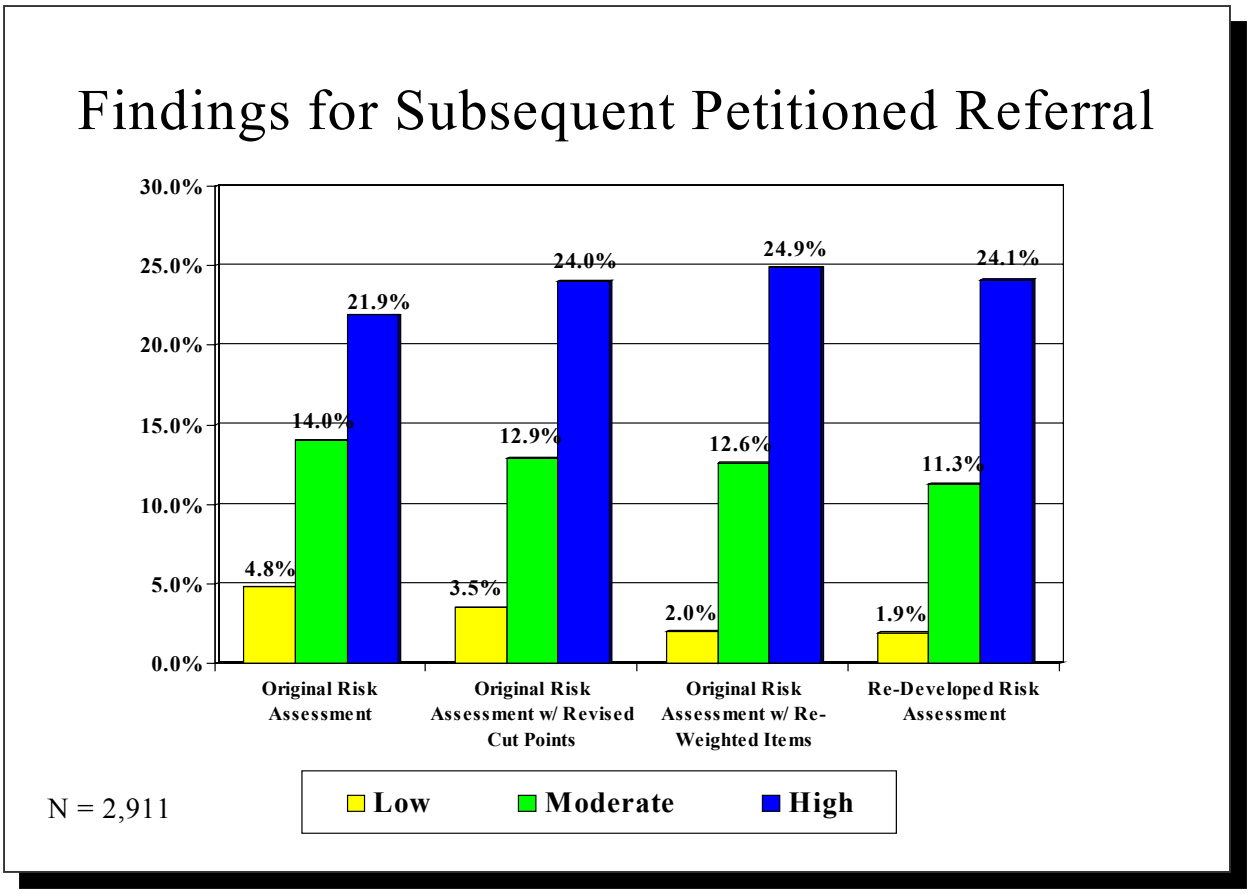
The re-developed risk assessment and the original risk assessment with re-weighted items also achieved greater separation between youth classified as low risk and high risk when the observed outcome is subsequent petitioned referrals. Table 8 and Figure 3 show that when the original risk assessment was applied, 4.8% of youth classified as low risk had a petitioned referral, while 21.9% of high risk youth had a referral petitioned (3.6 times greater than the rate for low risk youth). With revised cut points, low risk youth had a 3.5% recidivism rate versus 24.0% for high risk youth (5.8 times greater than the rate for low risk youth). Using the re-weighted or re-developed risk assessment, the rate of subsequent petitioned referrals for high risk youth was nearly 12 times greater than that of low risk youth.

Table 8

Findings for Subsequent Petitioned Referral by Risk Assessment Version

		Subsequent Petitioned Referral	
	Total N	**N**	**%**
Total Sample	2,911	323	**11.1%**
1. Original Risk Assessment			
Low Risk	1,429	69	**4.8%**
Moderate Risk	888	124	**14.0%**
High Risk	594	130	**21.9%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	33	**3.5%**
Moderate Risk	1,664	215	**12.9%**
High Risk	312	75	**24.0%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	16	**2.0%**
Moderate Risk	1,790	225	**12.6%**
High Risk	329	82	**24.9%**
4. Re-Developed Risk Assessment			
Low Risk	776	15	**1.9%**
Moderate Risk	1,608	181	**11.3%**
High Risk	527	127	**24.1%**

Figure 3



When the outcome measure is violent offense referrals, the results were similar to those found with the previous outcome measures (see Table 9 and Figure 4). Applying the original risk assessment, 16.3% of youth classified as high risk and 5.3% of low risk youth had a subsequent violent offense referral. With revised cut points, 3.9% of low risk youth and 19.6% of high risk youth had a subsequent referral for a violent offense. When the original risk assessment with re-weighted items and the re-developed risk assessment was applied, high risk youth had a subsequent violent offense referral rate that was more than five times greater than that of low risk youth (5.5 times greater for the original risk assessment with re-weighted items and 5.2 greater for the re-developed assessment).

Table 9 Findings for Subsequent Violent Offense Referral by Risk Assessment Version			
		Subsequent Violent Offense Referral	
	Total N	N	%
Total Sample	2,911	284	**9.8%**
1. Original Risk Assessment			
Low Risk	1,429	76	**5.3%**
Moderate Risk	888	111	**12.5%**
High Risk	594	97	**16.3%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	36	**3.9%**
Moderate Risk	1,664	187	**11.2%**
High Risk	312	61	**19.6%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	22	**2.8%**
Moderate Risk	1,790	202	**11.3%**
High Risk	329	60	**18.2%**
4. Re-Developed Risk Assessment			
Low Risk	776	21	**2.7%**
Moderate Risk	1,608	174	**10.8%**
High Risk	527	89	**16.9%**

Figure 4

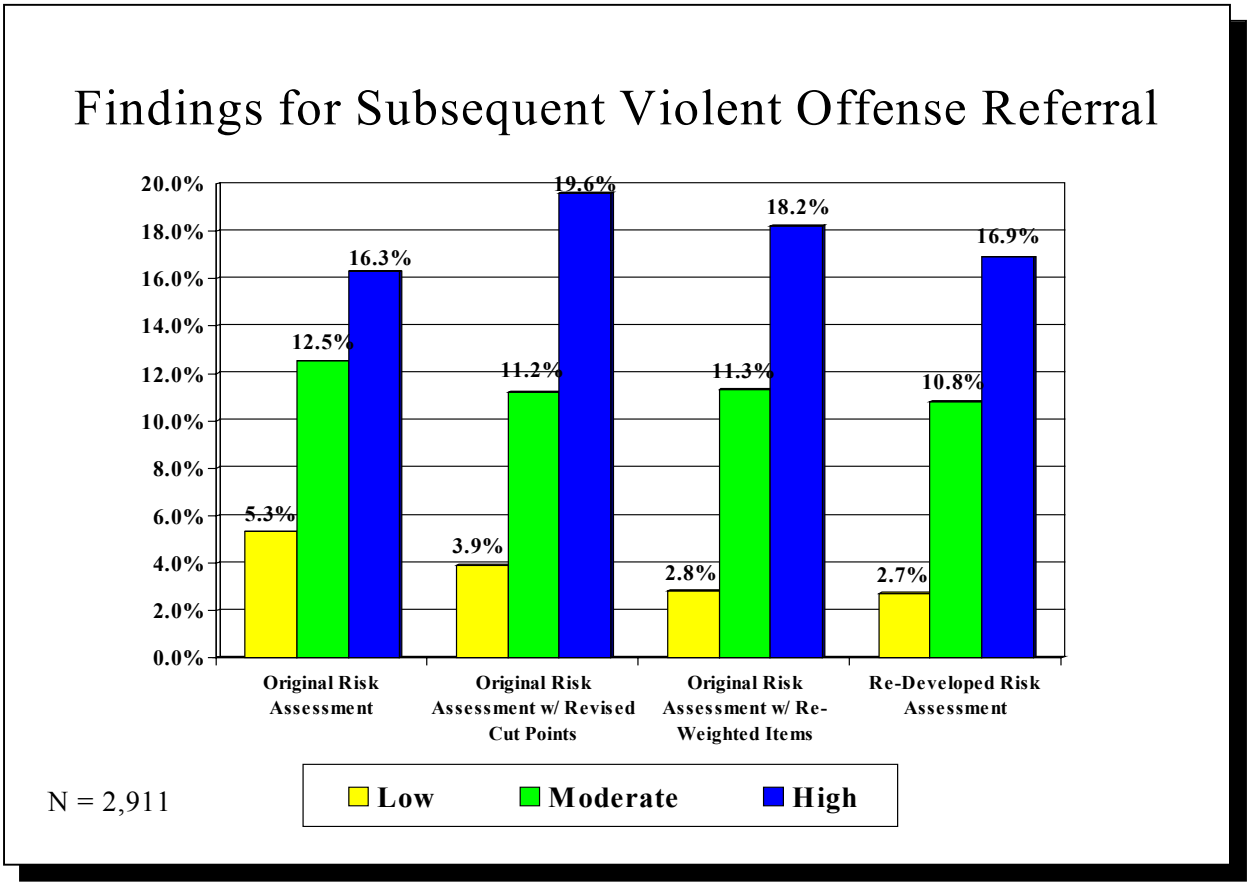


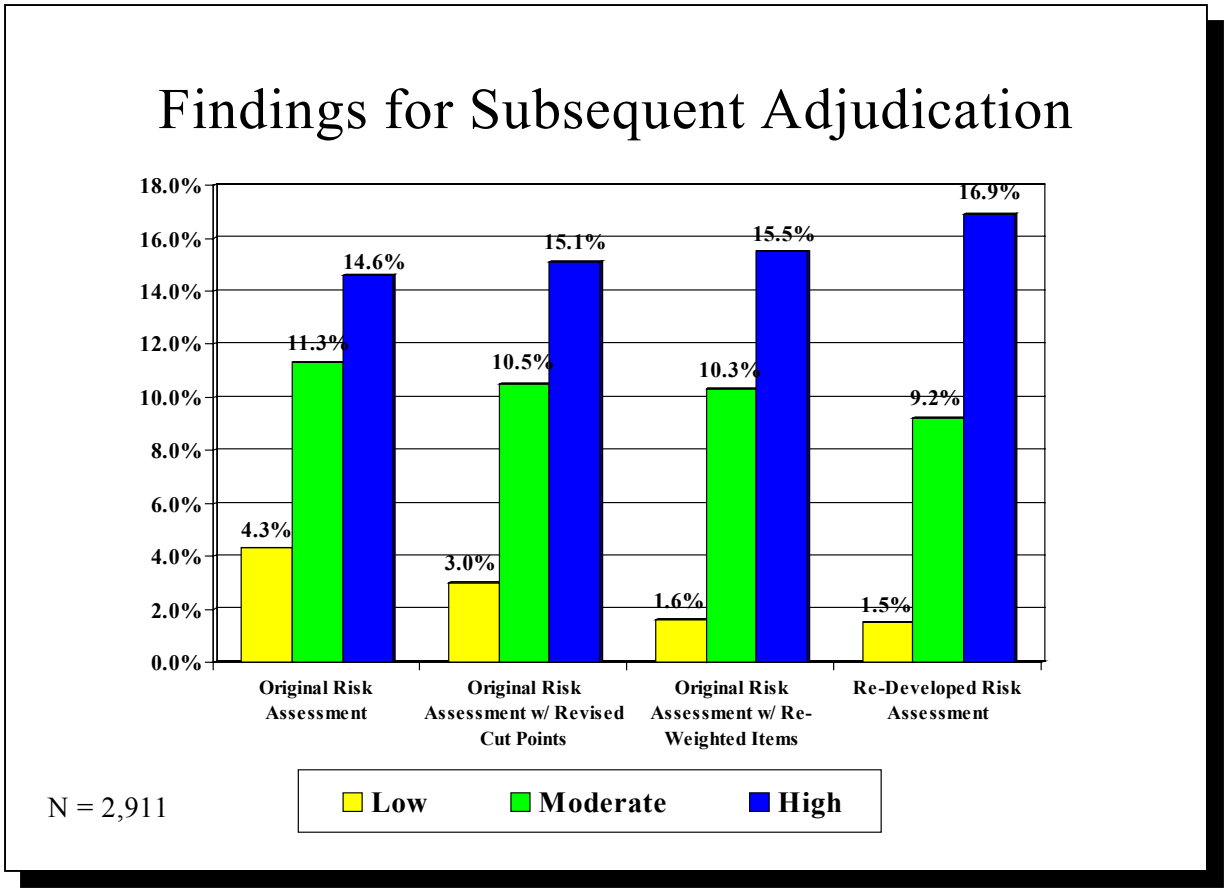
Table 10 and Figure 5 illustrate the results of the risk assessment versions when the outcome measure is subsequent adjudication. After applying the original risk assessment, 4.3% of youth classified as low risk had a referral that lead to adjudication, while 11.3% of youth classified as moderate risk and 14.6% of youth classified as high risk had a subsequent adjudication. For the original risk assessment with revised cut points, the differences in subsequent adjudication rates between consecutive risk levels were somewhat improved with 3.0% of youth classified as low risk, 10.5% of moderate risk youth and 15.1% of high risk youth having been adjudicated. Using the original risk assessment with re-weighted items yielded further improvement; 1.6% of low risk, 10.3% of moderate risk, and 15.5% of high risk youth had a subsequent referral that resulted in adjudication. When classified by the re-developed risk assessment, 1.5% of low risk youth, 9.2% of moderate risk youth, and 16.9% of high risk youth were subsequently adjudicated.

Table 10

Findings for Subsequent Adjudication by Risk Assessment Version

		Subsequent Adjudication	
	Total N	**N**	**%**
Total Sample	2,911	249	**8.6%**
1. Original Risk Assessment			
Low Risk	1,429	62	**4.3%**
Moderate Risk	888	100	**11.3%**
High Risk	594	87	**14.6%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	28	**3.0%**
Moderate Risk	1,664	174	**10.5%**
High Risk	312	47	**15.1%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	13	**1.6%**
Moderate Risk	1,790	185	**10.3%**
High Risk	329	51	**15.5%**
4. Re-Developed Risk Assessment			
Low Risk	776	12	**1.5%**
Moderate Risk	1,608	148	**9.2%**
High Risk	527	89	**16.9%**

Figure 5



The following sections review the results of the risk assessment classifications by sample subgroups.

B. Risk Assessment Classification Findings by Gender

Tables 11 through 13 review findings for the four risk assessment versions for males and females. Table 11 shows that the risk level distributions for males and females were similar across all risk scale versions, with proportionately more females classified as low risk and more males classified as moderate and high risk.

Table 11

Risk Level Distribution by Youth Gender

	Male		Female		Overall	
	N	%	N	%	N	%
Total Sample	2,018	100.0%	893	100.0%	2,911	100.0%
1. Original Risk Assessment						
Low Risk	927	**45.9%**	502	**56.2%**	1,429	49.1%
Moderate Risk	659	**32.7%**	229	**25.6%**	888	30.5%
High Risk	432	**21.4%**	162	**18.1%**	594	20.4%
2. Original Risk Assessment with Revised Cut Points						
Low Risk	592	**29.3%**	343	**38.4%**	935	32.1%
Moderate Risk	1,190	**59.0%**	474	**43.1%**	1,664	57.2%
High Risk	236	**11.7%**	76	**8.5%**	312	10.7%
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	497	**24.6%**	295	**33.0%**	792	27.2%
Moderate Risk	1,272	**63.0%**	518	**58.0%**	1,790	61.5%
High Risk	279	**12.3%**	80	**9.0%**	329	11.3%
4. Re-Developed Risk Assessment						
Low Risk	484	**24.0%**	292	**32.7%**	776	26.7%
Moderate Risk	1,140	**56.5%**	468	**52.4%**	1,608	55.2%
High Risk	394	**19.5%**	133	**14.9%**	527	18.1%

Table 12 presents findings for the five risk assessment versions by gender when the outcome is subsequent referral (any type). Overall, males were 41% more likely to have a subsequent referral than were females (base rates are 38.2% and 27.1% respectively). Despite the significant difference in base rates, all four risk assessment versions classified both male and female youth such that an increase in the risk level corresponded to an increase in the re-referral rate.

The original risk assessment with re-weighted items and the re-developed risk assessment versions, however, more accurately classified youth across genders than did the other versions.

Under the original risk assessment, the re-referral rate for high risk females was 43.8% and 59.6% for high risk males. In fact, the re-referral rate for high risk females was closer to that of moderate risk males (44.8%).

In comparison, when the original risk assessment with re-weighted items was applied, low risk males had a re-referral rate of 15.3%, while moderate risk males had a rate of 41.9% and high risk males a rate of 64.7%. Under this version, low risk females had a re-referral rate of 9.5%, moderate risk females a rate of 30.7% and high-risk females a re-referral rate of 46.3%. The original assessment with re-weighted items produced the greatest distinction between low and moderate risk males and females.

The re-developed assessment classified males such that low risk males had a re-referral rate of 15.7% and high risk males had a re-referral rate of 60.7%. Females classified as low risk had a re-referral rate of 9.6%, while high risk females had a re-referral rate of 49.6%. The re-developed risk assessment had the most similar high risk re-referral rates across gender, and the greatest distinction between the rates for moderate risk males and high risk females.

Table 12

Findings for Subsequent Referral by Youth Gender

	Male			**Female**		
	Total N	**Subsequent Referral**		**Total N**	**Subsequent Referral**	
		N	**%**		**N**	**%**
Total Sample	2,018	770	**38.2%**	893	224	**27.1%**
1. Original Risk Assessment						
Low Risk	927	222	**23.9%**	502	73	**14.5%**
Moderate Risk	659	295	**44.8%**	229	80	**34.9%**
High Risk	432	353	**59.6%**	162	71	**43.8%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	592	109	**18.4%**	343	38	**11.1%**
Moderate Risk	1,190	511	**42.9%**	474	150	**31.6%**
High Risk	236	150	**63.6%**	76	36	**47.4%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	497	76	**15.3%**	295	28	**9.5%**
Moderate Risk	1,272	533	**41.9%**	518	159	**30.7%**
High Risk	249	161	**64.7%**	80	37	**46.3%**
4. Re-Developed Risk Assessment						
Low Risk	484	76	**15.7%**	292	28	**9.6%**
Moderate Risk	1,140	455	**39.9%**	468	130	**27.8%**
High Risk	394	239	**60.7%**	133	66	**49.6%**

Table 13 makes a similar comparison for subsequent adjudication. Again, achieving similar rates within risk levels for both males and females was made difficult by the difference in base rates (males were twice as likely than females to have a subsequent adjudication).

All of the risk assessment versions classified males and females such that an increase in risk level had a corresponding increase in the rate of subsequent adjudication. Only the re-developed assessment, however, was able to attain a high degree of separation between moderate and high risk females; that is, high risk females have double the rate of subsequent adjudications of moderate risk females. The increase from moderate to high risk was less than 50% for other versions.

Table 13

Findings for Subsequent Adjudication by Youth Gender

	Male			**Female**		
	Total N	**Subsequent Adjudication**		**Total N**	**Subsequent Adjudication**	
		N	**%**		**N**	**%**
Total Sample	2,018	206	**10.2%**	893	3	**4.8%**
1. Original Risk Assessment						
Low Risk	927	52	**5.6%**	502	10	**2.0%**
Moderate Risk	659	82	**12.4%**	229	18	**7.9%**
High Risk	432	72	**16.7%**	162	15	**9.3%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	592	21	**3.5%**	343	7	**2.0%**
Moderate Risk	1,190	145	**12.2%**	474	29	**6.1%**
High Risk	236	40	**16.9%**	76	7	**9.2%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	497	10	**2.0%**	295	3	**1.0%**
Moderate Risk	1,272	152	**11.9%**	518	33	**6.4%**
High Risk	249	44	**17.7%**	80	7	**8.8%**
4. Re-Developed Risk Assessment						
Low Risk	484	11	**2.3%**	292	1	**0.3%**
Moderate Risk	1,140	122	**10.7%**	468	26	**5.6%**
High Risk	394	73	**18.5%**	133	16	**12.0%**

C. Risk Assessment Classification Findings by Ethnicity of the Youth

Tables 14 through 16 present recidivism findings for the risk assessment version for white youth and all other ethnic groups (i.e., non-white). Each version of the risk assessment classified a higher proportion of non-white youth as high risk (see Table 14). The original risk assessment classified 2.4 times more non-white youth as high risk compared to the proportion of white youth classified high risk. The original risk assessment with revised cut points and with re-weighted items, however, classified three times as many non-white youth as high risk. The re-developed risk assessment, like the original risk assessment, classified twice as many non-white youth as high risk.

Table 14

Risk Level Distribution by Youth Ethnicity

	White		Non-White		Overall	
	N	**%**	**N**	**%**	**N**	**%**
Total Sample	1,935	100.0%	968	100.0%	2,911	100.0%
1. Original Risk Assessment						
Low Risk	1,124	**58.1%**	299	**30.9%**	1,429	49.1%
Moderate Risk	543	**28.1%**	344	**35.5%**	888	30.5%
High Risk	268	**13.9%**	325	**33.6%**	594	20.4%
2. Original Risk Assessment with Revised Cut Points						
Low Risk	777	**40.2%**	152	**15.7%**	935	32.1%
Moderate Risk	1,038	**53.6%**	625	**64.6%**	1,664	57.2%
High Risk	120	**6.2%**	191	**19.7%**	312	10.7%
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	677	**35.0%**	111	**11.5%**	792	27.2%
Moderate Risk	1,132	**58.5%**	655	**67.7%**	1,790	61.5%
High Risk	126	**6.5%**	202	**20.9%**	329	11.3%
4. Re-Developed Risk Assessment						
Low Risk	654	**33.8%**	118	**12.2%**	776	26.7%
Moderate Risk	1,047	**54.1%**	559	**57.7%**	1,608	55.2%
High Risk	234	**12.1%**	291	**30.1%**	527	18.1%

Note: Eight cases lacked information regarding the youth's race.

Table 15 shows that when comparing risk assessment performance by ethnicity for subsequent referrals, the original risk assessment did not differentiate between moderate and high risk non-white youth as well as the other risk assessment versions did. When the original risk assessment was applied, the increase from moderate to high risk for non-white youth corresponded to a 25% increase in the re-referral rate (from 49.1% to 61.5%). Among non-white youth, the percentage increase was 43% for the original risk assessment with revised cut points (46.4% to 66.5%), 49% for the original risk assessment with re-weighted items (45.2% to 67.3%), and 52% for the re-developed risk assessment (42.9% to 65.3%). The re-developed risk assessment and the original assessment with re-weighted items provided better distinction between low and moderate risk non-white and white youth, with the latter providing the best distinction between the risk groups by ethnicity.

Table 15

Findings for Subsequent Referral by Youth Ethnicity

	White			Non-White		
	Total	Subsequent Referral		Total	Subsequent Referral	
	N	N	%	N	N	%
Total Sample	1,935	536	**27.7%**	968	456	**47.1%**
1. Original Risk Assessment						
Low Risk	1,124	208	**18.5%**	299	7	**29.1%**
Moderate Risk	543	205	**37.8%**	344	169	**49.1%**
High Risk	268	123	**45.9%**	325	200	**61.5%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	777	108	**13.9%**	152	39	**25.7%**
Moderate Risk	1,038	370	**35.6%**	625	290	**46.4%**
High Risk	120	58	**48.3%**	191	127	**66.5%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	677	80	**11.8%**	111	24	**21.6%**
Moderate Risk	1,132	395	**34.9%**	655	296	**45.2%**
High Risk	126	61	**48.4%**	202	136	**67.3%**
4. Re-Developed Risk Assessment						
Low Risk	654	78	**11.9%**	118	26	**22.0%**
Moderate Risk	1,047	345	**33.0%**	559	240	**42.9%**
High Risk	234	113	**48.3%**	291	190	**65.3%**

A similar comparison was made for the outcome of subsequent adjudication in Table 16. As with the previous comparison, the re-developed risk assessment and the original risk assessment with re-weighted items achieved better separation between risk levels than did the other risk assessment versions. The re-developed risk assessment had slightly greater separation between moderate and high risk non-white youth; the corresponding percentage increase for the re-developed risk assessment was 27.0%, compared to 15.5% for the risk assessment with re-weighted items (a difference of 3% and 1.8% respectively).

Table 16

Findings for Subsequent Adjudication by Youth Ethnicity

	White			Non-White		
	Total N	Subsequent Adjudication		Total N	Subsequent Adjudication	
		N	%		N	%
Total Sample	1,935	142	**7.3%**	968	105	**10.8%**
1. Original Risk Assessment						
Low Risk	1,124	43	**3.8%**	299	19	**6.4%**
Moderate Risk	543	56	**10.3%**	344	43	**12.5%**
High Risk	268	43	**16.0%**	325	43	**13.2%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	777	20	**2.6%**	152	8	**5.3%**
Moderate Risk	1,038	102	**9.8%**	625	71	**11.4%**
High Risk	120	20	**16.7%**	191	26	**13.6%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	677	11	**1.6%**	111	2	**1.8%**
Moderate Risk	1,132	108	**9.5%**	655	76	**11.6%**
High Risk	126	23	**18.3%**	202	27	**13.4%**
4. Re-Developed Risk Assessment						
Low Risk	654	10	**1.5%**	118	2	**1.7%**
Moderate Risk	1,047	86	**8.2%**	559	62	**11.1%**
High Risk	234	46	**19.7%**	291	41	**14.1%**

D. Risk Assessment Classification Findings by Geographic Location

Over half of the youth in the sample (55.8%) were from an urban county.[13] Of youth from an urban area, 55.7% were white, and 44.3% were of another ethnicity. In contrast, 91% of youth from rural areas were white. Given this difference in the urban and rural populations, the findings when comparing risk assessment performance for youth residing in urban vs. rural counties are related to those reviewed previously for white and non-white youth.

Table 17 shows the distribution by risk level when the risk assessment versions were applied to youth living in urban and rural areas. Regardless of the type of risk assessment version, urban youth were more likely to be classified as high risk than were youth from rural areas. For example, under the original risk assessment, most rural youth (55.9%) were classified as low risk, while a slightly lower proportion (45.7%) of urban youth were classified as low risk. Nearly one-fifth (17.3%) of rural youth and 21.9% of urban youth were classified as high risk. This pattern of distribution also appeared when the revised risk assessments were applied.

[13] As mentioned previously, St. Louis and St. Charles (circuits 11 and 22) are classified as urban, while the remainder of the sampled circuits is classified as rural (circuits 10, 12, 19 and 20). Percentages are based upon the total sample (N = 2,911) rather than the sample with county indicated (i.e., cases with county missing are included in the denominator).

Table 17

Risk Level Distribution by Geographic Location

	Rural		Urban		Overall	
	N	%	N	%	N	%
Total Sample	1,005	100.0%	1,626	100.0%	2,911	100.0%
1. Original Risk Assessment						
Low Risk	562	**55.9%**	743	**45.7%**	1,429	49.1%
Moderate Risk	269	**26.8%**	527	**32.4%**	888	30.5%
High Risk	174	**17.3%**	356	**21.9%**	594	20.4%
2. Original Risk Assessment with Revised Cut Points						
Low Risk	377	**37.5%**	492	**30.3%**	935	32.1%
Moderate Risk	540	**53.7%**	946	**58.2%**	1,664	57.2%
High Risk	88	**8.8%**	188	**11.6%**	312	10.7%
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	329	**32.7%**	410	**25.2%**	792	27.2%
Moderate Risk	591	**58.8%**	1,004	**61.7%**	1,790	61.5%
High Risk	85	**8.5%**	212	**13.0%**	329	11.3%
4. Re-Developed Risk Assessment						
Low Risk	331	**32.9%**	394	**24.2%**	776	26.7%
Moderate Risk	527	**52.4%**	896	**55.1%**	1,608	55.2%
High Risk	147	**14.6%**	336	**20.7%**	527	18.1%

Note: 280 cases lacked information about county of residence.

As with the previous comparisons across sample subgroups, each risk assessment version classified youth such that an increase in risk corresponds to an increase in recidivism. This was true whether the outcome was subsequent referral or subsequent adjudication in the follow-up period (see Tables 18 and 19).

Each of the risk assessment versions provided strong distinction between low and moderate risk cases in both the rural and the urban samples. That is, regardless of the sample group and the risk assessment applied, re-referral rates were nearly double with the increase to moderate risk (see Table 18). The increase in recidivism rates, however, was not as dramatic when rural and urban youth moved from moderate to high risk. For example, under the original risk assessment, moving from moderate to high risk corresponded to a 14.0% increase in re-referral rates for rural youth (from 45.4% to 51.7%) and a 37.2% increase for urban youth (41.0% to 56.2%). The percentage increase for urban and rural youth was greater for the revised

risk assessments, and greatest for the re-developed risk assessment (with a percentage increase of 45.0% for rural youth and 67.0% for urban youth).

Table 18

Findings for Subsequent Referral by Geographic Location

	Rural			Urban		
	Total N	Subsequent Referral		Total N	Subsequent Referral	
		N	%		N	%
Total Sample	1,005	345	**34.3%**	1,626	549	**33.8%**
1. Original Risk Assessment						
Low Risk	562	133	**23.7%**	743	133	**17.9%**
Moderate Risk	269	122	**45.4%**	527	216	**41.0%**
High Risk	174	90	**51.7%**	356	200	**56.2%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	377	67	**17.8%**	492	65	**13.2%**
Moderate Risk	540	232	**43.0%**	946	363	**38.4%**
High Risk	88	46	**52.3%**	188	121	**64.4%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	329	48	**46.6%**	410	44	**10.7%**
Moderate Risk	591	251	**42.5%**	1,004	373	**37.2%**
High Risk	85	46	**54.1%**	212	132	**62.3%**
4. Re-Developed Risk Assessment						
Low Risk	331	48	**14.5%**	394	46	**11.7%**
Moderate Risk	527	211	**40.0%**	896	309	**34.5%**
High Risk	147	86	**58.5%**	336	194	**57.7%**

This same pattern was evident when the outcome is subsequent adjudication in the follow-up period (see Table 19). Under the original risk assessment, moving from moderate to high risk corresponded to a 33.0% increase in rates for rural youth (from 13.4% to 17.8%) and a 30.0% increase for urban youth (11.0% to 14.3%). The percentage increase for urban and rural youth was greater for the revised risk assessments, and greatest for the re-developed risk assessment (with a percentage increase of 156.0% for rural youth and 57.0% for urban youth).

Table 19

Findings for Subsequent Adjudication by Geographic Location

	Rural			Urban		
	Total N	Subsequent Adjudication		Total N	Subsequent Adjudication	
		N	%		N	%
Total Sample	1,005	90	**9.0%**	1,626	143	**8.8%**
1. Original Risk Assessment						
Low Risk	562	23	**4.1%**	743	34	**4.6%**
Moderate Risk	269	36	**13.4%**	527	58	**11.0%**
High Risk	174	31	**17.8%**	356	51	**14.3%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	377	11	**2.9%**	492	15	**3.0%**
Moderate Risk	540	62	**11.5%**	946	102	**10.8%**
High Risk	88	17	**19.3%**	188	26	**13.8%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	329	7	**2.1%**	410	4	**1.0%**
Moderate Risk	591	65	**11.0%**	1,004	109	**10.9%**
High Risk	85	18	**21.2%**	212	30	**14.2%**
4. Re-Developed Risk Assessment						
Low Risk	331	6	**1.8%**	394	5	**1.3%**
Moderate Risk	527	49	**9.3%**	896	87	**9.7%**
High Risk	147	35	**23.8%**	336	51	**15.2%**

V. SUMMARY

Given that the goal of risk assessment is to classify youth according to the likelihood that they will re-offend in the future, each increase in risk level should correspond to a significant increase in recidivism, across outcomes. An effective risk assessment is one that maximizes the separation between recidivism rates for the high and low risk groups, as well as between rates for consecutive risk groups.

The best way to assess the performance of the risk assessment versions, then, is to compare the separation between risk levels. Following is a summary of how the risk assessment versions compare:

- The original risk assessment did not distinguish well between moderate and high risk youth overall. In particular, there was little difference in recidivism rates between moderate and high risk females and between moderate and high risk non-white youth.

- For the total sample, the original risk assessment with re-weighted items and the re-developed assessment resulted in greater differentiation between low and moderate risk youth, and moderate and high risk youth than did the other risk assessment versions (see Table 20).

Table 20

Percentage Increase in Rates between Risk Levels by Risk Assessment Version

Risk Assessment Version	Subsequent Referral Outcome			Subsequent Adjudication Outcome		
	From Low to Moderate	From Moderate to High	From Low to High	From Low to Moderate	From Moderate to High	From Low to High
1. Original Risk Assessment	105%	29%	164%	163%	29%	240%
2. Original Risk Assessment with Revised Cut Points	153%	50%	280%	250%	44%	403%
3. Original Risk Assessment with Re-Weighted Items	195%	56%	356%	544%	50%	69%
4. Re-Developed Risk Assessment	172%	59%	332%	513%	84%	1,027%

Note: The data shown is percentage increase, calculated by dividing the difference in rates by the rate of the lower risk level. For example, the percentage increase from low to moderate is (low rate – moderate rate)/low rate.

- With regard to sample subgroups, the areas of concern were the amount of separation between moderate and high risk females, moderate and high risk youth of non-white ethnicities, and moderate and high risk urban youth. The re-developed risk assessment and the original risk assessment with re-weighted items had greater differentiation between moderate and high risk youth in these subgroups than did the other risk assessment versions. The re-developed risk assessment provided slightly greater differentiation than did the original risk assessment with re-weighted items.

Additional considerations in evaluating risk assessment versions are face validity and reliability. That is, does the assessment appear to officers to measure risk and, given the same referral, would various officers complete a risk assessment in the same way for that referral? Feedback from officers indicate that many oppose the risk item that assesses parents' criminality because they feel it unfairly influences the youth, and that it takes significant work to determine whether or not a parent has a criminal background. In re-developing the risk assessment, this item was eliminated because it has a weak association with recidivism relative to outcome measures. Therefore, officers may be more likely to accept the re-developed risk assessment as having face validity. Eliminating this item may also improve reliability in that officers have indicated how difficult it is to obtain parent criminal activity information.

Results of this study indicate that the re-developed risk assessment and the original risk assessment with re-weighted items attain the best separation between risk levels. While both assessments achieved this regardless of the youth's gender, ethnicity, or area of residence, the re-developed assessment achieved slightly greater separation between moderate and high risk youth for females and youth of non-white ethnicity. In addition, the re-developed assessment does not assess parents' criminality, an item that officers have opposed in the past.

The decision to modify the original risk assessment is, however, based both on research and policy. A number of policy issues affect risk assessment modifications:

- Changes to the risk assessment would need to be made in BANNER (the statewide information system), which could be expensive and/or delay the implementation of BANNER;

- Changes to the risk assessment may also need to be made to J-TRAC, unless those counties would use the original risk assessment until BANNER implementation; and

- Changes would need to be made to the manual (which may include changes to definitions), and those changes communicated to officers and other staff (through training or other means).

Note, however, that all of the altered risk assessment versions reviewed in this report are similar to the original risk assessment (see Appendix A); which may ease the burden of modifications, particularly those related to manual changes and communicating changes to staff.

Appendix A

Risk Assessment Forms

1. THE CURRENT MISSOURI JUVENILE RISK ASSESSMENT

Juvenile Name _____ **Parent Name** _____ **Juvenile SS Number**_____ - ____ - _____
If juvenile has no SSN, use parent's)
Juvenile Date of Birth____/____/____ **Juvenile ID#** _____ **Race**_____ **Gender M F**
Present Offense Code (list multiple offenses) _____ , _____ , _____ **Juvenile Officer**_____
Date Referral Received____/____/____ **Date Form Completed**____/____/____ **County**_____ **Circuit**_____

		Score
R1.	Age at First Referral (record actual age ____):	
	a. 16	0
	b. 13,14, or 15 (circle actual age)	1
	c. 12 and under	4 ____
R2.	Prior Referrals *(record actual number of referrals ____)*	
	a. None	0
	b. One or more prior referrals	3 ____
R3.	Assault Referrals *(record actual number of referrals __)*	
	a. No prior or present referral for assault	0
	b. One or more prior or present referrals for misdemeanor assault	1
	c. One or more prior or present referrals for felony assault	3 ____
R4.	History of Placement	
	a. No prior out-of-home placement	0
	b. Prior out-of-home placement	3 ____
R5.	Peer Relationships	
	a. Neutral influence	0
	b. Negative influence	1
	c. Strong negative influence	3 ____
R6.	History of Child Abuse or Neglect	
	a. No prior child abuse or neglect	0
	b. Prior child abuse or neglect	3 ____
	(petition filed or DFS finding of probable cause)	
	Not Verified (score item from self-report) ❑	
R7.	Substance Abuse	
	a. No alcohol or drug problem	0
	b. Alcohol and/or drug abuse problem	1
	c. Severe Alcohol and/or drug abuse dependence	3 ____
R8.	School Behavior Problems	
	a. No or only minor problems	0
	b. Moderate problems	2
	c. Severe problems	4 ____
R9.	Parental Management Style	
	a. Positive management	0
	b. Moderately ineffective management	1
	b. Severely ineffective management	3 ____
R10.	Parents' Criminal History	
	a. No prior incarceration	0
	b. Prior incarcerations	3 ____

RISK LEVEL **RISK SCORE** ____

High Risk	+14 and above	____
Moderate Risk	+8 to +13	____
Low Risk	0 to +7	____

Motion to dismiss for cert. sustained ❑
Check action taken(check one):
❑ Informal Adjustment ❑ Adjudication

DISCRETIONARY OVERRIDE

If a discretionary override is made, circle yes, circle override risk level, and indicate reason. Risk level may be overridden one level higher.
Yes No If yes, override risk level (circle one): Low Moderate High
Discretionary Override Reason_____

Supervisor's Review/Approval of Discretionary Override:_____ Date: ___/____/____

DISPOSITION:
- ❑ Allegation found true with petition
- ❑ Allegation found not true with petition
- ❑ Sustained motion to dismiss
- ❑ Informal adjustment conference
- ❑ Informal adjustment, no conference
- ❑ Transfer to another juvenile court
- ❑ Transfer to another facility
- ❑ Other transfer_____
- ❑ Referral rejected (check reason): ❑ Allegation not true ❑ Insufficient evidence

SANCTIONS: (check all that apply)
- ❑ Restitution
- ❑ Community Service
- ❑ Court Fees and Assessment
- ❑ Supervision
- ❑ Day Treatment
- ❑ Intensive Supervision
- ❑ Out-of-Home Placement
- ❑ Court Residential Placement
- ❑ Commitment to DYS
- ❑ Other sanctions not within matrix: _____

3. THE CURRENT MISSOURI JUVENILE RISK ASSESSMENT WITH RE-WEIGHTED ITEMS

Juvenile Name _____ **Parent Name** _____ **Juvenile SS Number**_____-____-_____
If juvenile has no SSN, use parent's)
Juvenile Date of Birth_____/_____/_____ **Juvenile ID#** _____ **Race**_____ **Gender M F**
Present Offense Code (list multiple offenses) _____, _____, _____ **Juvenile Officer**_____
Date Referral Received_____/_____/_____ **Date Form Completed**_____/_____/_____ **County**_____ **Circuit**_____

		Score
R1.	Age at First Referral (record actual age _____):	
	a. 16	-2
	b. 13,14, or 15 (circle actual age)	0
	c. 12 and under	1 _____
R2.	Prior Referrals *(record actual number of referrals ____)*	
	a. None	0
	b. One or more prior referrals	2 _____
R3.	Assault Referrals *(record actual number of referrals __)*	
	a. No prior or present referral for assault	0
	b. One or more prior or present referrals for misdemeanor assault	1
	c. One or more prior or present referrals for felony assault	2 _____
R4.	History of Placement	
	a. No prior out-of-home placement	0
	b. Prior out-of-home placement	1 _____
R5.	Peer Relationships	
	a. Neutral influence	0
	b. Negative influence	1
	c. Strong negative influence	2 _____
R6.	History of Child Abuse or Neglect	
	a. No prior child abuse or neglect	0
	b. Prior child abuse or neglect	1 _____
	(petition filed or DFS finding of probable cause)	
	Not Verified (score item from self-report) ❑	
R7.	Substance Abuse	
	a. No alcohol or drug problem	0
	b. Alcohol and/or drug abuse problem	1
	c. Severe Alcohol and/or drug abuse dependence	2 _____
R8.	School Behavior Problems	
	a. No or only minor problems	-1
	b. Moderate problems	0
	c. Severe problems	1 _____
R9.	Parental Management Style	
	a. Positive management	0
	b. Moderately ineffective management	1
	b. Severely ineffective management	2 _____
R10.	Parents' Criminal History	
	a. No prior incarceration	0
	b. Prior incarcerations	1 _____

RISK LEVEL **RISK SCORE** _____

High Risk	+8 and above	_____
Moderate Risk	+1 to +7	_____
Low Risk	-3 to 0	_____

Motion to dismiss for cert. sustained ❑
Check action taken(check one):
❑ Informal Adjustment ❑ Adjudication

DISCRETIONARY OVERRIDE

If a discretionary override is made, circle yes, circle override risk level, and indicate reason. Risk level may be overridden one level higher.
Yes No If yes, override risk level (circle one): Low Moderate High
Discretionary Override Reason_____

Supervisor's Review/Approval of Discretionary Override:_____ Date: ___/_____/_____

DISPOSITION:
- ❑ Allegation found true with petition
- ❑ Allegation found not true with petition
- ❑ Sustained motion to dismiss
- ❑ Informal adjustment conference
- ❑ Informal adjustment, no conference
- ❑ Transfer to another juvenile court
- ❑ Transfer to another facility
- ❑ Other transfer_____
- ❑ Referral rejected (check reason): ❑ Allegation not true ❑ Insufficient evidence

SANCTIONS: (check all that apply)
- ❑ Restitution
- ❑ Community Service
- ❑ Court Fees and Assessment
- ❑ Supervision
- ❑ Day Treatment
- ❑ Intensive Supervision
- ❑ Out-of-Home Placement
- ❑ Court Residential Placement
- ❑ Commitment to DYS
- ❑ Other sanctions not within matrix: _____

4. THE RE-DEVELOPED JUVENILE RISK ASSESSMENT

Juvenile Name _____ **Parent Name** _____ **Juvenile SS Number**____-____-____
If juvenile has no SSN, use parent's)
Juvenile Date of Birth____/____/____ **Juvenile ID#** _____ **Race**_____ **Gender M F**
Present Offense Code (list multiple offenses) _____ , _____ , _____ **Juvenile Officer**_____
Date Referral Received____/____/____ **Date Form Completed**____/____/____ **County**_____ **Circuit**_____

		Score
R1.	Age at First Referral (record actual age ____):	
	a. 16	-2
	b. 13,14, or 15 (circle actual age)	0
	c. 12 and under	1 ____
R2.	Prior Referrals *(record actual number of referrals ____)*	
	a. None	0
	b. One or two prior referrals	2
	c. Three or more prior referrals	4 ____
R3.	Assault Referrals *(record actual number of referrals __)*	
	a. No prior or present referral for assault	0
	b. One or more prior or present referrals for misdemeanor or felony assault	1 ____
R4.	History of Placement	
	a. No prior out-of-home placement	0
	b. Prior out-of-home placement	1 ____
R5.	Peer Relationships	
	a. Neutral influence	0
	b. Negative influence	1
	c. Strong negative influence	2 ____
R6.	History of Child Abuse or Neglect	
	a. No prior child abuse or neglect	0
	b. Prior child abuse or neglect	1 ____
	(petition filed or DFS finding of probable cause)	
	Not Verified (score item from self-report) ❑	
R7.	Substance Abuse	
	a. No alcohol or drug problem	0
	b. Alcohol and/or drug abuse problem	1
	c. Severe Alcohol and/or drug abuse dependence	2 ____
R8.	School Behavior Problems	
	a. No or only minor problems	0
	b. Moderate or severe problems	2 ____
R9.	Parental Management Style	
	a. Positive management	0
	b. Ineffective management	1 ____
		RISK SCORE ____

RISK LEVEL

High Risk	+8 and above	____
Moderate Risk	+2 to +7	____
Low Risk	-2 to +1	____

Motion to dismiss for cert. sustained ❑
Check action taken(check one):
❑ Informal Adjustment ❑ Adjudication

DISCRETIONARY OVERRIDE

If a discretionary override is made, circle yes, circle override risk level, and indicate reason. Risk level may be overridden one level higher.

Yes No If yes, override risk level (circle one): Low Moderate High
Discretionary Override Reason_____

Supervisor's Review/Approval of Discretionary Override:_____ Date: ___/___/___

DISPOSITION:
- ❑ Allegation found true with petition
- ❑ Allegation found not true with petition
- ❑ Sustained motion to dismiss
- ❑ Informal adjustment conference
- ❑ Informal adjustment, no conference
- ❑ Transfer to another juvenile court
- ❑ Transfer to another facility
- ❑ Other transfer_____
- ❑ Referral rejected (check reason): ❑ Allegation not true ❑ Insufficient evidence

SANCTIONS: (check all that apply)
- ❑ Restitution
- ❑ Community Service
- ❑ Court Fees and Assessment
- ❑ Supervision
- ❑ Day Treatment
- ❑ Intensive Supervision
- ❑ Out-of-Home Placement
- ❑ Court Residential Placement
- ❑ Commitment to DYS
- ❑ Other sanctions not within matrix: _____

Appendix B

Item Analysis

Table B1

Item Analysis: Current Risk Assessment

	Sample		Subsequent Referral				Subsequent Adjudication			
Risk Assessment Item	**N**	**%**	**N**	**%**	**Corr.**	**P value**	**N**	**%**	**Corr.**	**P value**
Total Sample	**2,911**	**100.0%**	**994**	**34.1%**			**249**	**8.6%**		
Age at First Referral					.134	.001			.057	.001
16	363	12.5%	56	15.4%			7	1.9%		
13,14 or 15	1,586	54.5%	538	33.9%			144	9.1%		
12 and under	962	33.0%	400	41.6%			98	10.2%		
Prior Referrals					.258	.001			.139	.001
None	1,446	49.7%	316	21.9%			67	4.6%		
One or more	1,465	50.3%	678	46.3%			182	12.4%		
Assault Referrals (Prior or Present)					.078	.001			0.25	.087
No prior or present assault referral	1,990	68.4%	614	30.9%			154	7.7%		
One or more misdemeanor assault	704	24.2%	294	41.8%			76	10.8%		
One or more felony assault	217	7.5%	86	39.6%			19	8.8%		
History of Placement					.152	.001			.069	.001
No prior out-of-home	2,290	78.7%	696	30.4%			173	7.6%		
Prior out-of-home	621	21.3%	298	48.0%			76	12.2%		
Peer Relationships					.216	.001			.132	.001
Neutral influence	1,465	50.3%	332	22.7%			65	4.4%		
Negative influence	1,240	42.6%	555	44.8%			453	12.3%		
Strong negative influence	206	7.1%	107	51.9%			31	15.0%		
History of Child Abuse/ Neglect					.127	.001			.040	.015
No prior CA/N	2,444	84.0%	770	31.5%			197	8.1%		
Prior CA/N history	467	16.0%	224	48.0%			52	11.1%		
Substance Abuse					.126	.001			.092	.001
No problem	2,094	71.9%	635	30.3%			149	7.1%		
Moderate problem	744	25.6%	321	43.1%			86	11.6%		
Severe dependence	73	2.5%	38	42.1%			14	19.2%		
School Behavior Problems					.224	.001			.132	.001
No or minor problems	1,426	49.0%	329	23.1%			63	4.4%		
Moderate problems	1,149	39.5%	497	43.3%			143	12.4%		
Severe problems	336	11.5%	168	50.0%			43	12.8%		
Parental Management Style					.196	.001			.112	.001
Positive management	1,678	57.6%	420	25.0%			88	5.2%		
Moderately ineffective management	984	33.8%	448	45.5%			128	13.0%		
Severely ineffective management	249	8.6%	126	50.6%			33	13.3%		
Parents' Criminal History					.112	.001			.025	.098
No prior incarceration	2,260	77.6%	707	31.3%			185	8.2%		
Prior incarceration	651	22.4%	587	44.1%			64	9.8%		

Table B2

Item Analysis: Risk Assessment with Re-Weighted Items

	Sample		Subsequent Referral				Subsequent Adjudication			
Risk Assessment Item	**N**	**%**	**N**	**%**	**Corr.**	**P value**	**N**	**%**	**Corr.**	**P value**
Total Sample	**2,911**	**100.0%**	**1032**	**35.5%**			**254**	**8.7%**		
Age at First Referral					***.166***	.001			***.086***	***.001***
16	363	12.5%	56	15.4%			7	1.9%		
13,14 or 15	1,586	54.5%	538	33.9%			144	9.1%		
12 and under	962	33.0%	400	41.6%			98	10.2%		
Prior Referrals					.258	.001			.139	.001
None	1,446	49.7%	316	21.9%			67	4.6%		
One or more	1,465	50.3%	678	46.3%			182	12.4%		
Assault Referrals (Prior or Present)					.090	.001			***.033***	***.038***
No prior or present assault referral	1,990	68.4%	614	30.9%			154	7.7%		
One or more misdemeanor assault	704	24.2%	294	41.8%			76	10.8%		
One or more felony assault	217	7.5%	86	39.6%			19	8.8%		
History of Placement					***.152***	.001			.069	.001
No prior out-of-home	2,290	78.7%	696	30.4%			173	7.6%		
Prior out-of-home	621	21.3%	298	48.0%			76	12.2%		
Peer Relationships					***.239***	.001			***.146***	.001
Neutral influence	1,465	50.3%	332	22.7%			65	4.4%		
Negative influence	1,240	42.6%	555	44.8%			453	12.3%		
Strong negative influence	206	7.1%	107	51.9%			31	15.0%		
History of Child Abuse/ Neglect					.127	.001			.040	.015
No prior CA/N	2,444	84.0%	770	31.5%			197	8.1%		
Prior CA/N history	467	16.0%	224	48.0%			52	11.1%		
Substance Abuse					***.132***	.001			***.091***	.001
No problem	2,094	71.9%	635	30.3%			149	7.1%		
Moderate problem	744	25.6%	321	43.1%			86	11.6%		
Severe dependence	73	2.5%	38	42.1%			14	19.2%		
School Behavior Problems					.224	.001			.132	.001
No or minor problems	1,426	49.0%	329	23.1%			63	4.4%		
Moderate problems	1,149	39.5%	497	43.3%			143	12.4%		
Severe problems	336	11.5%	168	50.0%			43	12.8%		
Parental Management Style					***.217***	.001			***.127***	.001
Positive management	1,678	57.6%	420	25.0%			88	5.2%		
Moderately ineffective management	984	33.8%	448	45.5%			128	13.0%		
Severely ineffective management	249	8.6%	126	50.6%			33	13.3%		
Parents' Criminal History					.112	.001			.025	.098
No prior incarceration	2,260	77.6%	707	31.3%			185	8.2%		
Prior incarceration	651	22.4%	587	44.1%			64	9.8%		

Table B3

Item Analysis: Re-Developed Risk Assessment

	Sample		Subsequent Referral				Subsequent Adjudication			
Risk Assessment Item	**N**	**%**	**N**	**%**	**Corr.**	**P value**	**N**	**%**	**Corr.**	**P value**
Total Sample	**2,911**	**100.0%**	**994**	**34.1**			**249**	**8.6**		
Age at First Referral					.166	.001			.086	.001
16	363	12.5%	56	15.4			7	1.9%		
13,14 or 15	1,586	54.5%	538	33.9			144	9.1		
12 and under	962	33.0%	400	41.6			98	10.2		
Prior Referrals					.259	.001			.145	.001
None	1,444	49.7%	314	21.7			66	4.6%		
One or two	1,451	49.8%	671	46.2			179	12.3		
Three or more	16	0.5%	9	56.3%			4	25.0%		
Assault Referrals (Prior or Present)					.102	.001			.043	.010
No prior or present assault referral	1,990	68.4%	614	30.9			154	7.7		
One or more assault referral	921	31.6%	380	41.3			95	10.3		
History of Placement					.152	.001			.069	.001
No prior out-of-home	2,290	78.7%	696	30.4			173	7.6		
Prior out-of-home	621	21.3%	298	48.0			76	12.2		
Peer Relationships					.239	.001			.146	.001
Neutral influence	1,465	50.3%	332	22.7			65	4.4		
Negative influence	1,240	42.6%	555	44.8			153	12.3		
Strong negative influence	206	7.1%	107	51.9			31	15.0%		
History of Child Abuse/ Neglect					.127	.001			.040	.015
No prior CA/N	2,444	84.0%	770	31.5			197	8.1%		
Prior CA/N history	467	16.0%	224	48.0			52	11.1		
Substance Abuse					.132	.001			.091	.001
No problem	2,094	71.9%	635	30.3			149	7.1		
Moderate problem	744	25.6%	321	43.1			86	11.6		
Severe dependence	73	2.5%	38	52.1			14	19.2		
School Behavior Problems					.229	.001			.145	.001
No or minor problems	1,426	49.0%	329	23.1			63	4.4		
Moderate or severe problems	1,485	51.0%	665	44.8			186	12.5		
Parental Management Style					.224	.001			.138	.001
Positive management	1,678	57.6%	420	25.0			88	5.2		
Ineffective management	1,233	42.4%	574	46.6			161	13.1		

Appendix C

Suggested Risk Reassessment

Risk Reassessment

The purpose of risk reassessment is to measure changes in a youth's risk of future delinquency based upon response to services and other changes (such as a change in living arrangement). A risk reassessment may be completed periodically such as every three months, at judicial review, or when a significant change occurs with the youth that may affect risk level.

The risk reassessment scale combines items from the original risk assessment tool with additional items that evaluate a youth's progress toward case plan goals. The risk reassessment tool is in part consensus-based in that many items that assess change over time are not based upon research. Some items, however, are carried over from the initial risk assessment and are actuarial.

The Risk Assessment Committee chose to adopt the original risk assessment with re-weighted items and revised cut points. A suggested risk reassessment to be used in conjunction with that risk assessment is shown on the following page.

SUGGESTED RISK REASSESSMENT

Juvenile Name _____ **Parent Name** _____ **Juvenile SS Number**_____-____-_____
If juvenile has no SSN, use parent's)
Juvenile Date of Birth____/____/____ **Juvenile ID#** _____ **Race**_____ **Gender M F**
Present Offense Code (list multiple offenses) _____ , _____ , _____ **Juvenile Officer**_____
Date Referral Received____/____/____ **Date Form Completed**____/____/____ **County**_____ **Circuit**_____

Score

Fill in questions RE1 – RE3 from the initial risk assessment completed at time of disposition.

RE1. Age at First Referral (record actual age ____):
- a. 16 ..... -2
- b. 13,14, or 15 (circle actual age) 0
- c. 12 and under ..... 1 _____

RE2. Prior Referrals *(record actual number of referrals __)*
- a. None 0
- b. One or more prior referrals ..... 2 _____

RE3. Assault Referrals *(record actual number of referrals)*
- a. No prior or present referral for assault 0
- b. One or more prior or present referrals for misdemeanor assault 1
- c. One or more prior or present referrals for felony assault ..... 2 _____

When scoring the following items, use updated information since the initial risk assessment or most recent risk reassessment.

RE4. Non-delinquent findings (technicals) by court or Juvenile Parole Board
- a. None ..... -1
- b. One or more ..... +1 _____

RE5. Current Peer Relationships
- a. Neutral influence 0
- b. Negative influence 1
- c. Strong negative influence ..... 2 _____

RE6. Current Substance Use
- a. No 0
- c. Yes ..... 2 _____

RE7. Runaways from Home or Community-Based Placement
- a. No ..... -1
- b. Yes ..... +1 _____

RE8. Current School (__) or Employment (__) Problems (check applicable status)
- a. No problems, or problems very minor ..... -1
- b. Some attendance problems requiring conferences at school, short-term suspension, job loss ..... +1
- c. Sanctioned at school or does not enroll; fails to seek and maintain employment ..... +2 _____

RE9. Program Adjustment on Supervision
- a. Satisfactory – no behavior problems ..... -1
- b. Fair – some problems; no major infractions; no revocations filed 0
- c. Poor – chronic adjustment problems; major infractions requiring delinquency action or violation of probation petition filed ..... +2 _____

RISK SCORE _____

SCORED RISK LEVEL

High Risk	+8 and above	_____
Moderate Risk	+1 to +7	_____
Low Risk	-3 to 0	_____

DISCRETIONARY OVERRIDE

If a discretionary override is made, circle yes, circle override risk level, and indicate reason. Risk level may be overridden one level higher or lower.

Yes No If yes, override risk level (circle one): Low Moderate High
Discretionary Override Reason_____

Supervisor's Review/Approval of Discretionary Override:_____ Date: ___/_____/_____

FINAL RISK LEVEL 1. Low 2. Moderate 3. High

REASSESSMENT TYPE: 1. Routine 2. Change risk classification 3. Extension of probation

Appendix D

Law and Status Outcomes

LAW OUTCOMES

The following tables review law outcomes by the version of the risk assessment for the overall sample (that is, outcomes involving only law offenses). Table D1 shows that when the original risk assessment is applied, 15.3% of youth classified as low risk had a subsequent law referral, while 43.9% of high risk youth classified had a subsequent law referral. The altered risk assessment versions showed greater separation between youth classified as low risk and high risk, as well as between consecutive risk levels.

Table D1

Findings for Subsequent Law Referral by Risk Assessment Version

		Subsequent Law Referral	
	Total N	**N**	**%**
Total Sample	2,911	777	**26.7%**
1. Original Risk Assessment			
Low Risk	1,429	218	**15.3%**
Moderate Risk	888	298	**33.6%**
High Risk	594	261	**43.9%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	109	**11.7%**
Moderate Risk	1,664	513	**30.8%**
High Risk	312	155	**44.7%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	77	**9.7%**
Moderate Risk	1,790	532	**29.7%**
High Risk	329	168	**51.1%**
4. Re-Developed Risk Assessment			
Low Risk	776	77	**9.98%**
Moderate Risk	1,608	447	**27.8%**
High Risk	527	253	**48.0%**

Table D2 similarly compares classification findings when the outcome is law referrals accepted for investigation. The original risk assessment with re-weighted items and the re-developed risk assessment showed a greater difference in re-referral rates between low and high risk youth when compared to those the other two assessment versions.

Table D2 Findings for Subsequent Accepted Referral by Risk Assessment Version			
		Subsequent Accepted Law Referral	
	Total N	N	%
Total Sample	**2,911**	**551**	**18.9%**
1. Original Risk Assessment			
Low Risk	1,429	167	**11.7%**
Moderate Risk	888	207	**23.3%**
High Risk	594	177	**29.8%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	90	**9.6%**
Moderate Risk	1,664	358	**21.5%**
High Risk	312	103	**33.0%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	60	**7.6%**
Moderate Risk	1,790	384	**21.5%**
High Risk	329	107	**32.5%**
4. Re-Developed Risk Assessment			
Low Risk	776	59	**7.6%**
Moderate Risk	1,608	331	**20.6%**
High Risk	527	161	**30.6%**

The re-developed risk assessment and the original risk assessment with re-weighted items also achieved greater separation between youth classified as low risk and high risk when the observed outcome is subsequent petitioned law referrals (see Table D3).

Table D3 Findings for Subsequent Petitioned Law Referral by Risk Assessment Version			
		Subsequent Petitioned Law Referral	
	Total N	N	%
Total Sample	2,911	270	**9.3%**
1. Original Risk Assessment			
Low Risk	1,429	53	**3.7%**
Moderate Risk	888	105	**11.8%**
High Risk	594	112	**18.9%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	27	**2.9%**
Moderate Risk	1,664	177	**10.6%**
High Risk	312	66	**21.2%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	14	**1.8%**
Moderate Risk	1,790	182	**10.2%**
High Risk	329	74	**22.5%**
4. Re-Developed Risk Assessment			
Low Risk	776	14	**1.8%**
Moderate Risk	1,608	146	**9.1%**
High Risk	527	110	**20.9%**

Risk Assessment Classification Findings for Law Outcomes by Subgroups

Table D4 presents findings for the five risk assessment versions by gender when the outcome is subsequent law referral (accepted or not accepted). Overall, males were nearly twice as likely (96% more likely) to have a subsequent law referral than were females (base rates are 31.4% and 16.0%, respectively). Despite the significant difference in base rates, all four risk assessment versions classified both male and female youth such that an increase in the risk level corresponded to an increase in the re-referral rate for law offenses. The original assessment with revised cut points produced the greatest distinction between moderate risk males and high risk females.

Table D4

Findings for Subsequent Law Referral by Youth Gender

	Male			Female		
	Total N	Subsequent Law Referral		Total N	Subsequent Law Referral	
		N	%		N	%
Total Sample	2,018	634	**31.4%**	893	143	**16.0%**
1. Original Risk Assessment						
Low Risk	927	173	**18.7%**	502	45	**9.0%**
Moderate Risk	659	245	**37.2%**	229	53	**23.1%**
High Risk	432	216	**50.0%**	162	45	**27.8%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	592	85	**9.0%**	343	24	**7.0%**
Moderate Risk	1,190	416	**23.1%**	474	97	**20.5%**
High Risk	236	133	**27.8%**	76	22	**28.9%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	497	59	**11.9%**	295	18	**6.1%**
Moderate Risk	1,272	433	**34.0%**	518	99	**19.1%**
High Risk	249	142	**57.0%**	80	26	**32.5%**
4. Re-Developed Risk Assessment						
Low Risk	484	60	**12.4%**	292	17	**5.8%**
Moderate Risk	1,140	366	**32.1%**	468	81	**17.3%**
High Risk	394	208	**52.8%**	133	45	**33.8%**

Table D5 shows that when comparing risk assessment performance by ethnicity for the outcome subsequent law referral, the original risk assessment did not differentiate between moderate and high risk non-white youth as well as the other risk assessment versions did.

Table D5

Findings for Subsequent Law Referral by Youth Ethnicity

	White			Non-White		
	Total N	Subsequent Law Referral		Total N	Subsequent Law Referral	
		N	%		N	%
Total Sample	1,935	409	**21.1%**	968	366	**37.8%**
1. Original Risk Assessment						
Low Risk	1,124	157	**14.0%**	299	61	**29.8%**
Moderate Risk	543	160	**29.5%**	344	137	**51.5%**
High Risk	268	92	**34.3%**	325	168	**63.4%**
2. Original Risk Assessment with Revised Cut Points						
Low Risk	777	80	**10.3%**	152	29	**26.3%**
Moderate Risk	1,038	280	**27.0%**	625	232	**48.3%**
High Risk	120	49	**40.8%**	191	105	**68.1%**
3. Original Risk Assessment with Re-Weighted Items						
Low Risk	677	59	**8.7%**	111	18	**21.6%**
Moderate Risk	1,132	299	**26.4%**	655	232	**47.2%**
High Risk	126	51	**40.5%**	202	116	**68.8%**
4. Re-Developed Risk Assessment						
Low Risk	654	58	**8.9%**	118	19	**22.0%**
Moderate Risk	1,047	262	**25.0%**	559	185	**44.9%**
High Risk	234	89	**38.0%**	291	162	**67.0%**

STATUS OFFENSES

Table D6 shows that the risk assessment versions also classified youth such that an increase in risk level corresponded to an increase in the rate of subsequent status referrals.

Table D6

Findings for Subsequent Status Referral by Risk Assessment Version

	Total N	Subsequent Status Referral	
		N	%
Total Sample	2,911	316	**10.9%**
1. Original Risk Assessment			
Low Risk	1,429	105	**7.3%**
Moderate Risk	888	112	**12.6%**
High Risk	594	99	**16.7%**
2. Original Risk Assessment with Revised Cut Points			
Low Risk	935	50	**5.3%**
Moderate Risk	1,664	216	**13.0%**
High Risk	312	50	**16.0%**
3. Original Risk Assessment with Re-Weighted Items			
Low Risk	792	32	**4.0%**
Moderate Risk	1,790	232	**13.0%**
High Risk	329	52	**15.8%**
4. Re-Developed Risk Assessment			
Low Risk	776	30	**3.9%**
Moderate Risk	1,608	197	**12.3%**
High Risk	527	89	**16.9%**