

Department of Community Corrections & Rehabilitation
Office of Policy, Planning, and Evaluation

Validation of the Hennepin County Pre-Screener for Use in Initial Risk Assessment

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Introduction

Following the guiding principles of evidence-based practices¹, the Hennepin County Department of Community Corrections and Rehabilitation (DOCCR) uses a variety of general and specialized tools to assess actuarial risk/need to guide case assignment and intervention. To fill the need for a screening tool to assess risk at the point in entry into DOCCR, the Hennepin County Pre-Screener was developed based upon an adaptation of the Wisconsin DOC Risk Assessment². Subsequent revisions and expansion in use have been guided by strong research efforts. This validation study continues that guiding research support.

The initial development, pilot implementation, and monitoring of Pre-Screener performance were conducted beginning in 2001 by researcher Nancy Skilling, with documentation provided internally. Monitoring of the performance of the Pre-Screener consisted primarily of tracking the relationship between Pre-Screener and Level of Service Inventory scores. With results indicating a strong positive correlation ($r = .65$, $p < .001$), the Pre-Screener was initially implemented as a risk screen of primarily felony level offenders within the Central Intake Unit. Ms. Skilling completed a norming study, confirming the cut point of 14 or above for referral to traditional probation services.³ This was followed in early 2013 by a preliminary validation study for prediction of one to three year recidivism, with positive results for prediction of two year recidivism ($r = .30$, $AUC = .70$, $p < .001$) and further confirmation of the cut point of 14 or above.⁴ Of note was the finding of no significant correlation between recidivism and two items on the Pre-Screener, Alcohol Usage and Drug Usage.

¹Crime and Justice Institute & National Institute of Corrections (2009, October). *Implementing evidence Based Policy and Practice in Community Corrections*. U.S. Department of Justice. [Community Resources for Justice](#)

² Eisenberg, M., Fabelo, A., & Bryl, J. (2009, July) *Validation of the Wisconsin Department of Corrections Risk Assessment Instrument*. Lexington, KY: Counsel of State Governments Justice Center. [Council of State Governments Justice Center](#)

³ Skilling, N (2010, August). *Pre-Screener Norming Report*. Hennepin County Community Corrections and Rehabilitation: www.co.hennepin.mn.us

⁴ Skilling, N (2013, January). *Preliminary Adult Pre-Screener Validation Report: 1-Year to 3-Year Recidivism Analysis*. Hennepin County Community Corrections and Rehabilitation: www.co.hennepin.mn.us

With research data providing evidence of its value as an intake risk screen, the use of the Pre-Screener was expanded beyond felony offenders. Clients processed by the Misdemeanor Investigations Unit were also assessed beginning in October of 2012. Additional cut-point analysis was conducted in mid-2013 to set a second cut-point of 22 or above, resulting in a three category risk classification (Low 0 -13, Moderate 14 - 21, High 22+).⁵ After one year of use with this expanded client population, norms were updated to confirm the continued use of existing cut-points with this expanded population.⁶ An analysis of internal consistency of items as well as previous research findings regarding item performance lead to modifications in some item scoring criteria. Most notably, the Alcohol Usage scoring was modified to more closely align with recidivism outcomes for DWI offenders.

The use of the Pre-Screener as an initial risk screen was expanded during 2012 to include Misdemeanor Investigations intakes.

In 2014, the use of the Pre-Screener was expanded further within DOCCR to include a subpopulation of the Adult Corrections Facility (ACF). Inmates with in-house stays were assessed. Assessments aided in decisions regarding referral for interventions provided through the Hennepin County Transition from Jail to Community Initiative⁷. As part of research of another risk tool, the Pre-Screener was validated with this ACF subpopulation in early 2018.⁸ While the Pre-Screener was found to be a valid predictor of recidivism with this subpopulation ($r = .25$, $AUC = .66$, $p < .001$), its reduced predictive accuracy with the major demographic group (Black males) was a concern ($AUC = .60$, $p < .001$). Based upon this finding, the Pre-Screener was discontinued in use at the ACF.

⁵ Skilling, N (2013, June). *Cut-point Analysis for Hennepin PreScreener*. Hennepin County Community Corrections and Rehabilitation: www.co.hennepin.mn.us

⁶ Nonemaker, D. (2013, September). *Online Pre-Screener Norming Report*. Hennepin County Community Corrections and Rehabilitation www.co.hennepin.mn.us

⁷ Willison, J., Warwick, K. & Kurs, E. (2016, June). *Transition from Jail to Community (TJC) Initiative: Implementation Success and Challenges in Hennepin County, Minnesota*. Crime and Justice [Transition from Jail to Community Initiative](#)

⁸ Nonemaker, D. (2018, March). *Development of the Hennepin County Service Priority Indicator – Revised: Adapted for Use at the Adult Corrections Facility*. Hennepin County Community Corrections and Rehabilitation www.co.hennepin.mn.us

The Pre-Screener is currently used as a risk screen at the post-sentence point of entry of clients into the DOCCR adult probation system. The level of supervision and case assignment referrals are then determined based upon the type of probation offense and the risk classification of the client. For instance, a client with a domestic-related probation offense and a high risk classification on the Pre-Screener might be referred for high level traditional probation services within the Domestic Unit.

Pre-Screener risk classification is currently used to inform level of supervision and case assignment referrals.

The data-driven development of this risk screen tool continues with the present study, an updated validation analysis. This research is important for several reasons. The client population assessed for risk with the Pre-Screener has expanded since the previous validation analysis. The validity and predictive accuracy must be confirmed with this broader population. The scoring of the Alcohol Usage item has also been modified in the intervening years. Any change in content or scoring of an assessment instrument requires revalidation. Finally, periodic reevaluation of the effectiveness of interventions and assessments is an important component of evidence-based practices. Revalidation assures that the tool continues to be predictive. This also allows for exploration of data patterns with the goal of further improving the performance of the tool.

It is clarifying to define the concepts that are the basis for this validation study. Validity answers the question of whether this assessment tool measures risk to reoffend. Predictive accuracy refers to the degree to which the tool makes accurate predictions, given evidence that it is a valid tool. When thinking of accuracy in risk prediction, it is important to understand that measurement of risk to reoffend is not a direct measure of an individual's future behavior. It is a measure of the group risk classification of that individual.⁹ If the assessment has good predictive accuracy, the percentage of low risk individuals who reoffend will be low and the percentage of high risk individuals who reoffend will be high. There is no expectation of perfect prediction in the measurement of risk.

The most direct measure of risk to reoffend is recidivism, the conviction for an offense occurring after the assessment. Though this is perhaps the best measure available for evaluating the accuracy of general risk prediction, it is still an estimate. As mentioned previously, risk to reoffend is not certainty, but rather the likelihood of re-offense. Also, not all those

⁹ CSG Justice Center Staff (2015, March). *Risk Assessment: What You Need to Know*. The Council of State Governments [CSG Justice Center](#)

who reoffend are charged and convicted. The DWI offender may again drink and drive without being arrested. Opportunity to reoffend may vary to affect the occurrence of recidivism. For instance, the high risk domestic abuse offender may not currently have any relationships where further abusive behavior can be acted out. Finally, risk to reoffend is not a static characteristic of an individual, but rather can change over time. For example, the interventions implemented during probation may reduce risk following risk assessment. A change in circumstances of an individual, such as loss of employment or residence, may increase their risk during the recidivism time frame. In current events, the perpetrator of acts of terrorism is often described as having been radicalized. This is an example of a rare but extremely dangerous risk factor, where an association with a group with extreme beliefs greatly escalates an individual's risk for acts of violence. Conversely, the withdrawal from that group association can reduce risk of violent behavior. Such changeable risk factors are said to be dynamic, as opposed to static risk factors such as criminal history.¹⁰ All of these sources of outcome inaccuracy may act to reduce the statistical measurement of predictive accuracy, especially within small samples. Still, recidivism is a powerful outcome measure. With a sufficient sample size, statistical finding regarding validity and predictive accuracy can be interpreted with confidence that they meaningfully reflect the performance of the tool.

Recidivism is perhaps the best outcome measure available for evaluating the accuracy of measures of risk to reoffend.

Beyond the validity and predictive accuracy of the Pre-Screener with the total sample, DOCCR is an equity based organization. Therefore, the performance of the Pre-Screener for gender and racial subgroups is of importance. In addition to the need for a risk assessment tool to be similarly predictive across these subgroups, it should be a fair and predictively unbiased assessment. Fairness is displayed when the same score results in similar recidivism rates across demographic subgroups. The proportion of types of presumed errors, misclassification of recidivists versus misclassification of non-recidivists, should ideally also be similar in comparison. Item bias is exhibited when there are differences in the scores of specific risk factors that cannot be attributed to outcomes when comparing demographic subgroups. Item bias may require modification of item content, changes in the scoring criteria, or even removal of biased items. The disparate impact of risk prediction is also a concern. Predictive

The equity of risk assessment across demographic subgroups is of critical importance to DOCCR.

¹⁰ Desmarais, S. L. & Singh, J. P. (2013, March) *Risk Assessment Instruments Validated and Implemented in Correctional Settings in the United States* Lexington: Council of State Governments Justice Center [Counsel of State Governments Justice Center Publications](#)

disparity occurs when the proportions assigned to a risk classification are different when comparing demographic subgroups. Even when this proportional difference is accurately reflective of outcomes, predictive disparity should be minimized as much as possible and its impact considered in decisions regarding how the tool is used. Attaining all of these goals at once can be challenging, possibly requiring some compromises.¹¹

Though not the primary purpose of a validation study, item analysis is an important component of such a study. The data collected from administration of an assessment tool should always be viewed through the lens of possible improvements. The internal consistency of items gives an understanding of the interrelationship of risk factors, possibly detecting redundant or inconsistent items. The relationship of item scores to outcomes can suggest possible revisions to a scale. If there have been revisions to scoring, as is the case with scoring of the Alcohol Usage item of the Pre-Screener, the effectiveness of the revisions need to be evaluated. The evolution and continued improvement of assessment tools takes place primarily at this item analysis level.

Item analysis is an important component of a validation study.

Validation and predictive accuracy are evaluated based upon the full range of possible total scores. Typically, these total scores are then collapsed by setting cut points to classify risk levels for making decisions. Risk assessment and risk classification are related but distinct processes. While validity and predictive accuracy are characteristics inherent to the assessment tool, the risk categories used to classify levels of risk are not. Cut points for classification require reasonable accuracy while functioning effectively in meeting the screening needs of the organization. In actual application, a risk assessment is only as effective as its risk classifications. A risk screen with excellent predictive accuracy but risk categories that are poorly distinguished can lead to poor screening decisions. In contrast, a risk screen may have very accurate risk categories that are not effective because they provide screening decisions that are not aligned with the resources of the organization. Once data analysis establishes the base requirement of validity and predictive accuracy, the analysis of risk classification becomes of equal importance in determining the current effective use of a risk screen. This includes determining outcome differences across risk categories, error rates within risk categories, and

Risk assessment and risk classification are related but distinct processes.

¹¹ Skeem, J. L. & Lowenkamp, C. T. (2016, November) *Risk, Race, and Recidivism: Predictive Bias and Disparate Impact*. *Criminology*, Volume 54, Issue 4.

whether categories provide decision points that are aligned with the available resources of the organization.

The present study will complete an analysis of the validity and predictive accuracy of the Pre-Screener with a large sample of assessments administered beginning in 2013, using recidivism as an indicator of risk to reoffend. Since approximately half of intake assessments are completed for DWI offenses, the tool will be validated for DWI and non DWI subgroups. This analysis will also be completed for all gender and major racial subgroups. In addition, fairness of the Pre-Screener when comparing gender and major racial subgroups as well as the presence and impact of predictive disparity will be explored. The performance of current risk categories in distinguishing levels of risk to reoffend will be evaluated. Item analysis will look for evidence of biased content for any demographic subgroups. It may also suggest revisions that improve predictive performance, with specific attention to the performance of the risk factor of Alcohol Usage. It has performed poorly in past research analysis and its scoring has been revised to improve performance. Item analysis will determine whether the changes in scoring of this item have been helpful or whether further revisions or elimination of this item are necessary. Finally, with a small subset of assessments, intake procedures lead to the completion of a Pre-Screener assessment without the client present. In this circumstance, information is not available for the accurate scoring of some risk factors. Given a sufficient sample size, an analysis of these assessments will guide recommendations regarding the continued use of the Pre-Screener without the client present.

From prior research, much is already known about the characteristics of the Pre-Screener and its past performance in prediction of risk. This research context enhances meaningful interpretative insight into the patterns in current data. The results of this analysis add to that understanding and to the continued development of the Pre-Screener. This study also contributes to the body of general risk assessment research. The analysis of the fairness, possible sources of bias, and predictive disparity of the Pre-Screener across demographic subgroups aligns with the equity focused goals of DOCCR. Finally, this research study adds to a growing and much needed body of research regarding equity in risk assessment within community corrections.

In addition to validation analysis, this study will provide a comprehensive view of the performance of the Pre-Screener.

Methodology

The validation sample is comprised of clients with Pre-Screener assessments completed between January 1st, 2013 and May 1st, 2016 (N = 11,060). The full sample is available for determination of one year recidivism. Smaller samples are available for two year (N = 6441) and three year recidivism (N = 3362). For those with multiple assessments during the sample time frame, only the first assessment is retained. Due to record matching constraints for collection of recidivism data, those with non-Minnesota intake offenses are excluded from the sample (N=60). Only those with a one year recidivism time frame plus one year for case outcomes to resolve are included in the sample. The recidivism period is adjusted for those with confinement time at the Adult Corrections Facility (ACF). Sample demographic and intake offense information are obtained from the Court Services Tracking System (CSTS). Recidivism and criminal history data is provided by the Automated Recidivism (MNCED) application, relying upon data from the Minnesota Court Information System (MNCIS).

Sample demographic variables include age at assessment, gender, and race. Intake offense variables include offense level, rank, and type. Definitions of types and ranks of offenses can be found in Appendix B. Pre-Screener variables include assessment date, assessment unit, client presence, item scores, total score, risk classification, override status, and referral unit. Criminal history variables include number of prior convictions, number of prior felony convictions, number of prior public safety relevant convictions, and criminal history score. Recidivism is defined as the occurrence of a misdemeanor or above offense within the recidivism period resulting in a subsequent conviction. Recidivism variables include one, two, and three year recidivism, days to recidivism, number of recidivism offenses, number of felony recidivism offenses, number of public safety relevant recidivism offenses, and recidivism score.

The primary prediction or outcome variable is one year recidivism, with secondary outcomes of two and three year recidivism. The independent or predictive variable is Pre-Screener total score. Subgroup variables include current DWI offense, gender, race, assessment unit, and client presence.

Statistical procedures include subgroup means, frequencies and percentage comparisons, Pearson R correlation, Independent Sample T-test, Chi-Square, Reliability Analysis, Cramer's V, Logistics Regression, Cook's distance, ROC curve, and AUC diff analysis. Analysis utilizes SPSS

The validation sample is comprised of 11,060 offenders with assessments from 2013 through mid-2016.

The primary outcome variable is one year recidivism, with two and three year recidivism as secondary outcome variables.

and R statistical software. For this validation study, AUC values at or above .600 are considered confirmation of validity. For predictive accuracy, AUC values of .600 to .639 are considered to be fair, .640 to .699 are considered good, and .700 or above are considered excellent.¹² Differences between groups are reported when there is a statistical probability of less than five percent that such differences are due to random variation ($p < .05$).

Sample Description

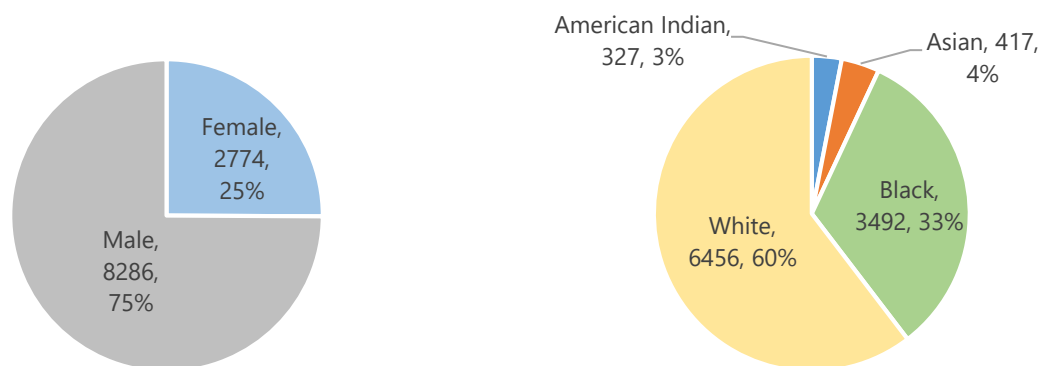
Demographics

The sample is primarily male (75%) and the majority have a racial designation of White (58%) followed by Black (32%) (See Figure 1). The most frequent age range is 22 to 30 (37%), though the average age is 35 years. Appendix C lists detailed summaries of sample demographic characteristics, with highlights listed below.

The sample is predominantly male (75%) with the majority identifying as White (58%).

- Female representation within racial groups is lowest among Blacks (20%) and highest among American Indians (42%).
- Males are slightly older on average (35.24 years) compared to females (34.52 years), a significant difference ($t = -2.94, p < .003$).
- There are significant differences in age across major racial groups ($F = 35.14, p < .000$), with Whites oldest on average (35.96 years) and Asians youngest (32.11 years).

Figure 1. Gender and Racial Percentages of the Validation Sample



¹² Desmariais, S. and Singh, J. (2013). "Risk Assessment Instruments Validated and Implemented in Correctional Settings in the United States: An Empirical Guide" [Council of State Governments Justice Center](#)

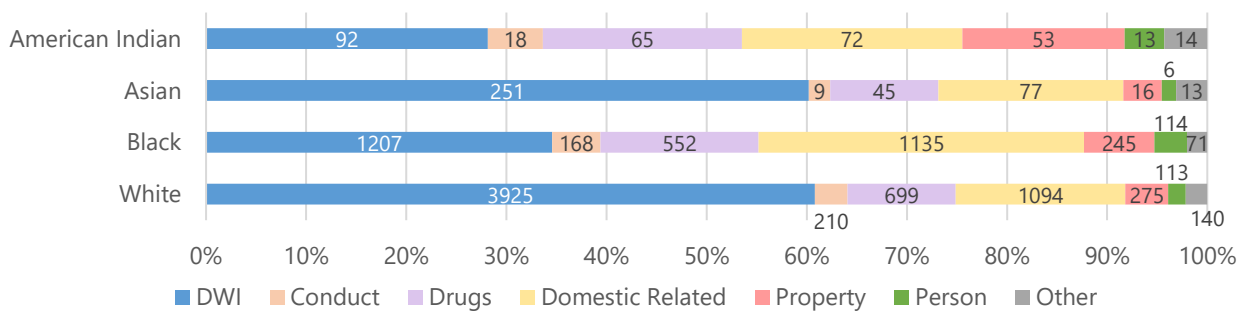
Intake Offense

Booking offenses are sorted into seven (7) offense categories, including Drug, Property, Person, DWI, Conduct, Domestic Related, and Other. Summary statistics, and comparisons across demographic groups can be found in Appendix D, with highlights listed below.

- Conduct offenses are most frequent for those who are 21 or younger (26%).
- DWI booking offenses are most common for White and Asian racial subgroups (61% and 60%, respectively). See Figure 2.

DWI offenses are more common for Asian and White racial subgroups (61% and 60%).

Figure 2. Percentage of Intake Offense by Racial Designation*



*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution & Traffic.

Recidivism

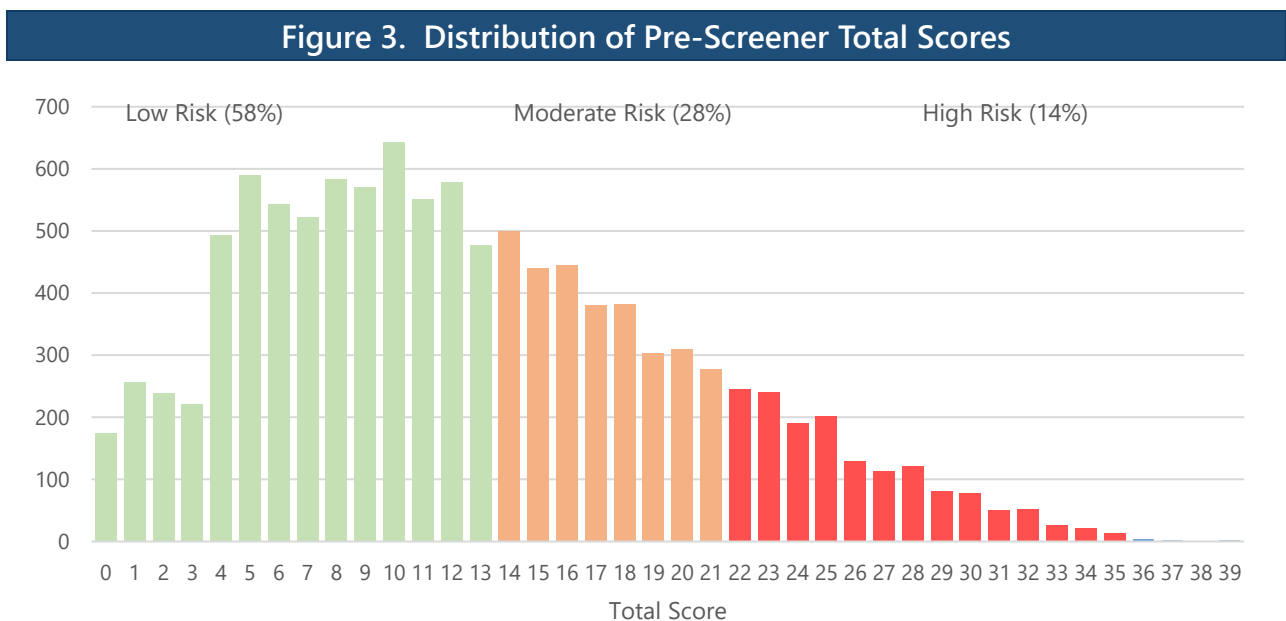
The one year recidivism rate for the total sample is 17.5%, with a three year recidivism rate for a partial sample (N = 4688) of 28.3%. Appendix E provides a detailed summary of recidivism variables across demographic and offense category subgroups. Major findings are listed below.

- Males have a higher one year recidivism rate (18.8%) compared to females (13.6%).
- American Indians (33.3%) and Blacks (26.9%) have more frequent one year recidivism compared to Whites (12.7%) and Asians (10.6%).
- American Indian males have the highest rate of one year recidivism of any racial/gender subgroup (38%).
- One year recidivism rates decrease with age, from 28.7% for those 21 or younger to 10.5% for those over 50 years of age.
- DWI offenders have the lowest rate of one year recidivism (10%), with the highest rates among those with property offenses (38.5%).

DWI offenders have the lowest one year recidivism rate (10%).

Pre-Screener Scores

The Pre-Screener is comprised of twelve risk factors with a maximum total score of 39 and three risk categories (See Appendix A). It is scored by a probation officer primarily during an interview with the client, with thirteen percent (13%) of sample assessments completed without the client present. For the full validation sample, the average Pre-Screener score is 12.8 (SD = 7.5). Figure 3 displays the frequency distribution of total scores for the full validation sample.



Appendix F provides a detailed summary of total scores and comparisons across demographic and offense category subgroups, with highlights listed below.

- Scores are significantly different across gender subgroups ($t = -16.79, p < .000$), with males scoring higher (13.4) on average compared to females (10.9).
- Average scores for American Indians (17.4) and Blacks (15.7) are significantly higher ($F = 334.27, p < .000$) than those for Whites (11.4) and Asians (10.8).
- American Indian males have the highest average score of any racial/gender subgroup (18.0).
- Average total scores decrease with age, from 14.3 for those 21 or younger to 10.9 for those over 50 years of age.
- DWI offenders have the lowest average score (10.1), with the highest score among those with property offenses (15.8).

Scores are higher for American Indians (17.4) and Blacks (15.7) compared to Whites (11.4) and Asians (10.8).

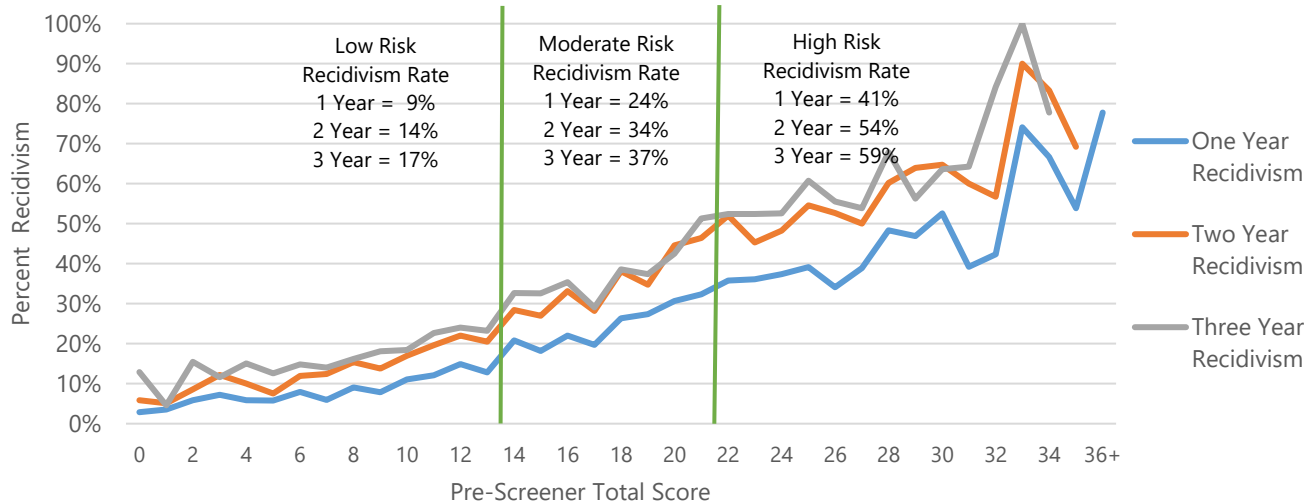
Analysis of Performance of the Pre-Screener

Full Sample Validation

There is a significant positive relationship between total score on the Pre-Screener and the primary outcome variable of one year recidivism (Pearson R = .32, $p < .000$). A positive correlation indicates that those with higher Pre-Screener scores are more likely to reoffend within one year than those with lower scores. The relationship of scores is stronger with smaller samples for the secondary outcome variables of two year (Pearson R = .35, $p < .000$, N = 8600) and three year (Pearson R = .35, $p < .000$, N = 4688) recidivism. This provides evidence of the validity of the Pre-Screener as a measure of risk to reoffend. This is visually depicted in Figure 4 with one year recidivism rates for each score of the Pre-Screener. Risk category recidivism rates are also listed.

Those with higher Pre-Screener scores are more likely to subsequently reoffend.

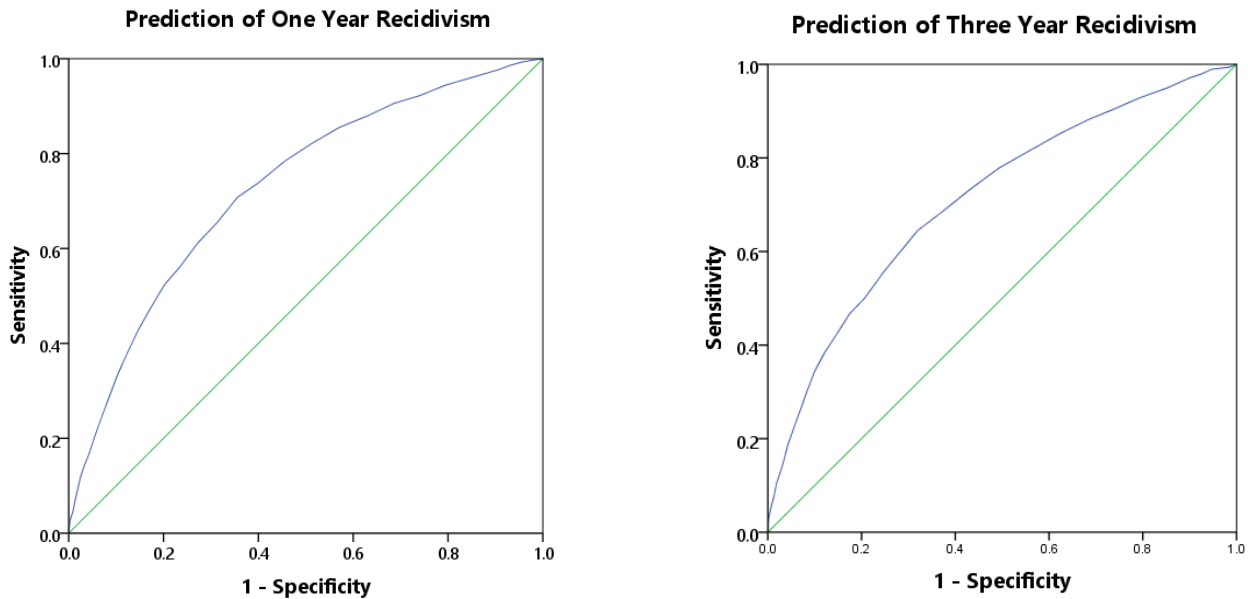
Figure 4. Percent of Recidivism by Pre-Screener Total Score



A ROC curve analysis for goodness of fit provides further confirmation of the sensitivity (correctly predicting recidivism) and specificity (correctly predicting no recidivism) of the Pre-Screener. With a diagonal line indicating performance at chance level, the resulting curve above the diagonal line visually represents the 'area under the curve' or AUC. A larger area indicates greater predictive benefit. Figure 5 displays the ROC curves for prediction of one year recidivism (AUC = .728, $p < .000$) and three year recidivism (AUC = .712, $p < .000$). These values greatly exceed the AUC of .600, the minimum criteria in this study for determining that the Pre-Screener is a valid measure of risk to reoffend.

ROC curve analysis confirms the validity of the Pre-Screener as a measure of risk to reoffend.

Figure 5. ROC curve for Pre-Screener Prediction of One Year and Three Year Recidivism



Full Sample Predictive Accuracy

With a positive answer to the question of whether the Pre-Screener is a valid measure of risk to reoffend, it is of practical importance to determine the predictive power of the measurement. There are several perspectives from which to view predictive power.

One perspective is the predictive power of the full range of total scores. The AUC results give an objective yet intuitive indicator of predictive power from this perspective. If we used Pre-Screener total scores of two individuals, one who will not reoffend and one who will, and predicted the recidivist as the individual with the higher score, the AUC value tells us the percentage of accurate predictions we will make, within the confidence interval boundaries. While an area above .60 is the minimal evidence of validity in this study, an area above .70 is considered excellent predictive power.

Table 1 provides a summary of Pearson R correlations as well as AUC values and confidence intervals for both primary and secondary outcome variables. All of these results can be viewed with great statistical confidence ($p < .001$). From the perspective of predictive power of the full range of total scores, these results indicate that the Pre-Screener is an excellent predictor of recidivism both within one year and over longer periods when recidivism rates have neared stabilization.

Utilizing the full range of total scores for risk prediction, the Pre-Screener displays excellent predictive accuracy.

Table 1. Pre-Screener Correlation and AUC by Recidivism Period				
Outcome Variable	Pearson R Correlation	AUC	AUC Confidence Interval	
			Lower	Upper
One year recidivism	.32*	.728*	.715	.740
Two year recidivism	.35*	.725*	.713	.738
Three year recidivism	.35*	.712*	.695	.728

**Significant at the .001 level (2-tailed).*

While adequate statistical accuracy over the full range of scores is necessary for its effective use, it is not a guarantee of predictive accuracy in applied settings. Most often, the scores of risk assessments are used as the basis for risk categorization. These categories are then the decision points upon which accurate decisions are made. An evaluation of the practicality, differentiation, and error rate of the current risk categories of the Pre-Screener provides this applied accuracy perspective.

The primary outcome measure of one year recidivism is used to evaluate applied accuracy for several reasons. Additional input from probation officers, more extensive risk assessment, and the behavior of the probationer may impact more long term behavior. The prediction of more immediate behavior is most critical for an initial screening assessment of risk. Also, some risk factors may change over time. A greater distance between assessment and collection of outcome measures may weaken the connection between prediction and outcome. In addition, longer outcome periods allow for a greater confounding effect from probation interventions, since the Pre-Screener is currently used for case assignment decisions. Finally, the one year recidivism outcome variable allows for analysis of the full validation sample as well as including the most current assessment data.

The performance of the Pre-Screener risk categories determines its applied usefulness.

Two types of errors are possible with risk classification. A false positive error occurs when an individual is classified as high risk and subsequently does not reoffend. This error is most impactful for that individual. A false negative error occurs when an individual is classified as low risk and subsequently reoffends, an error most impactful for the community. While the goal of risk classification is minimizing both types of errors, the priority is generally given to minimizing false negative errors.¹³

¹³ Wilkins, L.T. (1985). "The Politics of Prediction" In Farrington, D. & Tarling, R. (eds.) *Prediction in Criminology*. New York: SUNY Press.

Figure 6 displays the frequency distribution of one year recidivists and non-recidivists across totals scores of the Pre-Screener. Drop lines distinguish the current risk categories. More than half (58%) of the validation sample is classified as Low Risk, with 14% as High Risk. This classification provides practical decision points for the effective use of intervention resources within DOCCR. The cut points for risk categories appear well placed, based upon the interaction of these two distributions. The cut point distinguishing low from moderate/high risk is the most important in screening. Viewing the proportion of recidivists at this cut point (14) where individuals are shifted from low to moderate risk, the recidivism rate for those with this score is 21%. If the cut point were lowered by one to 13, those shifted to moderate risk would have a recidivism rate of 13%. The current cut point is therefore considered optimally placed. It is placed at a point that prioritizes minimizing false negatives while balancing the need for a useful risk screen. This addresses public safety concerns. The cut point between moderate and high risk appears to prioritize reducing false positives, minimizing the consequences of an individual falsely labeled as a high risk offender. For the development of a three level categorization of risk, this is a well-balanced methodology.

More than half (58%) of the validation sample is classified as low risk to reoffend.

Figure 6. Distribution of One Year Recidivists and Non-recidivists

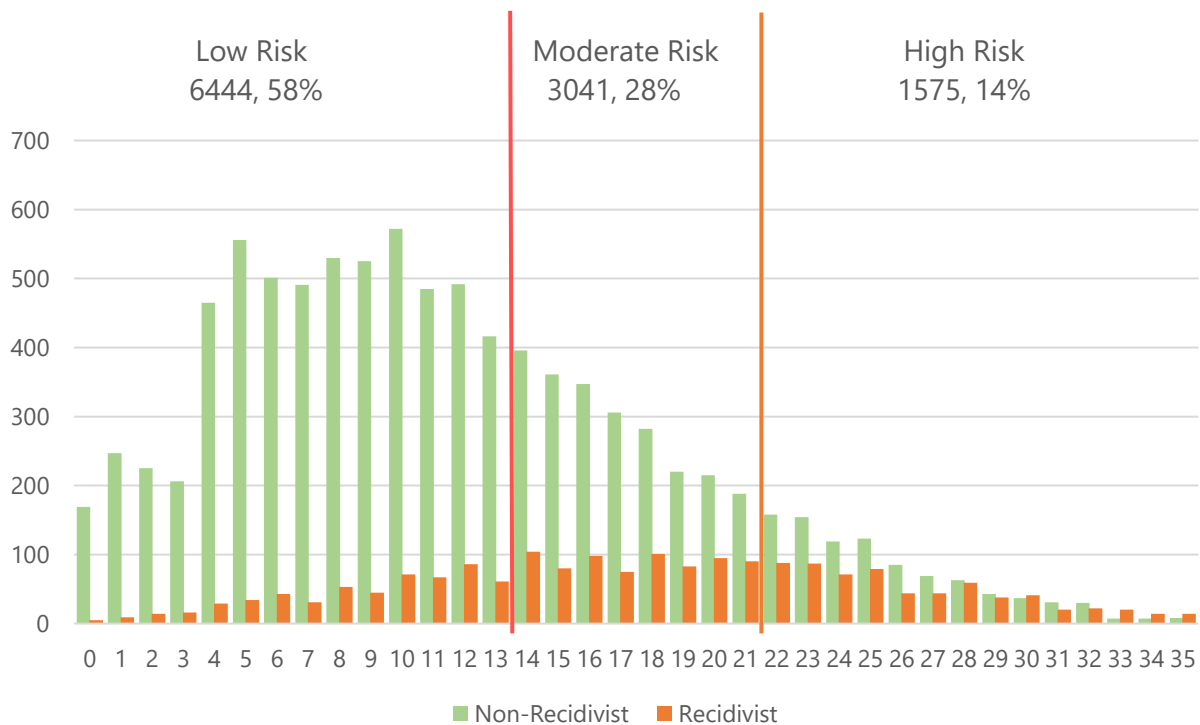


Table 2 presents the one year recidivism contingency table across risk categories, with the two types of errors denoted by red shading. Recidivism rates for each risk category are also shown.

Table 2. Summary of Pre-Screener Risk Categories				
	Pre-Screener Risk Category			
One Year Recidivism	Low Risk	Moderate Risk	High Risk	Total Sample
Not Recidivist	5880 65%	2315** 25%	934*** 10%	9129 100%
Recidivist	564* 29%	726 38%	641 33%	1931 100%
	*False Negative Error.	**False Positive Error.	***False Positive Error	
One Year Recidivism Rate*	9%	24%	41%	18%
*False Negative Error **False Positive Error				

One year recidivism rates are highly distinguished across risk categories (Cramer's $V = .303$, $p < .001$). With 29% false negative and 35% false positive errors, these results show a good balance of error types with priority given to minimizing errors most relevant to public safety. Additionally, 65% of non-recidivists are classified as low risk while 71% of those who subsequently reoffend are moved to moderate and high risk categories. With only 10% of false positive errors within the high risk category, the negative impact of such errors for individuals is also minimized.

Almost two thirds (65%) of non-recidivists are classified as low risk while more than two thirds (71%) of recidivists are classified as moderate or high risk.

The primary outcome variable of one year recidivism is a dichotomous (yes/no = 1/0) variable. While this is an appropriate outcome measure for validation of a risk screen, recidivism in this measure includes a broad range of behaviors from misdemeanor traffic to felony assault offenses. More specific information regarding the nature of recidivism is analyzed in this study. This includes number of days from assessment to first re-offense, number of felony re-offenses, number of public safety relevant re-offenses, and recidivism rank score. Public safety relevant offenses are those most likely to impact public safety, including person, domestic related, and criminal sexual offense types. For those who reoffend within one year, Table 3 compares these variables across risk categories. Those within the low risk category are instances of a false negative error, where there may be concern regarding the public safety impact of classifying a recidivist as low risk.

Table 3. Summary of Recidivism Variables across Risk Categories *				
Recidivism Characteristics	Pre-Screener Risk Category (Recidivists Only)			Total Average
	Low Risk	Moderate Risk	High Risk	
Average Days to Recidivism**	168	161	141	156
Average Felonies**	0.28	0.42	0.55	0.42
Average Public Safety Relevant Offenses**	0.19	0.29	0.45	0.31
Average Offense Rank Score**	16	19	24	20
<small>*All summaries are calculated based upon the subgroup of recidivists within one year (excluding non-recidivists). **Significant differences at the .001 level (2-tailed)</small>				

There are significant differences across risk categories for all specific recidivism variables based upon Analysis of Variance ($p < .001$). As the level of risk increases, average number of felonies and public safety relevant offenses increase. The average offense rank score also increases. Finally, days from assessment to first re-offense decrease with increased risk levels. These results are particularly relevant to the false negative errors in risk classification, those instances when an individual is classified as low risk and subsequently re-offends. The recidivism of those classified as low risk are likely to be less serious, and less impactful to public safety compared to re-offenses occurring within higher risk categories.

The recidivism of those classified as low risk is less likely to negatively impact public safety compared to higher risk categories.

Analysis of Overrides

The override function of the Pre-Screener allows the assessor to modify the risk classification. This most often would involve raising the risk level due to factors not assessed such as a clearly displayed mental health issue. Overrides exceeding 10% of assessments point to problems either in the assessment tool or in the training of assessors. The percent of overrides in sample assessments is less than 1%, a very low occurrence. The majority of the overrides (55%) are adjustments downward, another unusual occurrence. When comparing override risk classification changes with one year recidivism outcome, no positive gain in accuracy of predictions is evident. These comparisons can be seen in Table 4. With such a small sample of overrides, these results must be interpreted with great caution.

An override of a Pre-Screener risk classification is a very rare occurrence.

Override Adjustment	One Year Recidivism Sample			Outcome Recidivism Rate
	Pre-Screener Risk Classification	N	Override Classification	
Downward	Moderate	51	Low	18%
	High*	8	Moderate	50%
Upward	Low	44	Moderate	16%
	Moderate*	5	High	20%

*Interpret with caution due to small sample size.

Analysis of Assessment Location

The two units where the vast majority of Pre-Screener assessment are completed (98%) are Central Intake (48%) and Misdemeanor Investigations (50%). Central Intake processes the probation intake of felony (36%) and gross misdemeanor (51%) offenders, while Misdemeanor Investigations processes targeted misdemeanors (51%) offenders in addition of select gross misdemeanors (48%). Detailed summaries of demographic and intake offense variables comparing these two assessment units can be found in Appendix G. Table 5 compares the performance of the Pre-Screener across these two units.

Assessment Unit	Summary of Variables		Prediction of One Year Recidivism		
	Average Pre-Screener Score*	Recidivism Rate	Pearson R Correlation	AUC	AUC Diff
Central Intake	12.0	18%	.31*	.726*	-.717 p=.474
Misdemeanor Investigations	13.5	17%	.33*	.736*	

*Significant at the .001 level (2-tailed)

The Pre-Screener total scores display a strong positive relationship to one year recidivism and excellent predictive accuracy within both assessment units. There is no statistically discernable difference¹⁴ in its performance as a risk screen when comparing assessment units. One year recidivism rates are also similar across locations. Total scores are slightly higher within Misdemeanor Investigations compared to Central Intake.

The Pre-Screener performs similarly across assessment units.

¹⁴ Hanley, J. A. & McNeil, B. J. (1982). *The Meaning and Use of the Area Under a Receiver Operating Characteristic (ROC) curve*. Radiology, 143, 29-36.

Time Series Trends

With a sample of complete years from 2013 through 2015, an investigation of any changes in the performance of the Pre-Screener over time is possible. Such changes may point to changes in risk factors, changes in the assessment population, or training issues. Table 6 provides comparisons of full years sample sizes, average total scores, recidivism rates, correlations, and AUC values, with one year recidivism as the outcome variable.

Assessment Year	Summary of Variables			Prediction of One Year Recidivism	
	N	Average Pre-Screener Score*	Recidivism Rate	Pearson R Correlation	AUC
2013	2824	12.81	16%	.34**	.743*
2014	3300	13.18	18%	.31**	.723*
2015	3835	12.15	18%	.32**	.728*

*Significant at the .001 level (2-tailed)

Beyond some loss of predictive accuracy after 2013, as indicated by AUC values, no clear time trend patterns are apparent in the comparison of the performance of the Pre-Screener over three years. This loss of accuracy may be related to the performance problems evident in the Alcohol Usage risk factor. When viewing the Pearson R correlation of this item with one year recidivism across years, year 2013 shows no relationship while during years 2014 and 2015 there is a significant negative correlation. One further comparative view is presented in Table 7, displaying one year recidivism rates across risk categories and years. Though some variability is evident across years, the distinction between risk categories is strong each year.

No discernable patterns of changes in performance over time were evident with the Pre-Screener.

Assessment Year	Pre-Screener Risk Categories		
	Low Risk	Moderate Risk	High Risk
2013	8%	19%	44%
2014	9%	26%	39%
2015	9%	25%	42%

Client Not Present

For the total validation sample, almost thirteen percent (12.9%) of assessments were completed without the client present. Table 8 gives a comparative summary of assessments with clients present versus clients not present.

Client Status	Summary of Variables			Prediction of One Year Recidivism		
	N	Average Pre-Screener Score**	Recidivism Rate**	Pearson R Correlation	AUC	AUC Diff
Present	9635	12.33	16%	.31**	.728**	-2.11* p = .035
Not Present	1425	15.80	26%	.29**	.689**	

*Significant at the .05 level (2-tailed) **Significant at the .001 level (2-tailed)

The Pre-Screener displays good accuracy for assessments with the client not present. However, there is some loss of accuracy compared to assessments with the client present ($p < .05$). Other comparative differences include significantly higher average scores and one year recidivism for assessments with the client not present.

Males are assessed while not present slightly more often (13.8%) compared to females (10.3%). Percentage differences are more pronounced across racial subgroups as can be seen in Figure 7. These assessments are more frequent among American Indians (23%) and Blacks (17%) compared to Whites (11%) and Asians (9%). Percentage differences across race are displayed in Figure 7. Assessments without the client present have been steadily increasing over time, with yearly percentages shown in Figure 8.

Assessments completed without the client present have steadily increased over time.

Figure 7. Client Not Present by Race

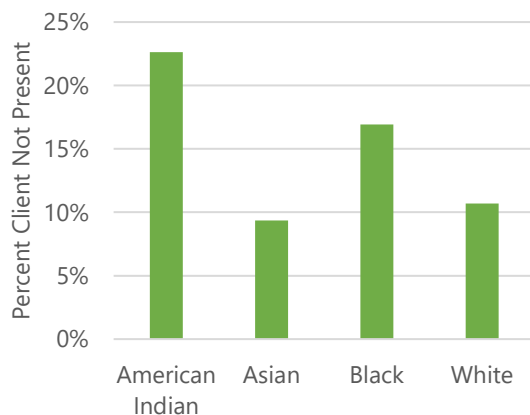
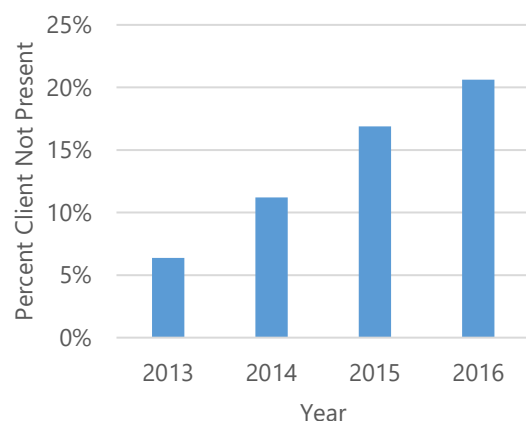


Figure 8. Client Not Present by Year



Item Analysis

Two sets of relationships are of importance in evaluating the performance of specific risk factors of the Pre-Screener. The first is the correlation of items with each other as well as with the total score. The second is the correlation of items with outcome measures. Table 9 presents the first set of relationships, the Pearson R intercorrelation of item scores. In viewing these relationships, internal consistency is displayed when items positively correlate with each other (>.10) and correlate well (>.20) with the total score.¹⁵ Item relationships that do not meet these conditions are shaded in red. The Alcohol Usage risk factor exhibits major problems with both of these conditions. Guttman's lambda 4 reliability measure (.581) is greatly improved with the exclusion of this item (.668), providing confirmation of consistency problems with this risk factor. If excluded, the resulting lambda 2 lower bound of reliability is .689.¹⁶

The Alcohol Usage risk factor exhibits problems in relation to other items and the total score.

Table 9. Pre-Screener Item and Total Score Intercorrelations

Items	Address Changes	Employment	Alcohol Usage	Other Drug Usage	Attitude	First Conviction Age	Prior Probations	Prior Revocations	Prior Felonies	Prior Burglary	Prior Bad Check or Forgery	Prior Assault
Address Changes	1.00	0.22**	0.03**	0.18**	0.12**	0.13**	0.02**	0.11**	0.12**	0.12**	0.05**	0.18**
Employment	0.22**	1.00	-0.01	0.28**	0.15**	0.14**	0.09**	0.18**	0.23**	0.24**	0.08**	0.16**
Alcohol Usage	0.03**	-0.01	1.00	0.03**	0.17**	-0.03**	0.08**	0.06**	-0.07**	-0.10**	-0.05**	-0.03**
Other Drug Usage	0.18**	0.28**	0.03**	1.00	0.14**	0.21**	0.09**	0.17**	0.24**	0.23**	0.08**	0.07**
Attitude	0.12**	0.15**	0.17**	0.14**	1.00	0.08**	0.08**	0.13**	0.11**	0.07**	0.01	0.21**
First Conviction Age	0.13**	0.14**	-0.03**	0.21**	0.08**	1.00	0.27**	0.24**	0.30**	0.35**	0.08**	0.13**
Prior Probations	0.02**	0.09**	0.08**	0.09**	0.08**	0.27**	1.00	0.35**	0.27**	0.24**	0.11**	0.02**
Prior Revocations	0.11**	0.18**	0.06**	0.17**	0.13**	0.24**	0.35**	1.00	0.43**	0.30**	0.15**	0.13**
Prior Felonies	0.12**	0.23**	-0.07**	0.24**	0.11**	0.30**	0.27**	0.43**	1.00	0.50**	0.27**	0.19**
Prior Burglary	0.12**	0.24**	-0.10**	0.23**	0.07**	0.35**	0.24**	0.30**	0.50**	1.00	0.23**	0.14**
Prior Bad Check or Forgery	0.05**	0.08**	-0.05**	0.08**	0.01	0.08**	0.11**	0.15**	0.27**	0.23**	1.00	0.03**
Prior Assault	0.18**	0.16**	-0.03**	0.07**	0.21**	0.13**	0.02*	0.13**	0.19**	0.14**	0.03**	1.00
Total Score	0.38**	0.43**	0.14**	0.40**	0.45**	0.57**	0.52**	0.64**	0.65**	0.55**	0.28**	0.46**

*Significant at the .05 level (2-tailed) **Significant at the .01 level (2-tailed)

¹⁵ DeVellis, R. F. (2003) *Scale development: Theory and applications (2nd Edition)*. Thousand Oaks, CA: Sage Publications, Inc.

¹⁶ Guttman, L. (1945) *A Basis for analyzing test-retest reliability*. *Psychometrika*, 10:4, 255-282.

The Pearson R correlation of item scores with one year recidivism variables is provided in Table 10. The correlation of items to one year recidivism is of primary importance. All other correlations are calculated for recidivists only. Otherwise, the influence of one year recidivism would dominate these correlations. The desirable result for these correlations would be a significant positive correlation. Correlations with insignificant or significantly negative correlations are shaded in light and darker red, respectively.

Table 10. Pre-Screener Item Correlations with One Year Recidivism Variables						
Items	Full Sample	Sample includes recidivists only.				
	One Year Recidivism	Total Recidivism Offenses	Public Safety Relevant Recidivism Offenses	Total Felony Recidivism Offenses	Recidivism Rank Score	Recidivism Level Score
Address Changes	0.13**	0.05*	0.11**	0.04*	0.09**	0.03
Employment	0.20**	0.17**	0.07**	0.12**	0.14**	0.16**
Alcohol Usage	-0.04**	-0.03	-0.02	-0.14**	-0.01	-0.05*
Other Drug Usage	0.15**	0.08**	-0.04	0.11**	0.05*	0.09**
Attitude	0.09**	0.07**	0.18**	0.02	0.14**	0.05*
First Conviction Age	0.19**	0.14**	0.03	0.11**	0.08**	0.13**
Prior Probations	0.12**	0.07**	0.02	0.08**	0.04	0.11**
Prior Revocations	0.19**	0.12**	0.03	0.13**	0.06**	0.16**
Prior Felonies	0.24**	0.16**	0.03	0.22**	0.12**	0.21**
Prior Burglary	0.24**	0.18**	-0.12	0.17**	0.07**	0.19**
Prior Bad Check or Forgery	0.08**	0.02	-0.06*	0.07**	-0.04	0.03
Prior Assault	0.17**	0.08**	0.30**	0.04	0.20**	0.04

*Significant at the .05 level (2-tailed) **Significant at the .01 level (2-tailed)

The risk factor of Alcohol Usage displays severe performance problems. These include a significant negative correlation to one year recidivism, and, among recidivists, either negative or insignificant correlations with all other outcome measures. Two other items have poor performance ($R < .10$), including Attitude, and Prior Bad Checks or Forgery. While the latter is weak in relation to all outcome variables, the Attitude item adds value with its relationship to Public Safety Relevant Recidivism Offenses. Items well related to one year recidivism ($r > .20$) include Employment, Prior Felonies, and Prior Burglary.

The Alcohol Usage risk factor is negatively correlated with one year recidivism.

A regression analysis of all risk factors for predicting one year recidivism (Model 1) is displayed in Table 11. The factor of Prior Bad Checks or Forgery does not contribute to risk prediction with the full validation sample. While the factor of Alcohol Usage is a significant predictor, it is being interpreted in a negative direction. In other words, this factor reduces risk prediction to a significant degree, leading to a deceptive measure of variance explained. Also included in Table 11 is logistics regression analysis of item prediction of one year recidivism with Alcohol Usage removed (Model 2) and with both Alcohol Usage and Prior Bad Checks/Forgery removed (Model 3).

Two risk factors do not contribute to prediction of one year recidivism.

Table 11. Logistic Regression Models of Pre-Screener Risk Factors			
Pre-Screener Risk Category			
Variables	Model 1	Model 2	Model 3
Address Changes	.109**	.106**	.106**
Employment	.274**	.277**	.277**
Alcohol Usage	-.112**	-	-
Other Drug Usage	.135**	.130**	.130**
Attitude	.039*	.030*	.030*
First Conviction Age	.132**	.134**	.134**
Prior Probations	.052*	.047*	.047*
Prior Revocations	.084**	.080**	.080**
Prior Felonies	.095**	.100**	.100**
Prior Burglary	.278**	.286**	.286**
Prior Bad Check/Forgery	-.002	.001	-
Prior Assaults	.127**	.128**	.128**
(Constant)	-2.938**	-3.011**	-3.011**
Variance Explained	17.6%	17.4%	17.4%
Model Chi Square	1240.980**	1230.071**	1230.070**
*Significant at the .05 level (2-tailed)		**Significant at the .01 level (2-tailed)	

With the risk factor of Alcohol Usage removed, the variance explained can be assumed to improve since this item was being used as a negative value in risk prediction. There is no difference in prediction of one year recidivism when the risk factor of Prior Bad Checks/Forgery is removed from the predictive model. This risk factor could be removed from the scale without impacting the performance of the Pre-Screener for the total sample. However, the predictive performance of this item for major gender and racial subgroups may be relevant and is investigated in subsequent analysis.

Analysis of DWI and non DWI Subgroups

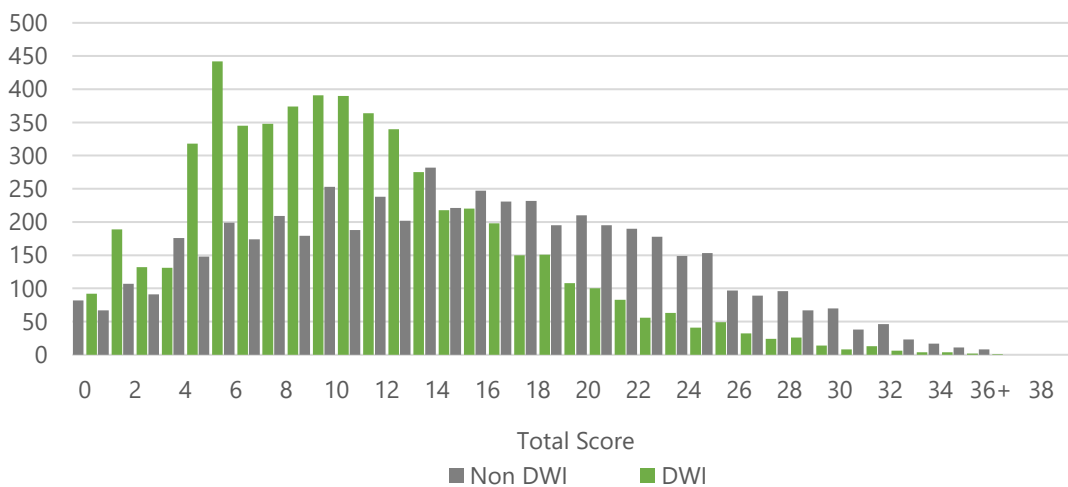
A little more than half (52%) of the sample is comprised of DWI offenders. There are significant differences in a variety of statistical characteristics of DWI offenders compared to clients with other offenses. A summary comparison of these two offense subgroups is provided in Table 12.

Offense Subgroup	Average Age	Average Score	One Year Recidivism
DWI	33.8	10.6	10%
Non DWI	36.2	15.1	26%
Total Sample	35.1	12.78	18%

All subgroup differences are significant at the .001 level (2-tailed)

There is a major contrast in the distribution of Pre-Screener scores, with non DWI scores displaying a normal distribution while DWI scores are skewed to the right, as shown in Figure 9.

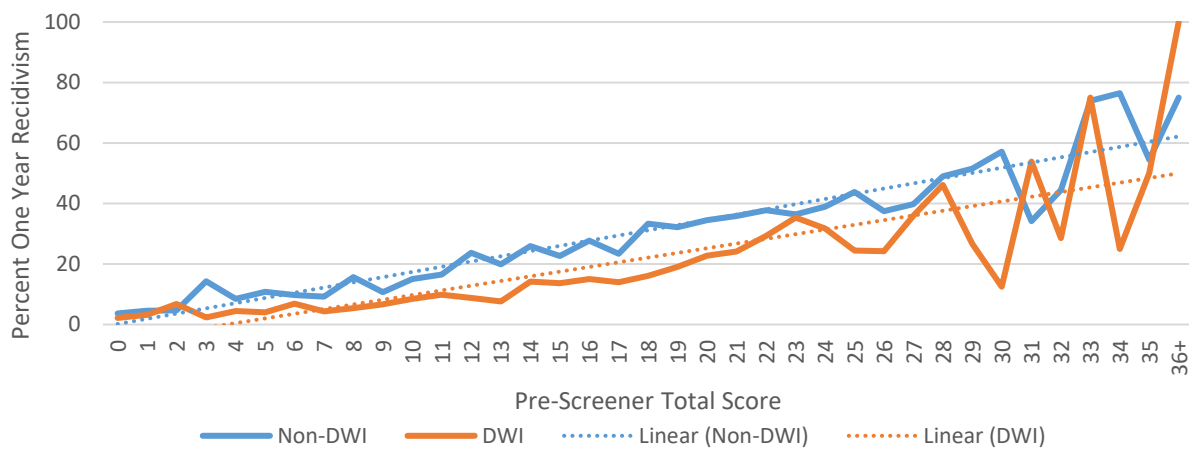
Figure 9. Distribution of Pre-Screener Scores by DWI and Non-DWI Subgroups



There is a significant positive correlation between Pre-Screener scores and one year recidivism for both DWI (Pearson R = .23, $p < .001$) and non DWI subgroups (Pearson R = .29, $p < .001$), with a significant difference in the correlational relationship ($p < .001$). The low comparative base rate of recidivism for DWI offenders can distort correlational analysis. Correlational analysis is sensitive to these base rate differences.

Figure 10 displays the recidivism rate at each total score of the Pre-Screener for DWI and non DWI offenders. The much greater variability of DWI recidivism rates at higher scores and the correlational differences are likely influenced by the skewed nature of the distribution for this group.

Figure 10. Recidivism by Pre-Screener Scores for DWI and Non-DWI Subgroups



With the problematic skewed distribution and low base rates of DWI offenders, AUC analysis is a more appropriate measure of validity. Table 13 displays AUC values and confidence intervals of the subgroups for prediction of one year and three year recidivism.

Outcome Variable	Offense Subgroup	AUC	AUC Confidence Interval		AUC Diff
			Lower	Upper	
One year recidivism	DWI	.699*	.675	.707	D = .518 p = .604
	Non-DWI	.691*	.676	.707	
Three year recidivism	DWI	.684*	.658	.710	D = .870 p = .384
	Non-DWI	.700*	.676	.723	

*Significant at the .001 level.

These results provide evidence for the validity of the Pre-Screener as a measure of risk to reoffend for both DWI and non DWI offenders. All values greatly exceed the AUC of .600, the minimum validity criteria in this study. Additionally, there is no significant difference in AUC values in comparisons of subgroups for prediction of one year and three year recidivism.

DWI Subgroup Accuracy

When considering the predictive power of the full range of total scores as represented by AUC analysis, the Pre-Screener displays good predictive accuracy for both DWI and non DWI subgroups (AUC > .64). Table 14 presents a summary of the performance of the Pre-Screener in applied use in classifying offenders into one of three risk classifications.

	DWI			
Risk Classification	Low Risk	Moderate Risk	High Risk	Total Sample
Risk Distribution	72%	22%	6%	
Not Recidivist	3876 75%	1031** 20%	230*** 5%	5136 100%
Recidivist	256* 45%	197 35%	113 20%	1931 100%
One Year Recidivism Rate*	6%	16%	33%	10%
	Non DWI			
Risk Distribution	43%	34%	23%	
Not Recidivist	2005 50%	1284 32%	704 18%	3993 100%
Recidivist	308 23%	529 39%	528 39%	1365 100%
One Year Recidivism Rate*	13%	29%	44%	26%
Type of Error	*False negative error.	**False Positive error.	***False Positive error	
*Significant differences at the .001 level (2-tailed)				

Rates of one year recidivism are well distinguished in both subgroups, though rates are consistently lower among DWI offenders. For DWI offenders, false negative errors are forty five percent (45%) of all recidivisms, while false positives are one fourth of all non-recidivists. These results are heavily influenced by the combination of the low base recidivism and highly skewed distribution of DWI offenders. Since almost three fourths (72%) of DWI offenders are classified as low risk, such a distribution is much more likely to have false positives even though the low risk recidivism rate is quite low. For non DWI offenders, risk levels are well distinguished. False negative errors are almost one fourth (23%) of all recidivists while false positives are one half (50%) of non-recidivists. This favors reduction of errors relevant to public safety for this subgroup.

The Pre-Screener performs well with DWI and non-DWI subgroups.

Analysis of Gender Subgroups

Gender Subgroup Validation

There are base rate differences in recidivism across gender subgroups. Gender subgroup validity analysis will utilize AUC values that do not carry a sensitivity to base rates, unlike correlation procedures. Table 15 displays AUC values and confidence intervals across gender subgroups and outcome variables, all statistically significant ($p < .001$).

Gender Subgroup	Outcome Variable	AUC	AUC Confidence Interval	
			Lower	Upper
Female	One year recidivism	.732*	.706	.764
	Two year recidivism	.723*	.698	.754
	Three year recidivism	.725*	.691	.762
Male	One year recidivism	.708*	.693	.723
	Two year recidivism	.720*	.693	.724
	Three year recidivism	.693*	.675	.715

*Significant at the .001 level (2-tailed)

These results confirm the validity of the Pre-Screener for measuring risk to reoffend for both females and males. AUC values far exceed the validity criteria ($> .60$) for all outcome measures.

Gender Subgroup Comparison of Predictive Accuracy

In comparing predictive accuracy for one year recidivism outcomes, AUC values were not significantly different across gender subgroups (AUC D = 1.479, $p = .14$).¹⁷ Similar gender subgroup AUC values were found for outcomes of two year (AUC D = .887, $p = .375$) and three year (AUC D = 1.507, $p = .13$) outcomes. There is no evidence, based upon these findings, that the Pre-Screener displays any difference in predictive accuracy for females compared to males. In addition, predictive accuracy for both groups is excellent (AUC $> .70$), with the exception of good validity with three year recidivism prediction for males.

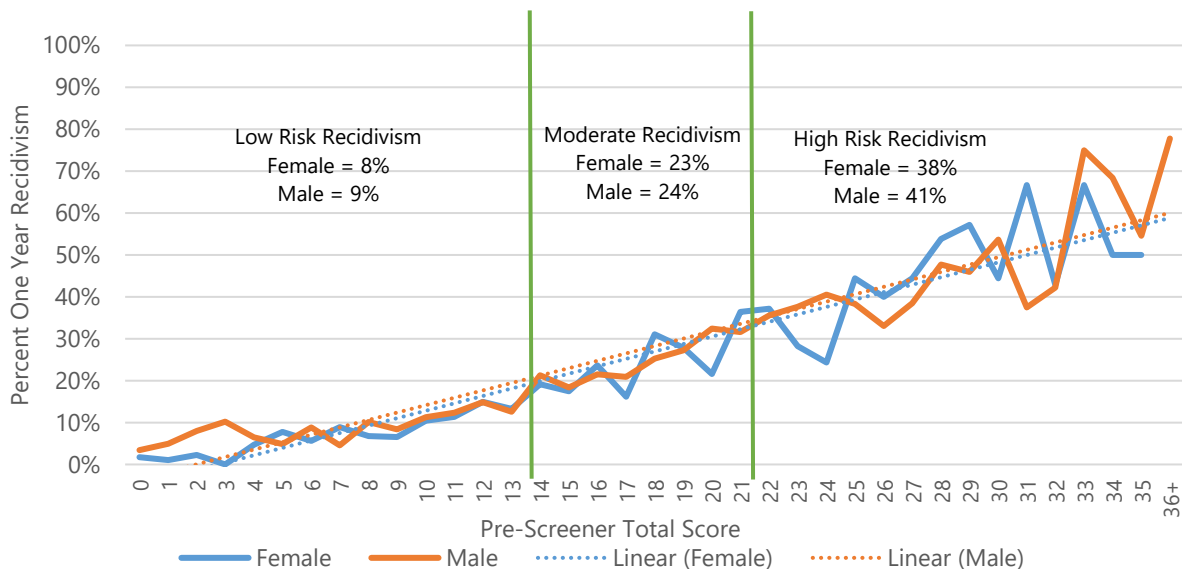
The Pre-Screener is valid and displays similar predictive power for females and males.

¹⁷ Robin, X., Turck, N., Hainard, A., Tiberti, N. Lisacck, F., Sanchez, J., & Muller, M.. (2011). [pROC: an open-source package for R and S+ to analyze and compare ROC curves.](#) BMC Bioinformatics, 12, 77.

Gender Subgroup Fairness of Prediction

Fairness in assessment asks the question of whether the same score means the same thing when comparing two groups or individuals. For risk assessment, this translates to similar comparative recidivism rates at each possible score. Figure 11 displays that comparison visually for gender subgroups. The graph shows the one year recidivism rate of females and males at each possible score along with the best fit linear representation of the relationship. Note the inconsistency of the data at points representing high total scores. This is due to very small sample sizes for those total scores. Scores of 36 and above are combined for the same reason. The greater consistency of male sample data is based upon a much larger sample size.

Figure 11. Percent One Year Recidivism by Pre-Screener Score for Gender Subgroups



The slope and intercept of the gender subgroup linear best fits appear quite similar, indicating that the same score is associated with the same outcome when comparing female and male samples. This is confirmed by a four model moderated multiple regression comparison of slope and intercept¹⁸, as seen in Table 16. Comparison of Models Two and Three indicate no additional variance in Pre-Screener assessment explained by gender. Comparison of Models Three and Four indicate no significant difference in the slope of gender prediction of risk.

Recidivism rates across the range of total scores are similar when comparing females and males.

¹⁸ Nunnally, J. C. & Bernstein, J. H. (1994) *Psychometric Theory (3rd Edition.)* New York: McGraw Hill.

Variables	Model 1	Model 2	Model 3	Model 4
Gender (Male)	0.388**	-	0.099	0.342*
Pre-Screener Total Score	-	0.110**	0.109**	0.122**
Gender * Total Score	-	-	-	-0.016
(Constant)	-1.853**	-3.162**	-3.226**	-3.419**
Variance Explained	0.6%	15%	15%	15%
Model Chi Square	40.953**	1062.769**	1065.047**	1068.208**
*Significant at the .05 level (2-tailed) **Significant at the .001 level (2-tailed)				

Gender Subgroup Item Bias

Any differential performance of risk factors of the Pre-Screener across gender subgroups that are not attributable to risk prediction are indicative of item bias. A detailed comparison of performance of items for females and males is available in Appendix H.

Viewing average scores, three item scores are not significantly different for females compared to males, including Address Change, Employment, and Alcohol Usage. The gender neutral behavior of Alcohol Usage is particularly reassuring, since this factor shows a weak negative correlation with outcomes.

For all other factors except one, males score higher on average compared to female, with variations attributable to risk outcomes. The exception is the risk factor of Prior Bad Check or Forgery, where females scores were significantly higher. Of note is the poor performance of this item in risk prediction ($r = .08$). A summary of the performance of this risk factor is shown across gender subgroups in Table 17. This factor appears to discriminate risk to reoffend well. Low correlations may be a function of the low base rate for a positive score on this item.

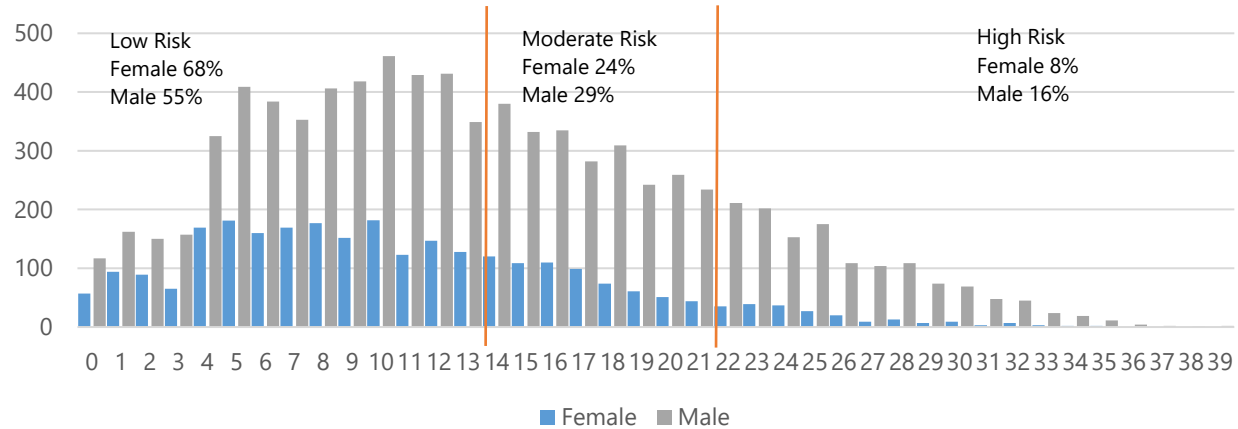
The risk factor of Prior Bad Checks or Forgery shows differential risk prediction across gender subgroups.

Gender	Score	% Scored	% Recidivism	Avg. Score	Corr.	AUC
Female	No	93%	12%	.22	.12**	.545**
	Yes	7%	27%			
Male	No	95%	18%	.16	.07**	.512*
	Yes	5%	30%			
*Significant at the .05 level (2-tailed) **Significant at the .01 level (2-tailed)						

Gender Differential Impact of Risk Classification

Females exhibit lower average Pre-Screener scores that are aligned with lower rate of recidivism. It is not surprising that they also have a high percentage of low risk classification compared to males. The distribution of scores by gender are shown in Figure 12. Risk classification percentages are also provided.

Figure 12. Distribution of Pre-Screener Total Scores by Gender Subgroups



One final perspective regarding fairness is the type of errors that occur in risk prediction. In an equitable assessment, the proportion of types of errors should be similar when comparing subgroups. However, a statistical assumption of such an expectation is the similar base rate of the event within subgroups, in this case the rate of recidivism. Given the lower base recidivism rate of females (14%) compared to males (19%), proportional differences in error types are not necessarily based in gender inequity. Table 18 presents error and recidivism rates by risk classification and gender. Presumed errors are shaded in red.

Table 18. Summary of Pre-Screener Risk Categories by Gender					
Gender	One Year Recidivism	Low Risk	Moderate Risk	High Risk	Total
Female	Not Recidivist	78%	20%**	3%**	100%
	Recidivist	42%*	38%	20%	100%
	Recidivism Rate*	8%	23%	38%	14%
Male	Not Recidivist	70%	24%**	7%**	100%
	Recidivist	34%*	34%	32%	100%
	Recidivism Rate*	9%	24%	41%	19%

*False Negative Error **False Positive Error

Analysis of Major Racial Subgroups

For all racial subgroups, Pre-Screener total scores are positively correlated with the primary outcome variable of one year recidivism ($p < .001$). The relationships of scores are also strong with smaller samples for the secondary outcome variables of three year recidivism ($p < .001$). Table 19 shows these Pearson R correlations across recidivism time frames and racial subgroups. Also displayed are AUC values and confidence intervals across racial subgroups and outcome variables, all statistically significant ($p < .001$). Note that three year recidivism outcomes are not presented for American Indian and Asian subgroups due to inadequate sample size.

Outcome Variable	Racial Designation	Sample Size	Recidivism Rate	Spearman Rho Correlation	AUC	AUC Confidence Interval	
						Lower	Upper
One Year Recidivism	American Indian	327	33%	.248*	.652*	.590	.713
	Asian	417	11%	.291*	.773*	.700	.845
	Black	3492	27%	.268*	.674*	.655	.694
	White	6456	13%	.246*	.713*	.694	.733
Three Year Recidivism	Black	1364	43%	.315*	.684*	.655	.712
	White	2934	21%	.246*	.673*	.649	.698

**Significant at the .001 level (2-tailed)

These results confirm the validity of the Pre-Screener for measuring risk to reoffend for all racial subgroups. Due to the variation in recidivism rates across racial groups, AUC values should be considered a more consistent validation measure. Viewing these AUC values, all exceed the validity criteria for all recidivism time frames. Validation is considered preliminary for American Indians. Due to sample size limitations, the AUC confidence interval is very broad and extends below the validity criteria.

The Pre-Screener is valid for measuring risk to reoffend for all racial subgroups.

Racial Subgroup Comparison of Predictive Accuracy

Viewing the prediction of the primary outcome variable of one year recidivism, predictive accuracy is excellent for Whites (AUC=.713) and within the good range for Blacks (AUC=.674). The comparative difference in these AUC values is statistically significant (AUC D = -2.732, $p = .007$). The comparative accuracy of American Indians and Blacks is statistically similar (AUC D = 0.643, $p = .546$), as is the comparative accuracy of Asians and Whites (AUC D = 1.564, $p = .118$).

An important research exploration is determining whether there are variables other than race that might be mediating or accounting for these differences among racial groups. In viewing the sample characteristics, one variation that is aligned with the differences in predictive accuracy is the proportion of DWI offenders within each racial group. As reported in the sample description, about sixty percent (60%) of Asians and Whites had a DWI as an intake offense, with lower percentages for Blacks and American Indians (35% and 28%, respectively). These DWI frequency differences across race may account for racial accuracy differences.

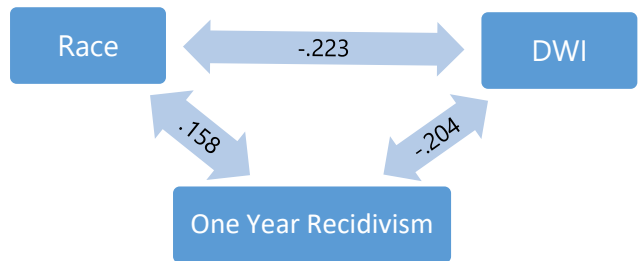
The sample sizes for American Indian and Asian subgroups are considered too small for splitting further. Further subgrouping would lead to inconsistent results for these racial groups. For this reason, the exploration of the explanatory effect of DWI distribution across racial groups will concentrate on the comparison of Blacks and Whites. There are commonalities between American Indians and Blacks as well as between Asians and Whites with regard to predictive accuracy and DWI distribution. Considering these commonalities, results will be provisionally generalized to American Indians and Asians.

For DWI offense to mediate race in predicting recidivism, it must be correlated with race and also be more strongly correlated with one year recidivism compared to race.¹⁹ With Blacks coded as one (1) and Whites coded as zero (0), Figure 13 displays the Pearson R correlations for these three variables, with results supporting the mediating role of DWI intake offense in explaining racial differences.

Difference in DWI offense distribution is a confounding factor in comparisons of racial subgroups.

¹⁹ Kraemer, H., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001) *How do risk factors work together? Mediators, moderators, and independent, overlapping and proxy risk factors.* American Journal of Psychiatry, 158:848-56.

Figure 13. Spearman Rho Correlations of Race, DWI and One Year Recidivism



To control for differences in frequency of DWI intake offenses across racial categories, Blacks and Whites within DWI intake offense subgroups are compared. Results are displayed in Table 20. Among Non-DWI offenders, there is no significant difference in accuracy of prediction of recidivism when comparing Blacks and Whites. For DWI offenders, predictive accuracy of one year recidivism for Blacks is significantly lower ($p < .05$) compared to Whites. Of note is the great difference in rate of recidivism among Black DWI offenders compared to White DWI offenders.

There is no difference in predictive accuracy comparing races among non DWI offenders.

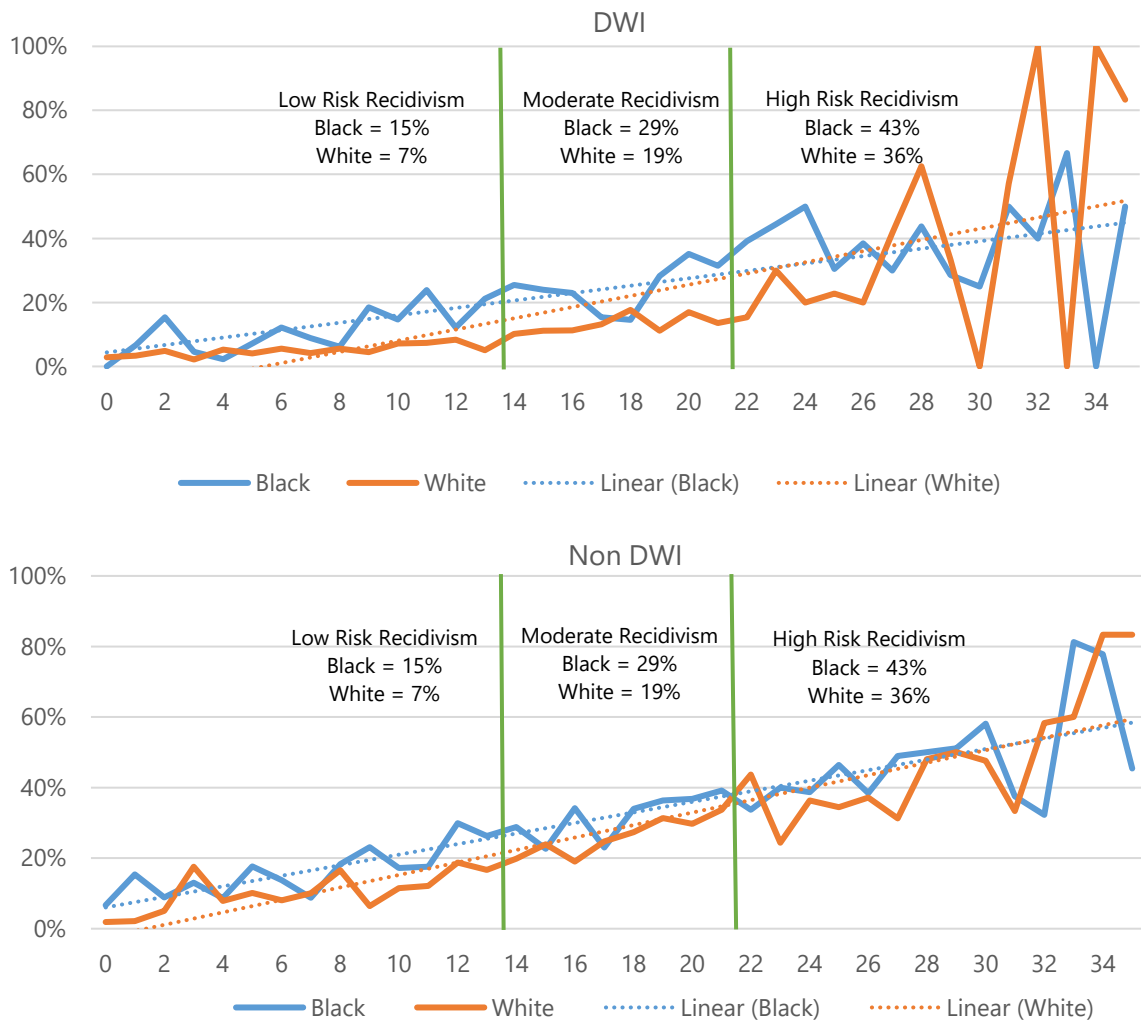
Table 20. Pre-Screener Summaries of One Year Recidivism by DWI Intake and Race								
Recidivism Period	DWI Intake	Racial Designation	Sample Size	Recidivism Rate	AUC	AUC Confidence Interval		AUC D
						Lower	Upper	
One Year Recidivism	Yes	Black	1217	20%	.657**	.631	.706	-2.31* P = .021
		White	3941	8%	.700**	.672	.724	
	No	Black	2275	31%	.659**	.635	.683	0.528 P = .597
		White	2515	21%	.667**	.634	.702	

*Significant at the .05 level (2-tailed) **Significant at the .01 level (2-tailed)

Racial Subgroup Fairness of Prediction

Figure 14 gives a visual comparison of one year recidivism rates for Black and White subgroups at each possible total score. Comparisons are presented separately for DWI and non-DWI offenders. For DWI offenders, there appears to be some separation in best fit lines for Blacks and Whites.

Figure 14. Percent of One Year Recidivism by Pre-Screener Score for Blacks and Whites



A four model regression comparing Black and White subgroups determines significant differences in intercept and/or slope when comparing these subgroups, as shown in Table 21. To account for the moderating effect of the differential distribution of DWI offenders across race, these differences are explored for DWI and non DWI offender subgroups separately. Note that the variance explained in these models does not reflect the variance explained by Pre-Screener assessment, since they are modeled on several layers of subgroups and exclude portions of the sample.

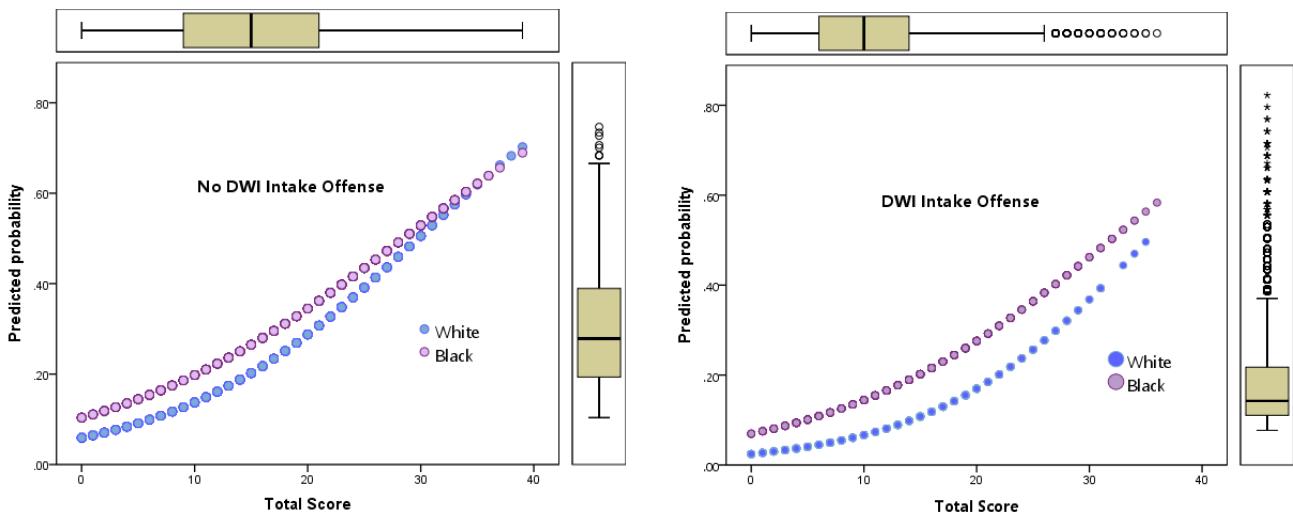
Table 21. Logistic Regression Models of Pre-Screener and Racial Differences				
Subgroup comparison of Blacks and Whites (Reference group = Whites)				
DWI Subgroup	Model 1	Model 2	Model 3	Model 4
Race	-.381**	-	.758**	1.016**
Total Score		.108**	.096**	.104**
Race * Total Score				-.018
(Constant)	-.816**	-3.492**	-3.572**	-3.673**
Variance Explained	1.5%	9.9%	11.9%	11.9%
Non DWI Subgroup	Model 1	Model 2	Model 3	Model 4
Race	-.323**		.308**	.645**
Total Score		.087**	.083**	.093**
Race * Total Score				-.019*
(Constant)	.024	-2.509**	-2.605**	-2.775**
Variance Explained	1.8%	11.6%	12.1%	12.2%

*Significant at the .05 level (2-tailed) **Significant at the .01 level (2-tailed)

These models indicate that for DWI offenders, there is no significant difference in the slope but a difference in intercept, with Blacks having higher rates of recidivism at similar scores to Whites. For non DWI offenders, there are slight differences in both intercept and slope.

A visual display of the predictive models for subgroups by DWI Intake offense are shown in Figure 15. These comparative model displays suggest that most of the differential prediction is evidenced among DWI offenders.

Figure 15. Regression Model Prediction of One Year Recidivism by Race and DWI Subgroups



For those without a DWI intake offense, recidivism rates are higher at lower scores for Blacks but converge with rates for Whites at higher score levels. A comparison of Black and White DWI offenders displays a constant predictive discrepancy over the ranges of Pre-Screener scores, with Blacks having higher rates.

Among DWI offenders, Blacks have higher recidivism rates over the range of scores, compared to Whites.

The skewed distribution of Pre-Screener scores for DWI offenders can be problematic in regression analysis, possibly distorting the predictive model. Interpretation of DWI subgroup regression models is presented with that cautionary note.

Racial Subgroups Item Bias

A detailed comparison of average item scores for racial subgroups is available in Appendix H. Results indicate that item average scores vary significantly in comparing racial subgroups. Most of these variations align with the racial subgroup recidivism rates, with American Indians and Blacks scoring higher compared to Asians and Whites. The exceptions to this pattern can be seen in the risk factors of Alcohol Usage and Prior Bad Check or Forgery. The higher scores of American Indians and Whites for Alcohol Usage is particularly problematic, since this factor is negatively correlated with risk outcomes for the total sample.

The Pearson R correlations of risk factors with one year recidivism across racial groups is provided in Table 22, with factors showing no significant relationship or a negative relationship shaded in red. Caution in comparing correlations across racial groups is necessary due to the varying recidivism rates across race and the much smaller sample sizes of American Indian and Asian clients.

Items	American Indian	Asian	Black	White	Total Sample
Address Changes	.02	.15**	.09**	.13**	.13**
Employment	.11*	.27**	.16**	.15**	.20**
Alcohol Usage	-.07	-.05	-.00	-.03*	-.04**
Other Drug Usage	.13*	.31**	.09**	.16**	.15**
Attitude	.06	.10*	.08**	.07**	.09**
First Conviction Age	.20**	.20**	.20**	.15**	.19**
Prior Probations	.16**	.09	.11**	.09**	.12**
Prior Revocations	.09	.19**	.16**	.16**	.19**
Prior Felonies	.26**	.22**	.17**	.21**	.24**
Prior Burglary	.24**	.12*	.22**	.21**	.24**
Prior Bad Check	.03	.18**	.04*	.08**	.08*
Prior Assault	.06	.11*	.13**	.14**	.17**
Total Score	.25*	.29**	.27**	.25**	.30**
Recidivism Rate	33%	11%	27%	13%	18%

*Significant at the .05 level (2-tailed) **Significant at the .01 level (2-tailed)

Viewing these results in combination, the Alcohol Usage risk factor is very problematic from the perspective of racial subgroup performance. It introduces random error across most minority subgroups and lowers accuracy for Whites. Other low performing risk factors across all or most racial subgroups include Attitude and Bad Checks or Forgery.

The assessment of the Attitude risk factor may be influenced by assessments with the client not present. This may impact American Indians to a greater extent, since almost one fourth (23%) are assessed without the client present. Percentages were lower for Blacks (17%), Whites (11%) and Asians (9%). The risk factor of Prior Bad Check or Forgery is most predictive of one year recidivism among females. For most racial groups, females represent approximately one fourth (20% to 27%) of the subgroup. The exception is American Indians, where females represent forty one percent (41%) of all American Indians. This interactive effect may be a factor in the poor predictive power for this specific risk factor. For the American Indian racial subgroup, correlational relationships were insignificant across six risk factors of the Pre-Screener. It is important to once again note the small sample size for this subgroup. The detection of statistically significant results is a more difficult task as sample sizes decrease.

Racial Differential Impact of Risk Classification

The Pre-Screener classification does have a differential racial impact. Blacks and American Indians are proportionally more likely to be classified in higher risk categories, in keeping with outcomes. The differences in risk classification across racial groups can be seen in Table 23. The percentage of error types across racial subgroups is also displayed. It is important to remember that comparative differences in error types are sensitive to base rate differences. The large differences in recidivism rates across racial groups may be an influential factor driving these differences in types of errors.

Previous analysis showed that the Pre-Screener underestimates the risk to reoffend of American Indians and Blacks compared to Asians and Whites. It is noteworthy to point out that the elimination of this differential prediction would shift more American Indians and Blacks to higher risk categories, likely resulting in an increase in differential impact among racial subgroups.

Table 23. Summary of Pre-Screener Risk Categories by Racial Subgroups				
	Risk Classification			
American Indian	Low Risk	Moderate Risk	High Risk	Total
Risk Distribution	28%	42%	30%	100%
Not Recidivist	76 35%	90 41%	52 24%	218 100%
Recidivist	14 13%	49 45%	46 42%	109 100%
Recidivism Rate*	16%	35%	47%	33%
Asian	Low Risk	Moderate Risk	High Risk	Total
Risk Distribution	73%	19%	8%	100%
Not Recidivist	290 78%	63 17%	20 5%	373 100%
Recidivist	16 36%	14 32%	14 32%	44 100%
Recidivism Rate*	5%	19%	41%	11%
Black	Low Risk	Moderate Risk	High Risk	Total
Risk Distribution	41%	35%	24%	100%
Not Recidivist	1201 47%	878 34%	473 19%	2552 100%
Recidivist	216 23%	364 39%	360 38%	940 100%
Recidivism Rate*	15%	29%	43%	27%
White	Low Risk	Moderate Risk	High Risk	Total
Risk Distribution	67%	24%	9%	100%
Not Recidivist	4010 71%	1243 22%	384 7%	5637 100%
Recidivist	307 38%	296 36%	216 26%	819 100%
Recidivism Rate*	7%	19%	36%	13%
Type of Error	*False Negative Error.	**False Positive Error.	***False Positive Error	
*Significant differences at the .001 level (2-tailed)				

Suggested Revisions to the Pre-Screener

Item analysis of the full sample and all major demographic subgroups points to the need to delete the risk factor of Alcohol Usage from the Pre-Screener. It is either not significantly predictive or is counter predictive of risk to reoffend. One other item, Prior Bad Checks/Forgery, is not predictive of risk for the full sample. It does display a positive relationship to one year recidivism for major subgroups, especially among females and Asians. Table 24 presents AUC values of the full sample and demographic subgroups with only Alcohol Usage removed and with both Alcohol Usage and Bad Checks/Forgery removed. All AUC values are statistically significant ($p < .001$). Results indicate that removal of Bad Checks/Forgery reduces accuracy for females and Asians slightly and makes no impact on other subgroups. Removal of this risk factor does not improve the overall performance of the Pre-Screener.

Results suggest the need to delete the risk factor of Alcohol Usage from the Pre-Screener.

Table 24. AUC Analysis of Pre-Screener Revisions by Demographic Subgroups			
Sample	Risk Factor Removed		AUC Diff
	Alcohol Usage	Alcohol Usage and Bad Checks/Forgery	
Full Sample	.733	.732	.001
Female	.740	.735	.015
Male	.727	.727	0.0
American Indian	.660	.660	0.0
Asian	.783	.789	.003
Black	.676	.676	0.0
White	.718	.718	0.0

With the removal of the one risk factor of Alcohol Usage, it is important to determine if modifications to cut points for risk categories are necessary. Table 25 summarizes risk classification performance with the revised scoring of the Pre-Screener (Alcohol Usage deleted) and no modification to cut points for risk classification. Though the total possible score of the Pre-Screener is now 37 points, the range of points within risk factors remain unchanged.

Table 25. Summary of Risk Classification with Modified Pre-Screener Scoring				
One Year Recidivism	Low Risk	Moderate Risk	High Risk	Total Sample
Risk Distribution	62%	26%	12%	100%
Not Recidivist	6243 69%	2121** 23%	765*** 8%	5136 100%
Recidivist	631* 33%	732 38%	568 29%	1931 100%
Recidivism Rate*	9%	26%	43%	18%
Type of Error	*False negative error.	**False Positive error.	***False Positive error	

A comparison of the change in classification with this modification is presented in Table 26, displaying the change in number of non-recidivists and recidivists within each risk category. A positive number indicates an increase with modified scoring while a negative number indicates a decrease.

Table 26. Change in Risk Classification with Modified Pre-Screener Scoring			
	Low Risk	Moderate Risk	High Risk
Frequency Change	430 4%	-187 -2%	242 -2%
Not Recidivist	363	-193	-169
Recidivist	67	6	-73
Change in Recidivism Rate	0%	2%	2%
Type of Error	*False negative error.	**False Positive error.	***False Positive error

These outcomes suggest that there is no negative impact to low risk classification, with no increase in recidivism rates for this group of offenders. There are gains in the prediction of moderate and high risk, with a two percent increase in recidivism rates for each of these risk levels. These results do not suggest the need for modification of cut points for risk level classification.

Discussion

The primary questions to be answered in this study are the overall validation and predictive accuracy of the Pre-Screener. The Pre-Screener is clearly measuring risk to reoffend for the full sample and for gender and racial subgroups, with AUC values well above the validation criteria of .600 in all samples. For the full sample, predictive accuracy is excellent over the recidivism time frames of one through three years (AUC > .700).

Gender subgroup accuracy is excellent for most recidivism time frames, though AUC values fall slightly below .700 for prediction of three year recidivism among males (.694). The validity of the Pre-Screener for use with all major racial subgroups was also confirmed. Predictive accuracy is excellent for prediction of one year recidivism among Asians and Whites and within the range of good predictive accuracy for American Indians and Blacks. This difference in accuracy is primarily based in differences in the distribution of DWI offenders across racial subgroups. When controlling for this difference, differences in predictive accuracy are minimized.

DWI offenders make up more than half of the validation sample (52%). They have the lowest average Pre-Screener scores and lowest recidivism rates compared to other types of offenders. Additionally, DWI offenders are much more common among Asians and Whites compared to American Indians and Blacks. With such a large percentage of the sample and a variety of distinguishing characteristics, the validity this DWI subgroup was also confirmed. AUC values were slightly below .700, indicating good predictive accuracy with no differences between DWI and non DWI offenders.

In its applied use in risk classification, cut points for risk level classification appear well placed, resulting in clear distinction of recidivism rates when comparing low, moderate, and high risk levels. As a risk screen for probation intake, it classifies 58% of probationers as low risk, with a one year recidivism rate of nine percent (9%) for this low risk group. This compares to recidivism rates of 24% for moderate risk and 41% for high risk classifications. Those who are classified as low risk offenders who subsequently recidivate within one year have fewer felonies and fewer public safety relevant re-offenses compared to higher risk recidivists.

The predictive performance of the Pre-Screener is stable when comparing assessments administered over a three years period and comparable across assessment units. Item analysis points to major problems with one

risk factor, Alcohol Usage. Scoring of this item had been revised in 2013 in hopes of improving performance. This revision clearly was not effective. The inclusion of Alcohol Usage in the Pre-Screener scale is counterproductive and should be eliminated from the scale.

There is some loss of accuracy in risk prediction for those assessments completed without the client present. Though accuracy for these assessments are well within the good range (AUC=.689), there are several data trends that are of concern. American Indians (23%) and Blacks (17%) are assessed without being present more frequently than Whites (11%) and Asians (9%). These frequencies align with predictive accuracy of the Pre-Screener for racial subgroups. Racial subgroups with higher percentage of assessments without client present have lower Pre-Screener predictive accuracy. A second clear data trend is the increase in these assessments over time. The percentage increases each year, from six percent (6%) in 2013 to twenty one percent (21%) in 2016. Considering the significant loss of accuracy, the differential frequencies across race, and the steady increase in these assessments over time, efforts should be made to reduce the frequency of these assessments.

Beyond predictive validity and accuracy, this study provides a detailed examination of issues of fairness across gender and racial subgroups. For comparisons of females and males, the Pre-Screener appears to be very gender neutral. In other words, the same score means the same thing in terms of risk prediction when comparing males and females. Females do have lower Pre-Screener scores that are well aligned with their lower recidivism rates when compared to males. In terms of risk classification, this leads to differential classification across gender. Females are less likely to be classified as high risk in keeping with their lower levels of re-offense. One risk factor, Prior Bad Checks or Forgery, was found to be more predictive of risk for females compared to males. Exclusion of this item does not improve prediction for males and reduces the explained variance of outcomes for females, suggesting that this risk factor be retained on the Pre-Screener scale.

The analysis of the equitable assessment of risk across major racial subgroups concentrates upon the comparison of Blacks and Whites. The sample sizes for American Indians and Asians are insufficient for reliable comparisons across racial groups. There are similarities in Pre-Screener score, recidivism outcome, and DWI distribution patterns of American Indians to Blacks and of Asians to Whites. Considering these similarities, the results of comparison of Blacks and Whites are provisionally

generalized to American Indians and Asians until larger samples are available. Findings are that there are consistently higher recidivism rates for Blacks compared to Whites with the same Pre-Screener score. This difference is primarily found within the DWI offender population. Among non DWI offenders, the difference is slight and is not evident across the full range of total scores. There is no evidence of item bias in accounting for risk measurement differences. It may be that there are risk factors accounting to these differences that are not present in the Pre-Screener, such as criminal history or economic factors. Alternatively, there may be societal factors that are differentially impacting racial groups, such as over policing of minority communities or differential conviction rates based upon race. The effect of these differences is the under prediction of risk to reoffend for Blacks compared to Whites. Even considering this under prediction, there is differential impact in risk classification across racial subgroups, with American Indians and Blacks more likely to be classified in higher risk categories. Within racial groups, risk categories are well distinguished though comparatively higher for Black and American Indian subgroups.

The issue of equity in risk prediction is not one dimensional, considering only accuracy of prediction, or only fairness of measurement, or only differential impact. All of these factors need to be balanced to an acceptable level that meets public safety needs. When there are major differences in base rates of recidivism when comparing racial subgroups, the optimal attainment of accurate prediction, fairness, and differential impact may not be statistically possible. For instance, in this case complete racial fairness would likely either decrease risk classification accuracy or increase differential impact for American Indians and Blacks. While not all of the variance in outcomes explained by race is accounted for in this study, the accuracy, fairness, and differential impact factors of the Pre-Screener considered together appear to be within acceptable levels.

The results of this analysis are quite positive and suggest that the Pre-Screener is a valuable intake risk screen. While no specific training issues are identified, it is felt that some lower performing risk factors such as Attitude could be improved with improvements in training and assessment standardization. If the resources are available, algorithmic calibration of risk factors of the Pre-Screener could also lead to improved prediction.

Recommendations

- Elimination of the risk factor of Alcohol Usage, with no resulting modification in cut offs for risk classification, is strongly recommended.
- Elimination of two research items still present on the Pre-Screener assessment is recommended.
- With revisions eliminating Alcohol Usage and research items, continued use of the Pre-Screener is recommended.
- It is recommended that assessments with the client not present be minimized as much as possible.
- Increased attention to and standardization of assessor training is recommended, with particular attention to the policies regarding assessments with the client not present.



Appendix A: Pre-Screener and Risk Level Description

Table A1. Pre-Screener Items and Scoring

Pre-Screener Risk Factors	Scoring Criteria	Score
Number of address changes in last 12 months.	Refused or None	0
	One	2
	Two or more	3
Percentage of time employed in last 12 months.	Refused; Not applicable; 60% or more	0
	40% to 59%	1
	Under 40%	2
Alcohol usage problems.	Refused; no interference with functioning	0
	Occasional abuse; some disruption of functioning	1
	Frequent abuse; serious disruption; need treatment	2
Other drug problems.	Refused; no interference with functioning	0
	Occasional abuse; some disruption of functioning	1
	Frequent abuse; serious disruption; need treatment	2
Attitude	Unknown; motivated to change; receptive to assistance	0
	Dependent or unwilling to accept responsibility	2
	Rationalizes behavior; negative behavior; unmotivated	3
Age at first conviction	Unknown; 24 or older	0
	20 to 23 years old	2
	19 or younger	4
Number of prior periods of probation/supervised release supervisions	Unknown; none	0
	One or more	4
Number of prior probation/ supervised release revocations	Unknown; none	0
	One or more	4
Number of prior felony convictions	Unknown; none	0
	One	2
	Two or more	4
Convictions or juvenile adjudications for any listed – score all that apply	Unknown; none of those listed	0
	Burglary, theft, auto theft, shoplifting, or robbery	2
	Worthless checks or forgery	3
Convictions or juvenile adjudications for assaultive offenses within the last 5 years	Unknown; no	0
	Yes	4

Table A2. Risk Levels of the Pre-Screener.

Pre-Screener Risk Level	Scoring Range
Low	0 to 13
Moderate	14 to 21
High	22 and above

Appendix B: Definition of Offense Rank and Type

Table B1. Offense Rank					
Offense	Rank	Offense	Rank	Offense	Rank
Status/Other	1	Prostitution	11	Harassment	21
Gambling	2	Crimes Against Government	12	Other Person	22
Traffic	3	Crimes Against Justice	13	Robbery	23
Disturbing the Peace	4	Escape	14	Vehicular Assault	24
Receiving Stolen Goods	5	Crimes Against Family	15	Assault	25
Property	6	Burglary	16	Domestic Assault	26
Theft	7	Drugs	17	Kidnapping	27
Counterfeiting/Fraud	8	DWI	18	Criminal Sexual Conduct	28
Vehicle Theft	9	Arson	19	Vehicular Homicide	29
Obscenity	10	Weapons	20	Homicide	30

Table B2. Type of Offense*	
Offense Category	Definition
Crim Sex/Obscenity	Sex related crimes, including obscenity. (Ex. Criminal Sexual Conduct, Indecent Exposure, Possession of Pornography, Failure to Register as Predatory Offender)
Domestic Assault	Threat, violence, abuse, or willful neglect toward someone in a family or intimate relationship. (Ex. Domestic Assault, Violation of Order for Protection)
Drugs	Crimes involving the possession or selling of illegal substances. (Ex. Drug Possession or Sale)
DWI	Crimes involving driving while intoxicated. (Ex. DWI, Refusal to Test)
Person (Non-Domestic)	Crimes involving willful attempt or threat to injure someone else, excluding domestic assault. (Ex. Homicide, Assault, Kidnapping, Robbery)
Property	Crimes involving a focus upon property and not persons. (Ex. Burglary, Fraud, Forgery, Theft, Vehicle Theft, Arson, Property Damage, Trespassing)
Prostitution	Crimes involving the commission of a sex act for monetary consideration or other thing of value. (Ex. Prostitution in Public Place)
Societal Conduct	Crimes involving disruption of public peace or order. (Ex. Disorderly Conduct, Escape, Rioting, Public Intoxication, Loitering,)
Traffic/Other	All traffic crimes, excluding DWI, (ex. Hit and Run, Criminal Vehicular Operation, Careless Driving, Driving After Suspension) as well as crimes not otherwise classified (Ex. Status Offenses)
Weapons	Crimes involving the illegal possession or use of weapons. (Ex. Prohibited Person in Possession of Firearms, Reckless Discharge of Firearms)

*Offense types with a frequency of less than one percent (1%) within the validation sample are collapsed into a category of 'other' for all analysis.

Appendix C: Sample Demographic Summary

Table C1. Pre-Screener Sample Gender and Racial Distribution						
Race	Female		Male		Total	
	N	%	N	%	N	%
American Indian	135	41.3%	192	58.7%	327	3.0%
Asian	87	20.9%	330	79.1%	417	3.8%
Black	684	19.6%	2808	80.4%	3492	31.6%
White	1752	27.1%	4704	72.9%	6456	58.4%
Unknown/Other	116	31.5%	252	68.5%	368	3.3%
Total	2774	25.1%	8286	74.9%	11060	100%

Table C2. Average Age by Gender and Racial Designation						
Race	Female		Male		Total	
	Average Age	<i>SD</i>	Average Age	<i>SD</i>	Average Age	<i>SD</i>
American Indian	31.72	8.72	33.14	10.18	32.55	9.61
Asian	29.85	6.66	32.71	9.76	32.11	9.26
Black	32.68	9.72	34.57	11.08	34.20	10.85
White	35.71	11.56	36.05	11.75	35.96	11.70
Unknown/Other	34.19	12.30	32.71	11.17	33.18	11.54
Total	34.52	11.03	35.24	11.44	35.06	11.35

Table C3. Sample Age Range Distribution		
Age Range	N	%
21 or Younger	746	6.7%
22 thru 30	4051	36.6%
31 thru 40	3063	27.7%
41 thru 50	1821	16.5%
51 or Older	1379	12.5%

Appendix D: Intake Offense Summary

Table D1. Intake Offense Severity by Gender						
Offense Severity	Female		Male		Total	
	N	%	N	%	N	%
Felony	521	18.8%	1602	19.3%	2123	19.2%
Gross Misdemeanor	1497	54.0%	3896	47.0%	5393	48.8%
Misdemeanor	756	27.2%	2788	33.7%	3544	32.0%

Figure D1. Intake Offense Severity by Race

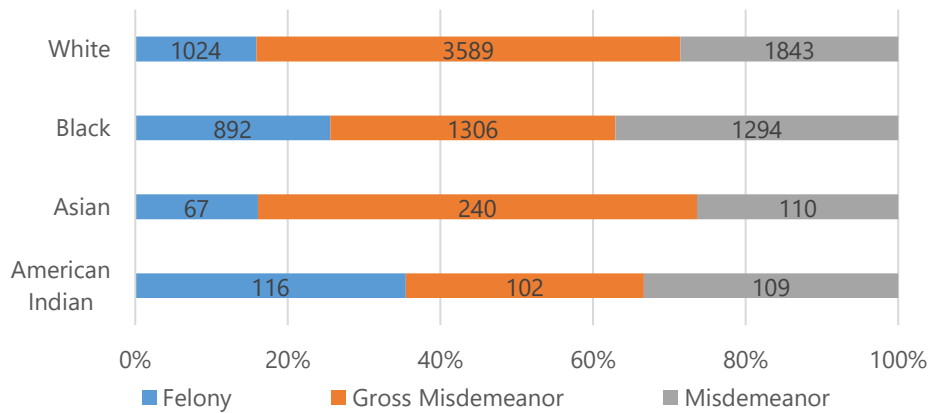


Table D2. Intake Offense Type by Gender						
Offense Type	Female		Male		Total	
	N	%	N	%	N	%
DWI	1633	58.9%	4097	49.4%	5730	51.8%
Conduct	295	10.6%	1293	15.6%	1588	14.4%
Drugs	329	11.9%	1053	12.7%	1382	12.5%
Domestic Related	138	5.0%	907	10.9%	1045	9.4%
Property	200	7.2%	454	5.5%	654	5.9%
Person	87	3.1%	302	3.6%	389	3.5%
Other*	92	3.3%	180	2.2%	272	2.5%

*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution & Traffic

Appendix D: Intake Offense (cont.)

Table D3. Intake Offense Type by Race								
Offense Severity	American Indian		Asian		Black		White	
	N	%	N	%	N	%	N	%
DWI	92	28.1%	253	60.7%	1217	34.9%	3941	61%
Conduct	43	13.1%	53	12.7%	661	18.9%	779	12.1%
Drugs	65	19.9%	45	10.8%	555	15.9%	700	10.8%
Domestic Related	40	12.2%	25	6.0%	532	15.2%	421	6.5%
Property	54	16.5%	17	4.1%	277	7.9%	294	4.6%
Person	19	5.8%	10	2.4%	178	5.1%	177	2.7%
Other*	14	4.3%	14	3.3%	72	2.1%	144	2.2%

*Offense Types with 1% or less are collapsed into Other Category, including Crim Sex, Weapons, and Prostitution & Traffic

Table D4. Intake Offense Type by Age Range										
Offense Severity	21 or Younger		22 thru 30		31 thru 40		41 thru 50		51 or Older	
	N	%	N	%	N	%	N	%	N	%
DWI	163	21.8%	2096	51.7%	1682	54.9%	961	52.8%	828	60.0%
Conduct	195	26.1%	569	14.0%	402	13.1%	259	14.2%	163	11.8%
Drugs	120	16.1%	566	14.0%	378	12.3%	202	11.1%	116	8.4%
Domestic Related	112	15.0%	363	9.0%	264	8.6%	192	10.5%	114	8.3%
Property	74	9.9%	238	5.9%	157	5.1%	113	6.2%	72	5.2%
Person	40	5.4%	131	3.2%	123	4.0%	51	2.8%	44	3.2%
Other*	42	5.6%	88	2.2%	57	1.8%	43	2.4%	42	3.0%

*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution & Traffic

Table D5. Intake Offense Type by Offense Level						
Offense Severity	Felony		Gross Misdemeanor		Misdemeanor	
	N	%	N	%	N	%
DWI	71	3.3%	4940	91.7%	719	20.3%
Conduct	58	2.7%	38	0.7%	1492	42.2%
Drugs	1371	64.6%	-	-	11	0.3%
Domestic Related	14	0.7%	162	3.0%	869	24.5%
Property	496	23.4%	50	0.9%	108	3.0%
Person	90	4.2%	121	2.2%	178	5.0%
Other*	23	1.1%	82	1.5%	167	4.7%

*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution, & Traffic.

Appendix E: Recidivism Summary

Table E1. Summary of Outcome Variables by Recidivism Time Frame			
Time Frame	Percent Recidivism	Percent Felony Recidivism	Percent Public Safety Relevant Offenses
One Year (N=11060)	18%	6.0%	4%
Two Years (N=8600)	25%	9%	6%
Three Years (N=4688)	28%	10%	8%

Table E2. One Year Recidivism Rate by Gender and Race			
Race	Female	Male	Total
American Indian	27%	38%	33%
Asian	9%	11%	11%
Black	19%	29%	27%
White	11%	13%	13%
Total	14%	19%	18%

Figure E1. One Year Recidivism by Age Range

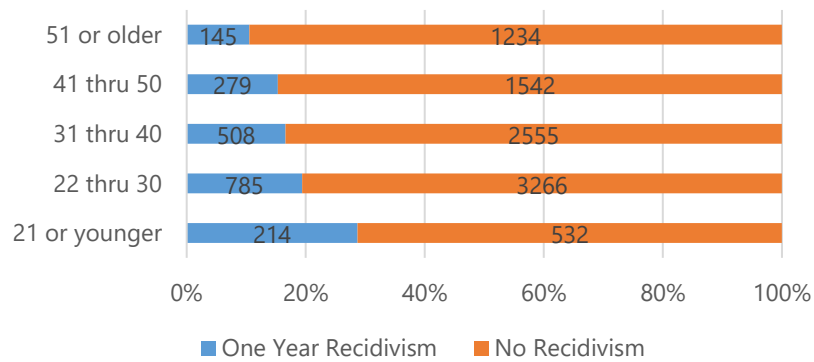


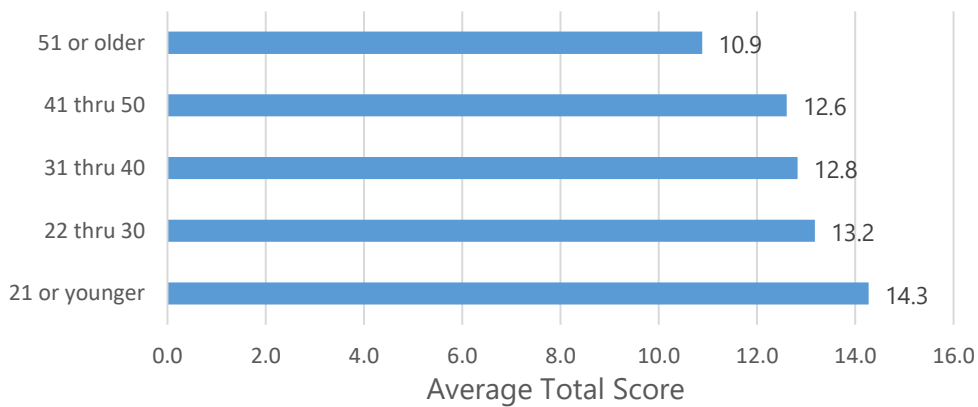
Table E3. One Year Recidivism Rate by Gender/Race and Intake Offense Type							
Intake Offense Type	Gender		Race				Total
	Female	Male	American Indian	Asian	Black	White	
DWI	8%	11%	17%	3%	20%	8%	10%
Conduct	14%	22%	40%	11%	24%	17%	20%
Drugs	22%	26%	38%	33%	28%	20%	24%
Domestic Related	18%	32%	32%	28%	36%	24%	30%
Property	37%	38%	61%	24%	43%	30%	38%
Person	22%	22%	21%	20%	29%	16%	22%
Other*	18%	16%	7%	14%	25%	17%	17%

*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution, & Traffic.

Appendix F: Pre-Screener Total Score Summary

Race	Female		Male		Total	
	AVG	SD	AVG	SD	AVG	SD
American Indian	16.47	7.21	18.04	7.78	17.39	7.58
Asian	8.43	4.34	11.38	6.95	10.76	6.60
Black	12.75	6.75	16.42	7.80	15.70	7.74
White	10.04	6.31	11.86	6.91	11.36	6.80
Unknown/Other	7.64	5.66	8.17	5.54	8.00	5.58
Total	10.87	6.65	13.41	7.61	12.78	7.46

Figure F1. Pre-Screener Total Score by Age Range



Offense Type	Female		Male		Total	
	AVG	SD	AVG	SD	AVG	SD
DWI	9.29	5.52	11.10	6.45	10.59	6.25
Conduct	11.51	6.90	14.27	7.87	13.76	7.77
Drugs	13.50	7.20	15.53	7.11	15.04	7.18
Domestic Related	13.99	7.53	17.91	8.37	17.39	8.36
Property	14.19	7.14	17.44	7.51	16.45	7.54
Person	14.16	8.18	15.73	7.95	15.38	8.02
Other*	12.40	8.94	10.80	8.16	11.34	8.45

*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution & Traffic

Appendix F: Pre-Screener Total Score (cont.)

Table F3. Pre-Screener Average Total Score by Race and Intake Offense Type								
	American Indian		Asian		Black		White	
Offense Severity	AVG	<i>SD</i>	AVG	<i>SD</i>	AVG	<i>SD</i>	AVG	<i>SD</i>
DWI	14.28	7.28	10.07	6.08	13.30	7.04	9.88	5.72
Conduct	19.40	8.00	9.81	6.25	15.74	7.89	12.31	7.25
Drugs	16.86	7.61	11.93	6.82	16.06	6.84	14.34	7.28
Domestic Related	19.88	6.92	14.56	8.90	19.47	8.14	15.17	8.02
Property	19.50	6.40	13.06	7.91	17.50	7.12	15.53	7.64
Person	18.58	8.40	15.50	4.65	17.03	7.88	13.56	7.88
Other*	17.29	6.89	10.21	7.45	14.96	9.11	10.08	7.76

*Offense Types with 1% or less are collapsed into Other Category, including Crim Sex, Weapons, and Prostitution & Traffic

Table F4. Pre-Screener Average Total Score by Gender and Offense Level						
	Felony		Gross Misdemeanor		Misdemeanor	
Gender	AVG	<i>SD</i>	AVG	<i>SD</i>	AVG	<i>SD</i>
Female	13.84	7.20	9.98	5.79	10.60	7.26
Male	16.11	7.12	12.04	7.05	13.78	8.16
Total	15.55	7.01	11.47	6.79	13.10	8.08

Table F5. Pre-Screener Average Total Score by Race and Offense Level						
	Felony		Gross Misdemeanor		Misdemeanor	
Gender	AVG	<i>SD</i>	AVG	<i>SD</i>	AVG	<i>SD</i>
American Indian	18.15	6.95	15.44	7.50	18.41	8.02
Asian	12.24	6.66	10.40	6.20	10.65	7.31
Black	16.38	6.78	14.64	7.85	16.30	8.13
White	14.88	7.43	10.41	5.96	11.27	7.33

Appendix G: Assessment Location Summary

Table G1. Pre-Screener Assessment Location by Gender						
Assessment Location	Female		Male		Total	
	N	%	N	%	N	%
Central Intake	1441	52%	3808	46%	5249	48%
Misdemeanor Investigations	1284	46%	4263	51%	5547	50%
Other	49	2%	215	3%	264	2%

Table G2. Pre-Screener Assessment Location by Race								
Assessment Location	American Indian		Asian		Black		White	
	N	%	N	%	N	%	N	%
Central Intake	187	57%	195	47%	1598	46%	3027	47%
Misdemeanor Investigations	129	39%	215	51%	1797	51%	3285	51%
Other	11	4%	7	2%	97	3%	144	2%

Table G3. Intake Offense Type by Assessment Location						
Offense Type	Central Intake		Misdemeanor Investigations		Other	
	N	%	N	%	N	%
DWI	2948	56%	2661	48%	121	46%
Conduct	165	3%	1419	26%	4	2%
Drugs	1315	25%	24	1%	43	16%
Domestic Related	18	1%	1022	18%	5	2%
Property	543	10%	85	1%	26	10%
Person	119	2%	216	4%	54	20%
Other*	141	3%	120	2%	11	4%

*Offense Types with less than 1% are collapsed into Other Category, including Crim Sex, Weapons, Prostitution & Traffic

Appendix H: Pre-Screener Item Summary

Table H1. Pre-Screener Item Average Score by Gender			
Item	Female	Male	Total
Address Change	0.91	0.93	0.93
Employment	0.65	0.66	0.66
Alcohol Usage	0.87	0.88	0.88
Other Drug Usage*	0.38	0.43	0.42
Attitude*	0.99	1.18	1.13
First Conviction Age*	1.46	1.92	1.81
Prior Probations*	2.87	3.20	3.12
Prior Revocations*	1.02	1.39	1.29
Prior Felonies*	0.41	0.93	0.80
Prior Burglary*	0.46	0.52	0.51
Prior Bad Check or Forgery*	0.22	0.16	0.18
Prior Assault*	0.64	1.19	1.05

*Significant differences at the .001 level (2-tailed).

Table H2. Pre-Screener Item Average Score by Race				
Item	American Indian	Asian	Black	White
Address Change*	1.39	0.69	1.07	0.85
Employment*	1.20	0.48	0.91	0.52
Alcohol Usage*	0.91	0.73	0.71	0.98
Other Drug Usage*	0.80	0.24	0.47	0.39
Attitude*	1.27	1.06	1.44	0.99
First Conviction Age*	2.53	1.55	2.10	1.65
Prior Probations*	3.39	3.01	3.35	3.04
Prior Revocations*	2.09	1.05	1.70	1.10
Prior Felonies*	1.35	0.62	1.37	0.52
Prior Burglary*	0.94	0.37	0.75	0.38
Prior Bad Check or Forgery*	0.17	0.17	0.26	0.14
Prior Assault*	1.36	0.79	1.58	0.80

*Significant differences at the .001 level (2-tailed).