

# UCCI:RESEARCH

VALIDATION STUDY



# The Indiana Risk Assessment System and Youth Assessment System

## A Re-validation Study

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## EXECUTIVE SUMMARY

### Overview

Just over a decade ago, Indiana adopted a validated risk and need assessment system for both adults and youth supervised by the State's criminal justice and juvenile justice systems. Specifically, the State sought to implement a risk and need assessment that was developed for a Midwest population, expanded as offenders moved deeper into the system, built upon previous assessments, and was user-friendly and easily implemented. As such, the Indiana Judicial Center (now known as the Indiana Office of Court Services), as staff agency for the Indiana Risk Assessment Task Force, contracted with the University of Cincinnati, Center for Criminal Justice Research, to implement a risk and need assessment that provided assessments at multiple stages of the criminal and juvenile justice system and was validated on an Indiana population.

Through this partnership, the Indiana Risk Assessment Task Force and the University of Cincinnati developed and validated the Indiana Risk Assessment System (IRAS) in 2013<sup>1</sup> and the Indiana Youth Assessment System (IYAS) in 2012<sup>2</sup> through prospective research designs. The IRAS contains five complete assessments, including the Pre-trial Assessment Tool (PAT), the Community Supervision Tool (CST), the Prison Intake Tool (PIT), the Supplemental Reentry Tool (SRT), and the Static Tool. Additionally, the IRAS contains the Community Supervision Screening Tool (CSST), which acts as a shortened version of the CST.

The IYAS contains five complete tools, including the Diversion Tool (DIV), Detention Tool (DET), Disposition Tool (DIS), Residential Tool (RES) and Reentry Tool (RT). There is also a Dispositional Screening Tool which acts as a shortened version of the DIS Tool.

The IRAS and IYAS tools have now been in use by the state of Indiana for more than a decade. The Indiana Office of Court Services partnered with the University of Cincinnati Corrections Institute (UCCI) to revalidate each of the 11 tools (excluding the Dispositional Screener) contained within the IRAS and IYAS. It is also worth noting that a reliability study was completed on various IRAS and IYAS tools in 2019.<sup>3</sup> This reliability study is used to inform the interpretation of the present validation results.

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<sup>1</sup> Latessa, E., Lovins, B., & Makarios, M. (2013). Validation of the Indiana Risk Assessment System: Final Report. *University of Cincinnati School of Criminal Justice, Center for Criminal Justice Research.*

<sup>2</sup> Latessa, E. & Lovins, B. (2012). The Indiana Youth Assessment System: Final report. *Center for Criminal Justice Research, University of Cincinnati.*

<sup>3</sup> Manchak, S. M., Petrich, D., & Willoughby, E. (2019). A reliability study for the Indiana Risk Assessment System: Final report. *University of Cincinnati Corrections Institute.*



## Summary of Methods

### *Data Sources*

Data for the revalidation project were gathered from multiple sources, all of which were provided by Indiana government offices or from authorized partners. Risk and need assessment information was gathered from the INcite Risk Assessment Application system. This system also contains information related to client demographics (e.g., sex, race, date of birth, and offense type). Outcome data (i.e., recidivism) was gathered from multiple sources. For outcomes related to the various IRAS instruments, data was drawn from the Indiana Prosecuting Attorneys Council (IPAC) Case Management System, the Indiana Department of Correction (IDOC) database, and data from the Odyssey Case Management System maintained by Indiana Office of Court Technology. Outcome data for the IYAS instruments were taken from the Quest Case Management System, the Odyssey Case Management System, and Division of Youth Services data provided by the Department of Correction.

Individual cases within the IRAS and IYAS databases were matched to the outcome databases. Matching cases was accomplished by matching clients first name, last name, birth month, birth year, and last four digits of their social security number from the IRAS or IYAS assessment file to the various outcome files. If the matching technique between data files was successful, the case was included in the validation study. If matching was unsuccessful, a second round of matching was conducted for the cases that could not be exactly matched between the files. This matching technique included the use of approximate matching to help account for potential spelling or data entry errors in names or social security numbers between files that lead to cases failing to match (a full explanation of this matching technique will be provided in the Methods section – see pages 26 and 27). If a case was properly matched, it was included in the final sample. If the case was not successfully matched, then the case was excluded from the validation study.

### **Summary Results by Tool**

- Full Results, Tables, and Figures for the PAT can be found on pages 33-42.

#### ***IRAS Pre-trial Assessment Tool (PAT)***

##### ***Outcome: Failure to Appear within 1-Year of the Assessment***

- The IRAS PAT was a significant predictor of failure to appear (FTA) within 1-year of the assessment; however, the AUC value (0.54) was weak and fell slightly below the industry standard for acceptable predictive ability. Notably, a key limitation of examining FTA in the current study was the inability to link

clients PAT with the ending of their court case. Given that FTAs can only occur while a court case is open, this likely influenced the validity of the tool in the current study. Notably, a recent study conducted by Lowder et al. (2022) examined the predictive validity of the PAT within 12 counties in Indiana. This study was able to connect the assessment with clients' court case and found that the PAT predicted FTA at an acceptable level (AUC = 0.69).

- No significant or substantive differences were identified in the IRAS PAT's overall ability to predict failure to appear across sex, race, offense type, or across rural and urban counties.

***Outcome: New Case Filed 1-Year of the Assessment***

- The IRAS PAT was a significant predictor of a new case filed within 1-year of the assessment. The AUC value of 0.58 fell within acceptable levels of predictive power.
- Significant differences in the IRAS PAT's ability to predict a new case filed were identified across sex. Specifically, the IRAS PAT's predictive power was slightly stronger for Females in comparison to Males. However, the tool remained a significant predictor of a new case filed for Males.
- Significant differences in the IRAS PAT's ability to predict a new case filed were also identified across race. Specifically, the IRAS PAT's predictive power was slightly stronger for White clients in comparison to Black clients. However, the tool remained a significant predictor of a new case filed for Black clients.
- No substantive differences were found in the PAT's overall ability to predict a new case filed across offense type or across urban and rural counties.

***IRAS Community Supervision Tool (CST)***

- Full Results, Tables, and Figures for the CST can be found on pages 42-53.

***Outcome: New Case Filed within 3-Years of the Assessment***

- The IRAS CST was a significant predictor of a new case filed within 3-years of the assessment (AUC = 0.60). This AUC value fell within the industry standard of predictive power.
- Significant differences were identified in the CST's ability to predict a new case filed across race. Specifically, the predictive power of the CST was slightly stronger for White clients than Black clients. Notably, the predictive power of the CST was still statistically significant and within industry standards for Black clients.
- No substantive differences were found in the CST's overall ability to predict a new case filed across sex, offense type, or across urban and rural counties.

***Outcome: New Conviction within 3-Years of the Assessment***

- The IRAS CST was a significant predictor of a new conviction (AUC = 0.58) within 3-years of the assessment. This AUC value fell within the industry standard of predictive power.
- Significant differences were identified in the CST's ability to predict a new conviction across offense types. Specifically, the predictive ability of the CST was stronger for clients convicted of substance use offenses in comparison to clients convicted of violent offenses. Importantly, the CST was still a statistically significant predictor of a new conviction for clients convicted of violent offenses.
- No substantive differences were found in the CST's overall ability to predict a new conviction across sex, race, or across urban and rural counties.

***IRAS Community Supervision Screening Tool (CSST)***

- Full Results, Tables, and Figures for the CSST can be found on pages 53-61.

***Outcome: New Case Filed within 3-Years of the Assessment***

- The IRAS CSST was a significant predictor of a new case filed (AUC = 0.60) within 3-years of the assessment. This AUC value fell within the industry standard of predictive power.
- Significant and substantive differences were found in the CSST's ability to predict a new case filed across county type. Specifically, the CSST was a stronger predictor of a new case filed for urban counties (AUC = 0.61) than rural counties (AUC = 0.57).
- No substantive differences were identified in the IRAS CSST's ability to predict a new case filed across sex, race, or offense types.

***Outcome: New Conviction within 3-Years of the Assessment***

- The IRAS CSST was a significant predictor of a new conviction (AUC = 0.58). This AUC value fell within the industry standard of predictive power.
- No substantive differences were identified in the IRAS CSST's ability to predict a new conviction across sex, race, offense types, or county type.

***IRAS Prison Intake Tool (PIT)***

- Full Results, Tables, and Figures for the PIT can be found on pages 61-73.

***Outcome: New Conviction within 3-Years of the Assessment***

- The IRAS PIT was a significant predictor of new conviction within 3-years of the assessment; however, the AUC value (0.55) fell at the lowest end of the industry standard.

- Significant differences were identified in the predictive ability of the IRAS PIT across race. Specifically, the IRAS PIT was not a significant predictor of new conviction for Black clients. Further, the AUC value for Black clients was significantly lower than the AUC values for White clients and clients of Other racial categories.
- No substantive differences were identified in the overall ability of the PIT to predict new conviction across sex or offense types.

***Outcome: Return to Department of Correction Any Time Post-Assessment***

- The IRAS PIT was a significant predictor of return to the department of correction at any point post assessment; however, the AUC value (0.54) was weak and fell below the industry standard.
- No substantive differences in the predictive ability of the IRAS PIT to predict a return to the department of correction were found across sex, race, or offense types.

***IRAS Supplemental Reentry Tool (SRT)***

- Full Results, Tables, and Figures for the SRT can be found on pages 73-84.

***Outcome: New Conviction within 3-Years of the Assessment***

- The IRAS SRT was a significant predictor of a new conviction (AUC = 0.60). This AUC value fell within the industry standard of predictive power.
- The SRT's predictive power was significantly stronger for clients convicted of offenses categorized as other (AUC = 0.64) in comparison to clients convicted of substance related offenses (AUC = 0.54).
- No substantive differences were identified in the SRT's overall ability to predict new conviction across sex and race.

***Outcome: Return to Department of Correction within 3-Years of the Assessment***

- The IRAS SRT was a significant predictor of a return to the department of correction (AUC = 0.60). This AUC value fell within the industry standard of predictive power.
- No substantive differences in the predictive ability of the IRAS SRT to predict a return to the department of correction were found across sex, race, or offense types.

***IRAS Static Tool***

- Full Results, Tables, and Figures for the Static Tool can be found on pages 84-90.

***Outcome: New Conviction within 3-Years of the Assessment***

- The IRAS Static Tool was a non-significant predictor of a new conviction (AUC = 0.49) within 3-years of the assessment. As such, the Static Tool was not found to be a valid tool within the sample under study.
- No substantive differences were identified in the IRAS Static Tool's ability to predict new conviction across sex or race.

#### ***IYAS Detention (DET) Tool***

- Full Results, Tables, and Figures for the DET Tool can be found on pages 90-96.

##### ***Outcome: New Referral within 3-Years of the Assessment***

- The IYAS DET Tool was a significant predictor of a new referral within 3-years of the assessment; however, the AUC value (0.53) was weak and fell below the industry standard.
- No substantive differences were found in the DET Tool's overall ability to predict a new referral across sex, race, offense types, or across county.

#### ***IYAS Diversion (DIV) Tool***

- Full Results, Tables, and Figures for the DIV Tool can be found on pages 96-103.

##### ***Outcome: New Referral within 3-Years of the Assessment***

- The IYAS DIV Tool was a significant predictor of a new referral within 3-years of the assessment. Further, the AUC value of 0.58 fell within the industry standard of predictive power.
- Substantive differences were identified in the IYAS DIV Tool's predictive ability across race and offense types. Specifically, the tool had stronger predictive ability for White youth in comparison to Black youth, as well as for youth referred for property offenses in comparison to youth referred for offenses categorized as other. Notably, the tool was still found to be a significant predictor of a new referral for Black youth and youth referred for offenses categorized as other.
- Substantial variation was identified in the predictive ability of the IYAS DIV across county type as the DIV Tool had stronger predictive power in urban counties (AUC = 0.58) than rural counties (AUC = 0.53). Notably, the tool was still a significant predictor in rural counties.

#### ***IYAS Disposition (DIS) Tool***

- Full Results, Tables, and Figures for the DIS Tool can be found on pages 103-111.

##### ***Outcome: New Adjudication within 3-Years of the Assessment***

- The IYAS DIS Tool was a significant predictor of a new adjudication within 3-years of the assessment. However, the AUC value of 0.53, while significant, is weak and below the values generally accepted across the industry.
- Significant variation was found in the tool’s predictive ability across race. That is, the tool was found to be a non-significant predictor of recidivism for youth identified as an Other racial category. Further, the AUC value for Other youth was found to be significantly lower than the AUC value for Black youth.
- No substantial variation was found in the overall ability of the DIS Tool to predict new adjudication across sex, offense types, or across urban and rural counties.

***IYAS Residential (RES) Tool***

- Full Results, Tables, and Figures for the RES Tool can be found on pages 112-119.

***Outcome: New Adjudication within 3-Years of the Assessment***

- The IYAS RES Tool was a significant predictor of new adjudication within 3-years of the assessment; however, the AUC value (0.55) fell at the lowest end of the industry standard.
- No significant or substantive differences were identified in the predictive ability of the IYAS RES Tool across sex, race, or offense types.

***IYAS Reentry (RT) Tool***

- Full Results, Tables, and Figures for the RT Tool can be found on pages 120-128.

***Outcome: New Adjudication within 3-Years of the Assessment***

- The IYAS RT Tool was a significant predictor of new adjudication within 3-years of the assessment; however, the AUC value (0.55) fell at the lowest end of the industry standard.
- No significant or substantive differences were identified in the predictive ability of the IYAS RT Tool across sex, race, offense types, or across rural and urban counties.

**Summary of Limitations**

- Given differences between each tool examined in the current study, some limitations only apply to certain tools. These limitations are discussed in detail starting on page 130. However, some limitations were consistent across tools. These limitations included:
  - Issues matching the data files containing assessment data with data files containing recidivism data.
  - Low prevalence rates of recidivism measures.

- Not having access to key variables that may influence the validity of tools (e.g., release date from prison).
- Missing data and data inconsistencies existing throughout the databases used in the current study. For example, in some cases it was not possible to identify whether a court case ended in a conviction or dismissal for adults, or an adjudication or dismissal for youth.
- Although the overall reliability of the IRAS and IYAS tools were strong, some reliability concerns were highlighted throughout the reliability study conducted by Manchak et al. (2019). These reliability issues could potentially lead to issues with the validity of the tools. For example, for the PIT, 4 of the 5 risk and need domains were identified as having either low-moderate or poor interrater reliability in the previously conducted reliability analysis.<sup>4</sup> Low-moderate or poor interrater reliability can signal inconsistencies in the scoring of domains, which in turn, could explain why several items in the Criminal Lifestyle and Family and Social Support domains on the PIT were not significantly associated with recidivism. Imprecise scores of items and domains can then lead to issues in the calculation of total scores and risk levels, which likely reduces the predictive power of the tool as clients risk scores and levels may not be correctly classified.

## Summary of Conclusions

- 5 out of 6 IRAS tools were found to be statistically significant predictors of recidivism, with the exception being the Static Tool. The PAT, CST, CSST, and SRT reached acceptable levels of predictive validity, with the PIT falling just below industry standard.
- All 5 IYAS tools were found to be statistically significant predictors of recidivism. However, all the tools, besides the DIV Tool, either failed to reach acceptable levels of predictive validity or reached the low end of acceptable levels of predictive validity.
- The IRAS and IYAS tools predictive validity was generally consistent across sex, race, offense types, and county type. However, some significant variation was found in the predictive validity of various IRAS and IYAS tools across these groups. Notably, when variation did exist across groups, the current study could not identify why these differences exist. Further, the variation we observed did not consistently point in

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<sup>4</sup> Manchak, S. M., Petrich, D., & Willoughby, E. (2019). A reliability study for the Indiana Risk Assessment System: Final report. *University of Cincinnati Corrections Institute*.

one direction, so we do not recommend adjustments to the tool to address concerns over group differences.

## Summary of Recommendations

We offer a series of recommendations around the use of the IRAS/IYAS Tools, future data collection, and consideration of future research for the IRAS/IYAS Tools. These recommendations are detailed further starting on page 145.

- **Recommendation 1: Continue to use the IRAS and IYAS tools as designed.** All tools (with the exception of the Static Tool) were found to be significant predictors of recidivism. Further, as can be seen in the majority of the included figures within the report, the pattern of recidivism trends as expected (i.e., low risk clients have the lowest rates of recidivism, followed by moderate, and then high (and very high for some tools) risk clients), suggesting the tools are correctly classifying a large proportion of clients supervised within the state of Indiana.
- **Recommendation 2: Review the purpose and/or goal of the IRAS Static Tool.** The Static Tool was the only tool within the current study that did not significantly predict recidivism. Further, there are additional concerns with Static Tool that are outlined in detail starting on page 136. Given these factors, it is recommended that Indiana review the overall purpose and goal of the Static Tool as it may not be a tool that helps agencies identify risk of recidivism.
- **Recommendation 3: Continue to invest in continuous quality improvement (CQI) related to the IRAS and IYAS.** This includes, but is not limited to, the following:
  - Continue to obtain buy-in from key stakeholders around the use of the IRAS and IYAS tools.
  - Ensure that current policies and practices are logical and tailored to the environment in which they are monitored. This includes a review of policies and practices on when tools are used, when clients are reassessed, override decisions, the connection between assessment results and case planning and service referrals, and expectations and suggestions for sharing assessment information with outside stakeholders (e.g., external service providers) effectively.
  - Continue to provide ongoing training/coaching on the IRAS and IYAS for staff certified in the use of the tools. The training/coaching should include a focus on staff interview skills, scoring, and overall use of the tool(s).



- During training/coaching sessions, there should be an emphasis on translating the results of the assessment into practice. For example, the results of the assessments can help inform supervision level decisions (e.g., frequency of contact), expectations for treatment referrals, and how to conduct effective case planning.
- Establish quality assurance policies that can help maintain the fidelity of the tools.
- Ensure that jurisdictions using an IRAS or IYAS tool(s) have services in place that address the need areas identified on the IRAS and IYAS assessments.

- ***Recommendation 4: Review and adjust data collection efforts related to risk assessment information.***

This can include, but is not limited to:

- Review and adjust how recidivism measures (e.g., arrest, referral, conviction, adjudication, return to DOC) are tracked. One possibility is to develop systems that track clients assessed by specific IRAS and IYAS tools with recidivism measures. For example, for clients assessed by the IRAS PAT, when their court case is disposed, a system should be in place to ensure failure to appear warrants are properly entered on the court case record.
- Ensure that recidivism measures are tracked consistently across the state.
- Develop quality assurance measures to review data related to clients, assessments, and recidivism.

- ***Recommendation 5: Conduct a prospective study to re-examine the validity of the IRAS and IYAS tools.***

Conducting a prospective study would allow a research team to more deeply explore whether changes to the current tools would improve predictive validity. Further, a prospective design allows researchers to better control the information gathered around client data, assessment data, and recidivism data. This would increase confidence in the quality of data. With increased confidence in the data, a research team could better explore the validity of the IRAS and IYAS tools. Moreover, it would allow for a stronger examination and consideration of factors such as the weighting of items, the removal or adjustment of items, the construction of risk and need domains, and adjustment to risk/need levels.

- ***Recommendation 6: Further examine sources of variation in predictive accuracy across groups (e.g., racial, sex, and offense type groups).*** Although the IRAS and IYAS tools predictive validity was relatively consistent across sex, race, and offense types, some variation did exist. The current study could not identify why variation existed across these sex, race, and offense type groups. As such, those differences

should be noted and monitored. Future studies surrounding the IRAS and IYAS (e.g., such as the prospective study suggested above) should examine these differences further.

## INTRODUCTION

Criminal justice agencies across the country have increasingly incorporated risk-and-needs assessment tools into their practices. These tools are designed to predict justice-involved individuals' risk for future criminal behavior by capturing factors that are found to be related to recidivism (Andrews & Bonta, 2010). Results from risk-and-need tools are commonly used to guide decisions about diversion, case management, supervision, and placement practices (Barnoski, 2004; Cunningham & Sorensen, 2006; Meredith et al., 2007; Viglione et al., 2015). In other words, risk-and-needs assessment is intended to help agencies be more effective and efficient.

The State of Indiana adopted two risk assessment systems developed by the University of Cincinnati: the Indiana Youth Assessment System (IYAS) for juveniles and the Indiana Risk Assessment System (IRAS) for adults. A principal goal for adopting these systems was to ensure consistency across criminal justice agencies in the State. Since adopting the IRAS and the IYAS, Indiana has implemented system-wide policies for administering these assessment instruments and they have been used with justice-involved populations at various points in the criminal and juvenile justice systems (Indiana Risk Assessment System, 2010, Policy and Procedure; Indiana Youth Assessment System, 2010, Policy for Indiana Youth Assessment System). In using the IRAS and the IYAS, practitioners can identify clients who are most at risk of recidivating, while also identifying the areas that need to be targeted in treatment to reduce risk. This is because both systems conform to the principles of effective classification (i.e., risk, need, responsivity). As a result, by using the IRAS and the IYAS, practitioners are encouraged to efficiently allocate supervision resources and structure decision-making in a manner that reduces the likelihood of recidivism (Latessa et al., 2009).

The IRAS and the IYAS are made up of multiple tools, each intended for use with clients at specific points in the criminal and juvenile justice systems. Specifically, the IRAS comprises six different tools for adults including a Pre-trial Assessment Tool (PAT), a Community Supervision Tool (CST), a Community Supervision Screening Tool (CSST), a Prison Intake Tool (PIT), a Supplemental Reentry Tool (SRT), and a Static Tool. Likewise, the IYAS consists of five different tools for juveniles including a Diversion Tool (DIV), a Detention Tool (DET), a Disposition Tool (DIS), a Residential Tool (RES), and a Reentry Tool (RT). While initially constructed for use with justice-involved individuals in Ohio, the IRAS and the IYAS were adapted to meet the needs of justice-involved persons in Indiana. Prior work validated the IRAS and IYAS (Latessa et al., 2013; Latessa & Lovins, 2012), demonstrating that the tools significantly distinguish between risk levels for criminal and juvenile justice populations in Indiana. In other words, the tools can separate individuals in the Indiana justice system into risk

groups based on their likelihood to recidivate, they can identify factors that need to be targeted for successful treatment, and they can capture potential barriers that would hinder the effectiveness of treatment.

More recently, researchers tested the reliability of the tools to determine if assessors are scoring the tools correctly and consistently. The authors of the study concluded that certified and authorized assessors of the IRAS and IYAS tools in the State of Indiana do in fact rate the tools in a reliable and accurate manner (Manchek et al., 2019). Together, these studies indicate that the two risk assessment systems adopted by Indiana are useful tools for guiding decision making for justice-involved individuals.

Best practice recommends that risk tools be revalidated regularly to account for changes in the population, as well as changes in local crime trends, laws, and practices (Andrews et al., 2006; Schwalbe, 2007; Vincent et al., 2012). Such changes are likely to impact how well risk assessment tools perform over time. Through revalidations, criminal and juvenile justice practitioners can ensure that risk tools continue to capture risk accurately among their populations. Further, with increasing concern over the performance of risk assessments across sub-groups (Eckhouse et al., 2019; Harbinson et al., 2019), revalidations provide new opportunities to assess whether a tool predicts risk with similar accuracy across different sub-groups of the population (e.g., race, sex, ethnicity, or offender type). Given the importance of regular revalidations and the need to ensure unbiased performance across sub-groups, the Indiana Office of Court Services partnered with the University of Cincinnati Corrections Institute (UCCI) to revalidate 11 tools contained within the IRAS and IYAS. This report discusses the results of the revalidation study. The remainder of the report provides a brief overview of the IRAS and IYAS, followed by a detailed discussion of the methods used to examine the validity of the tools, and the presentation of results for each tool. Finally, the report ends with recommendations for improving the use of the tools and further exploring the validity of the two risk assessment systems.

## **BACKGROUND**

Justice agencies are tasked with making decisions that have significant implications for the allocation of resources, for the rehabilitation of justice-involved individuals and more broadly, for the safety of the public. To be sure, these agencies decide who is sentenced to prison or probation, what conditions individuals under supervision receive, and how violations are handled. Historically, such decisions were guided by personal experience, professional judgment, and a person's understanding about effective methods to prevent future criminal behavior. Given the implications of such decisions, however, best-practices have been developed to help guide decision-making with evidence-based systems. One such system is risk-and-needs assessment tools.

These tools can assess an individual's risk of recidivating so that more effective decisions can be made about supervision and treatment (Baglivio & Jackowski, 2013; Bechtel et al., 2011; Desmarais et al., 2018). Conforming to the principles of effective classification (i.e., the risk, need, and responsivity principles or RNR principles), these assessments help agencies identify individuals most at risk for recidivating, thereby allowing them to deliver effective interventions (Andrews & Bonta, 2010).

The RNR principles are beneficial for agencies specifically because they guide correctional staff in their decisions about who requires the most intensive rehabilitative services and how those services are best provided (Andrews & Bonta, 2010). More specifically, the *risk* principle in the RNR model indicates that the level of supervision and treatment an individual receives should be determined by their risk of recidivism. Following from this principle, to reduce the likelihood of recidivism, it is recommended that lower risk clients receive little supervision and services, while higher risk clients receive intensive levels of supervision and a greater number of services.

The *need* principle states that to reduce the likelihood of recidivism, interventions and services need to identify and address an individual's dynamic risk factors or criminogenic needs (i.e., antisocial attitudes, antisocial peers, antisocial personality characteristics, family and marital discord, poor education/employment performance, few pro-social leisure activities, and substance abuse).

The *responsivity* principle highlights that the most effective interventions and services use cognitive behavioral interventions and social learning strategies that are tailored to clients by considering specific characteristics such as intelligence, mental health, motivation, transportation, childcare, language, cultural barriers, history of trauma, among others.

Consequently, by using risk-and-needs assessments that adhere to the RNR principles, agencies are better able to identify who to focus on, what to focus on, and how to deliver treatment and services to be most effective. Correctional programs that use risk-and-needs assessments and adhere to the RNR model are more effective in changing behavior, and ultimately, reducing recidivism (e.g., Andrews et al., 1990; Dowden & Andrews, 1999; Dowden & Andrews, 2000; Lowenkamp, Latessa, & Smith, 2006; Lowenkamp, Smith, et al., 2006; Smith et al., 2009). Thus, as indicated by Bonta (2007, pg. 520), "the value of risk/need instruments is not limited to decisions around who should be supervised more closely or who should be kept in custody for the protection of the public. Because these instruments also sample criminogenic needs, they can be used to direct rehabilitation services in order to reduce offender risk."

## IRAS and IYAS

In line with the RNR principles, the IRAS and IYAS were designed to identify static risk factors (i.e., factors that cannot be changed), dynamic risk factors (i.e., factors that can be changed), and barriers to treatment. Each risk assessment system has separate tools that can be used with clients at specific points in the criminal and juvenile justice system. Having multiple tools is advantageous because it allows for more accurate assessments of risk as populations move through the justice systems. For example, individuals on community supervision are likely different from the population of individuals who are in prison (Latessa et al., 2009). And given that it is unlikely for a single instrument to have universal applicability across various justice-involved populations, multiple risk assessment tools for specific target population becomes necessary (Wright et al., 1984).

The IRAS and IYAS together contain ten complete tools and two screening tools. Specifically, the five complete IRAS assessments are the Pre-trial Assessment Tool (PAT), the Community Supervision Tool (CST), the Prison Intake Tool (PIT), the Supplemental Reentry Tool (SRT), and the Static Tool. The IRAS also contains the Community Supervision Screening Tool (CSST), which acts as a shortened version of the CST. The CSST allows agencies to process clients more efficiently through the assessment process. Specifically, the CSST contains a select number of items from the CST that identifies clients as either low or high risk. Clients who are identified as high risk to recidivate are then given the full CST assessment to better capture their criminogenic risk and needs. Clients identified as low risk on the CSST do not have to take part in the full CST, which allows agencies to save time and resources.

The IYAS contains five complete tools, including the Diversion Tool (DIV), Detention Tool (DET), Disposition Tool (DIS), Residential Tool (RES) and Reentry Tool (RT). There is also a Dispositional Screener tool, which is a shortened version of the DIS.<sup>5</sup> This screener tool works in the same manner as the CSST. Notably, the Dispositional Screener was not part of the current study.

Each tool in the IRAS and IYAS suite contains a specific number of items and domains that assess the client's risk and needs based on the stage of the criminal or juvenile justice system in which they are supervised. Although the items and domains differ by tool, they generally assess the areas of (1) criminal (or juvenile) justice history, (2) family and living arrangements, (3) peers and social support, (4) education, employment, and finances, (5) pro-social skills, (6) substance abuse, mental health, and personality, and (7) values, beliefs, and attitudes.

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<sup>5</sup> The Dispositional Screener Tool includes six items. Each of these six items are contained within the full IYAS DIS Tool.

Table 1 displays a detailed breakdown of the IRAS and IYAS Tools. Specifically, for the 11 tools being examined in the current study, this table shows the number of items contained in each tool, the names of the risk and need domains contained within the tool (if applicable), the risk levels identified on the tool, and the cutoff scores for risk level.

Table 1. Description of the IRAS and IYAS Tools

Tool	Number of Items	Risk and Need Domains	Risk Level Cutoff Scores
IRAS PAT	7 items	None	Low: 0 – 2 Moderate: 3 – 5 High: 6+
IRAS CST	35 items	<ol style="list-style-type: none"> <li>1. Criminal History (6 items)</li> <li>2. Edu., Emp., &amp; Financial Situation (6 items)</li> <li>3. Family and Social Support (5 items)</li> <li>4. Neighborhood Problems (2 items)</li> <li>5. Substance Use (5 items)</li> <li>6. Peer Associations (4 items)</li> <li>7. Criminal Attitude and Behavioral Patterns (7 items)</li> </ol>	<p><i>Males</i></p> <p>Low: 0 – 14 Moderate: 15 – 21 High: 22 – 29 Very High: 30+</p> <p><i>Females</i></p> <p>Low: 0 – 13 Moderate: 14 – 21 High: 22+</p>
IRAS CSST	9 items	None	Low: 0 – 2 High: 3+
IRAS PIT	31 items	<ol style="list-style-type: none"> <li>0. Age at Time of Assessment (1 Item)</li> <li>1. Criminal History (7 items)</li> <li>2. School Behavior and Employment (6 items)</li> <li>3. Family and Social Support (5 items)</li> <li>4. Substance Abuse and Mental Health (5 items)</li> <li>5. Criminal Lifestyle (7 items)</li> </ol>	<p><i>Males</i></p> <p>Low: 0 – 8 Moderate: 9 – 16 High: 17 – 24 Very High: 25+</p> <p><i>Females</i></p> <p>Low: 0 – 12 Moderate: 13 – 18 High: 19+</p>
IRAS SRT	32 items	<ol style="list-style-type: none"> <li>0. Age at Time of Assessment (1 Item)</li> <li>1. Criminal History (8 items)</li> <li>2. Edu., Emp., &amp; Social Support (7 items)</li> <li>3. Substance Abuse &amp; Mental Health (4 items)</li> <li>4. Criminal Attitudes &amp; Behavioral Patterns (12 items)</li> </ol>	<p><i>Males</i></p> <p>Low: 0 – 8 Moderate: 9 – 14 High: 15 – 20 Very High: 21+</p> <p><i>Females</i></p> <p>Low: 0 – 10 Moderate: 11 – 18 High: 19 – 22 Very High: 23+</p>



IRAS Static	8 items	None	<p><i>Males</i>  Low: 0 – 1  Moderate: 2 – 3  High: 4 – 6  Very High 7+</p> <p><i>Females</i>  Low: 0 – 3  Moderate: 4 – 5  High 6+</p>
IYAS DET	6 items	None	<p><i>Males</i>  Low: 0 – 2  Moderate: 3 – 4  High 5 – 7</p> <p><i>Females</i>  Low: 0 – 3  Moderate: 4 – 5  High: 6 – 7</p>
IYAS DIV	6 items	None	<p>Low: 0 – 1  Moderate: 2 – 4  High: 5 – 7</p>
IYAS DIS	32 items	<ol style="list-style-type: none"> <li>1. Juvenile Justice History (2 items)</li> <li>2. Family &amp; Living Arrangements (6 items)</li> <li>3. Peers &amp; Social Support Network (6 items)</li> <li>4. Education &amp; Employment (4 items)</li> <li>5. Pro-Social Skills (3 items)</li> <li>6. Substance Abuse, Mental Health, &amp; Personality (6 items)</li> <li>7. Values, Beliefs, and Attitudes (5 items)</li> </ol>	<p><i>Males Males</i>  Low: 0 – 11  Moderate: 12 – 18  High: 19 – 33</p> <p><i>Females</i>  Low: 0 – 12  Moderate: 13 – 18  High: 19 – 33</p>
IYAS RES	33 items	<ol style="list-style-type: none"> <li>1. Juvenile Justice History (3 items)</li> <li>2. Family &amp; Living Arrangements (3 items)</li> <li>3. Peers &amp; Social Support Network (7 items)</li> <li>4. Education &amp; Employment (3 items)</li> <li>5. Pro-Social Skills (4 items)</li> <li>6. Substance Abuse, Mental Health, &amp; Personality (8 items)</li> <li>7. Values, Beliefs, and Attitudes (5 items)</li> </ol>	<p>Low: 0 – 11  Moderate: 12 – 18  High: 19 – 34</p>

IYAS RT	41 items	<ol style="list-style-type: none"> <li>1. Juvenile Justice History (7 items)</li> <li>2. Family &amp; Living Arrangements (4 items)</li> <li>3. Peers &amp; Social Support Network (9 items)</li> <li>4. Education &amp; Employment (4 items)</li> <li>5. Pro-Social Skills (4 items)</li> <li>6. Substance Abuse, Mental Health, &amp; Personality (7 items)</li> <li>7. Values, Beliefs, and Attitudes (6 items)</li> </ol>	<p>Low: 0 – 15</p> <p>Moderate: 16 – 24</p> <p>High: 25 – 42</p>
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Notes: IRAS = Indiana Risk Assessment System; IYAS = Indiana Youth Assessment System; PAT = Pre-trial Assessment Tool; CST = Community Supervision Tool; CSST = Community Supervision Screening Tool; PIT = Prison Intake Tool; SRT = Supplemental Reentry Tool; DET = Detention; DIV = Diversion; DIS = Disposition; RES = Residential; RT = Reentry; Edu. = Education; Emp. = Employment.

## Validation of the IRAS and IYAS

The Indiana risk assessment systems were adapted from the Ohio Risk Assessment System (ORAS) and Ohio Youth Assessment System (OYAS). The ORAS and OYAS were initially developed and validated as a statewide system to assess the risk and needs of justice involved-individuals in Ohio (Latessa, Lovins et al., 2009; Latessa, Smith et al., 2009). Based on the development and validation of the ORAS and OYAS, the Indiana Judicial Center contracted with the University of Cincinnati, Center for Criminal Justice Research to validate the risk assessment systems using justice populations in Indiana.

Validation is the process of determining how well a tool performs at predicting risk—referred to as predictive validity. Validation of a risk assessment tool is important for several reasons. First, validations can determine if an instrument performs well in predicting the targeted outcome (i.e., recidivism). A valid instrument will identify distinct groups of individuals in the justice systems who pose different levels of risks to public safety. Second, because there are differences in individual characteristics, laws, agency policies, and local supervision conditions, it is likely that an instrument that accurately classifies risk in one state might not work as well in another state. For example, items that predict recidivism in a state with several services for justice-involved individuals may not predict recidivism in a state with fewer resources (Monahan & Skeem, 2016). Subsequently, through the validation process, we can ensure that risk tools are useful to the specific populations for which they are intended. Results of a validation study can help adjust a tool and change the items and weights to fit the targeted population. Such processes have shown promise (Barnoski & Drake, 2007; Duwe, 2019; Duwe & Rocque, 2019; Hamilton et al., 2016; 2021). Finally, because an instrument must be fair to all criminal and juvenile justice sub-groups, validation provides an opportunity to examine how an instrument performs across different groups. For example, through validation we can test if an instrument overestimates

risk for females compared to males, thus ensuring that supervision and programming levels reflect actual levels of risk.

Prior work validated the IRAS and IYAS in Indiana. Validating the IRAS involved collecting data on risk assessments from 28 jurisdictions in Indiana. The sites for the study were selected based on geographic representation across the state, recommendations from Indiana staff, and whether the site was available and willing to participate during the data collection process. Data collection took place from April to July 2009 and adults who were either on probation or within 6 months of release from prison were assessed with an appropriate instrument (i.e., CST, CSST and Reentry Tool). A sample of 988 individuals were followed for a period ranging from 22 to 26 months to observe whether they would be arrested for a new crime. Arrest data were collected from the Federal Bureau of Investigation (see Latessa et al., 2013 for more information).

Findings from this study resulted in revisions to the original (i.e., the ORAS) risk level cut-off points on some tools. This was done to provide a more even distribution of cases by risk and to distinguish between recidivism rates more accurately for the Indiana study sample. Overall, the results from this study indicated that the three tools tested (i.e., CST, CSST and RT) significantly distinguished between risk levels. For example, using the CST, it was found that recidivism rates increased with risk level, with low-risk males recidivating at a rate of 13%, moderate risk males recidivating at a rate of 28%, high risk males recidivating at a rate of 42%, and very high-risk males recidivating at a rate of 56%. Further, despite the weaker correlation among females, recidivism rates were still found to increase with increases in risk level.

The procedure for validating the IYAS involved obtaining data from 21 counties and 6 juvenile correctional facilities in Indiana. Because of limitations regarding access to youth pre-adjudication, only two tools—the disposition instrument (IYAS DIS) and the reentry instrument (IYAS RT)—were tested. Data were collected between February 2009 and June 2009 through face-to-face interviews with youth, self-report questionnaires, and file review. Overall, there were a total of 841 juveniles who were assessed from 18 to 22 months for new arrests. Results from the study revealed that both tools were effective at differentiating low, moderate, and high risk youth. For example, using the IYAS DIS low risk males were rearrested at a rate of 13%, moderate risk at 31%, and high risk at 48%. Similarly, low risk females were rearrested at a rate of 15%, moderate risk at 28%, and high risk at 48% (see Latessa & Lovins, 2012 for more information).

## Reliability of the IRAS and IYAS

To be valid, an instrument must be reliable. Reliability in this context means consistency between the assessors who score an instrument. In other words, if two assessors were asked to score the same client, a reliable instrument is one that would lead both assessors to converge on the same (or similar) score (DeVellis, 2012). Reliability and validity are interrelated such that an instrument that has weak reliability will have weak validity (Duwe & Rocque, 2019). Thus, if a tool does not accurately predict the outcome of interest (i.e., recidivism), and the reliability assessment demonstrates low internal reliability between staff, it may be possible to improve validity by focusing on reliability. For example, it may help to ensure all assessors use the same definitions for risk and need to prevent variation.

To ensure reliability of the IRAS and IYAS, a previous study was completed in 2019 on the IRAS and IYAS tools (Manchak et al., 2019). This study found that certified and authorized users of the IRAS and IYAS tools in the State of Indiana can rate the tool in a reliable and accurate manner. The tools included in the reliability study were the IRAS PAT, CST, PIT, and SRT, as well as the IYAS DET, DIV, DIS, RES, and RT tools. Using various measures such as average deviation from criterion score, average agreement with criterion score, and inter-rater reliability estimates, the authors concluded that when users have access to all the necessary information to decide on a score for an item, reliability is high.

Manchak and colleagues (2019) found no major areas of concern for any of the risk assessment tools evaluated at the level of total score. However, a series of minor concerns were uncovered for most tools. As such, recommendations were provided that could help increase reliability in specific domains for specific tools (see Manchak et al., 2019 for more information). For example, the inter-rater reliability results for the IRAS CST found poor interrater reliability for the “Criminal History” domain. In contrast, acceptable interrater reliability was found for the “Education/Employment”, “Substance Use”, “Peer Associations”, and “Criminal Attitudes and Behavioral Patterns” domains, as well as for the total score. Similarly, looking at average agreement with criterion score, results for the IYAS RT Tool show high overall agreement to criterion for the total score, with 91% of users meeting good to excellent agreement to criterion. When looking at each domain, however, moderate reliability to criterion scores was observed for the “Family and Living Arrangements” and “Prosocial Skills” domains; good reliability was observed in the “Education and Employment” domain; and excellent reliability was observed for the remaining domain scores. Overall, results from the reliability study indicate

acceptable levels of reliability for the IRAS and IYAS tools. This study will, therefore, help inform the current re-validation study.

## **Revalidation of IRAS and IYAS**

Once a correctional agency adopts a valid risk assessment tool, the agency must consistently monitor and work to improve the performance of the tools. One way of doing this is by revalidating the tool on a regular basis. Revalidating a tool is important for two reasons. First, test settings in which risk assessment tools were initially developed and validated often change over time. Examples include changes in population-level recidivism rates, changes in justice populations (such as average age or length of sentence), new sentencing legislation, budget changes, and changes in program and service offerings. As a result of such changes, the performance of a risk assessment tool may be impacted in a particular setting. Thus, through revalidation we can determine if a tool needs modification for optimal performance.

The second reason for revalidation concerns the performance of a tool across different groups in a population. With risk assessment tools expanding to guide decision-making across various stages of the criminal and juvenile justice systems, debates have ensued about whether these tools operate equally across demographic groups (Eckhouse et al., 2019; Geraghty & Woodhams, 2015). Some recent work suggests that validity of tools might differ by sex, race, and ethnicity (Anderson et al., 2016; Matz et al., 2020; Rembert et al., 2014; Schwalbe et al., 2006). For example, Anderson and colleagues (2016) found that the Youth Level of Service/Case Management Inventory (YLS/CMI) exhibited lower validity for girls compared to boys, while Rembert et al. (2014) found the Los Angeles County Needs Assessment Instrument (LAC) performed better for White and Hispanic clients compared to African American clients.

Other research suggests that while certain tools show variation across groups, they continue to be effective at predicting risk for all groups (Harer & Langan, 2001; Smith et al., 2009; Thompson & McGrath, 2012). Collectively, this body of research suggests that correctional agencies must carefully consider the issue of differential prediction of their risk tools for various groups that might exist in the population.

Beyond race, ethnicity, and gender, however, little work has been done to understand if risk assessments developed out of the RNR framework are applicable across various offense types. A study by Reisig et al. (2006), found that while the Level of Service Inventory–Revised (LSI-R) did not predict well for gendered pathways, it did predict well for females who followed an economically motivated pathway into crime. Thus, by revalidating

a tool, various groups can be oversampled to provide further evidence that the risk assessment tools are able to predict recidivism across multiple groups from the same population.

Given the importance of regular revalidations of risk assessment tools and the amount of time that has passed (roughly 10 years) since the initial validation of the IRAS and IYAS tools, revalidation becomes particularly salient to ensure that the tools are performing optimally and predicting recidivism accurately for different population groups in Indiana. Further, the results of the recent reliability study by Manchak and colleagues (2019) makes revalidation of the IRAS and IYAS particularly advantageous. Because the results showed that users of these instruments score tools in a reliable and accurate manner, there is an increased likelihood that the results of a revalidation will be minimally impacted by reliability issues. As such, confidence in the reliability of the tools provides an opportunity to revalidate the tools without significant concern that problems with scoring are impacting results. However, while the reliability study did not identify significant concerns with reliability, the study did uncover small issues throughout the suite of IRAS and IYAS tools. Thus, these results will help contextualize the results we present below.

## **Revalidating the IRAS and IYAS Tools**

In 2014, the Indiana Office of Court Services contracted with the University of Cincinnati Corrections Institute with the goal of revalidating the IRAS and IYAS instruments across the state of Indiana.<sup>6</sup> Specifically, the current study aims to validate six IRAS tools including the PAT, CST, CSST, PIT, SRT, and Static Tool, as well as five IYAS tools including the DET, DIV, DIS, RES and RT. Beyond examining the overall predictive validity of the tools, this study will also focus on understanding whether the validity of the tools tends to vary across sex, race, offense types, and county type (i.e., urban and rural). Importantly, while analyses across groups will examine all aspects of the tools (e.g., items and domains), the primary focus of our study is on variation in the each tool's overall ability to predict recidivism across the various groups.

## **METHODOLOGY**

### **Data Sources**

Data for the current project was gathered from multiple sources, all of which were provided by Indiana government offices or from authorized partners. Risk assessment information for both the IRAS and IYAS tools

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<sup>6</sup> The period between the contract and final report was a result of a number of factors. These include, but are not limited to, the COVID-19 pandemic, significant staff turnover, and unexpected delays in data sharing.

were gathered from Indiana’s Incite Risk Assessment Application system. This system also contains information related to client demographic information (e.g., sex, race, date of birth, and offense types). For outcomes (i.e., measures of recidivism) related to the IRAS tools, data were drawn from the Indiana Prosecuting Attorneys Council (IPAC) Case Management System, the Indiana Department of Correction (IDOC) database, and the Odyssey Case Management System maintained by the Indiana Office of Court Technology. Outcome data for the IYAS instruments were taken from the Quest Case Management System and the Odyssey Case Management System. Additionally, Division of Youth Services (DYS) data was provided by the Department of Correction.

## **Measures of Recidivism**

The dependent variable for the current project was recidivism. However, recidivism will be defined in different ways depending on the specific tool being analyzed. Further, each IRAS tool had two main measures of recidivism, while each IYAS tool had one main measure of recidivism. Additionally, additional measures of recidivism were used for each tool as a sensitivity check. Each measure of recidivism was chosen in collaboration with the Indiana Office of Court Services and the Indiana validation study workgroup. The recidivism measures for each tool are defined below. Each tool’s primary measures of recidivism are listed in Table 2.

**IRAS PAT.** The first main measure of recidivism for the PAT was whether a client received a failure to appear (FTA) warrant within 1-year of the assessment.<sup>7</sup> The second main measure of recidivism for the PAT was whether a client received a new case filed for a criminal offense within 1-year of the assessment. Initially, a new arrest was going to be used as a measure of recidivism; however, large portions of missing data were found within the arrest data. To overcome this limitation, a new case filed was used as a proxy measure for arrest, while acknowledging that not all clients who are arrested will have a case file opened in court. As such, all IRAS tools that were initially going to examine new arrest will examine a new case filed as a measure of recidivism. The first additional measure of recidivism for the PAT was whether a client received a FTA warrant within 2-years of their assessment. The second additional measure of recidivism for the PAT was whether a client had a new case filed within 2-years of the assessment.

**IRAS CST and CSST.** The main measures of recidivism for both the CST and CSST were (1) a new case filed within 3-years of the assessment and (2) a new conviction within 3-years of the assessment. The additional

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<sup>7</sup> The initial plan was to examine whether an individual received a FTA warrant during the length of their court case (i.e., from the time they were assessed through the time their case concluded in court). However, data limitations restricted the research team from matching each clients PAT assessment with the correct court case. As such, this is a limitation of this measure that will be discussed in more detail in the Conclusion and Recommendation section of the report.

measures of recidivism for these tools were a new case filed any time post-assessment and a new conviction any time post-assessment. Notably, identifying whether a client was convicted for a new crime was determined by examining the disposition outcome of their case. In some instances, the disposition was either unknown or unclear (e.g., mistrial) as to whether the client was convicted or not. In those instances, cases were marked as missing, as we could not confidently determine whether the case ended in a formal conviction or dismissal. This process remained for all IRAS tools that used new conviction as a measure of recidivism.

**IRAS PIT.** The first main measure of recidivism for the PIT was a new conviction within 3-years of the assessment. The second main measure of recidivism for the PIT is a return to the Department of Correction (DOC) *any time* post-assessment. A return to DOC any time post assessment was used as opposed to a return to DOC within 3-years of the assessment because there was a very low prevalence rate of clients assessed by the PIT who returned to DOC. Specifically, only 7% of the sample were identified as returning to DOC any time after the assessment, with this rate dropping to below 4% for returns within 3-years of the assessment. Statistically, it can be difficult to predict an event that happens at such a low rate (Maalouf & Siddiqi, 2014). As such, the decision was made to use return to DOC any time-post assessment to examine the event at a slightly higher prevalence rate than at 3-years post assessment. Moreover, this means that only one additional measure of recidivism was used for the PIT – any new conviction post-assessment.

**IRAS SRT.** The two main measures of recidivism for the SRT sample were (1) a new conviction within 3-years of the assessment and (2) a return to DOC within 3-years of the assessment. As such, the two additional measures of recidivism were any new conviction and any return to DOC post-assessment.

**IRAS Static Tool.** Only one measure of recidivism was used for the Static Tool – a new conviction within 3-years of the assessment. The additional measure of recidivism for the Static Tool was any new conviction post-assessment.

**IYAS DET and DIV Tools.** Unlike the majority of the adult tools, only one main measure of recidivism was used for the IYAS tools. For the DET and DIV Tools, the measure of recidivism was a new referral to court within 3-years of the assessment. Limitations with the arrest data restricted us from examining arrest as an outcome for the youth samples. A new referral was used for these two tools as they are typically used to assess youth who are in the pre-adjudication phases of the juvenile justice process. Two additional measures of recidivism were used for the IYAS tools. For the DET and DIV Tools, the two additional measures were any new referral post-assessment and a new adjudication within 3-years of the assessment.



***IYAS DIS, RES, and RT Tools.*** The main measure of recidivism for the DIS, RES, and RT Tools was a new adjudication within 3-years of the assessment. A new adjudication was used for these three tools as these assessments are given to youth who have been, or will be, formally processed by the juvenile justice system. In a similar manner as the outcome new conviction for the IRAS tools, to determine whether a youth was adjudicated in court, we examined disposition outcomes for youths' court case(s). In some instances, the dispositions were unknown or unclear (e.g., Other). Cases were marked as missing in instances in which it could not be determined whether youth were adjudicated or not. The additional measures of recidivism for these tools were any new adjudication post-assessment and a new referral to court within 3-years of the assessment.

## **Demographic Information**

A main goal of the current project was to examine the validity of the IRAS and IYAS tools across sex, race, offense types, and county types. As such, for both the adult and youth samples, cases were separated by sex (i.e., male and female), race (i.e., White, Black, and Other), offense types (i.e., violent, property, sexual offenses, substance related offenses, and other offense categories), and county types (i.e., urban and rural). For race, any client who was categorized as a racial category other than White or Black was categorized as Other. As for offenses, cases were categorized into various offense types based on a two-step process. First, using the criminal codes from the Indiana General Assembly, all offenses were categorized as either violent related, property related, sexual related, or substance related offenses. Any crimes that did not meet one of those four offense types were categorized as "other." To provide an example, the Indiana General Assembly defines offenses against the person under Article 42. As such, all crimes that fell under this article were coded as violent offenses. These offenses included homicide, battery and related offenses, kidnapping and confinement, human trafficking, and robbery. Second, for each client, the most serious offense associated with their IRAS or IYAS risk assessment was identified. The most serious offense was used to categorize the client into one of the five offense type categories. Regarding county type, each client was assigned to a rural or urban county based on the county in which the assessment was conducted. Identifying counties as urban and rural was determined by using definitions provided by Purdue University Center for Regional Development. This center identified each county within Indiana as urban, rural, or mixed (Purdue University Center for Regional Development, 2020). For this study, mixed counties and rural counties were combined into one category because the majority of IRAS and IYAS cases were assessed in urban counties.

## Sampling Strategy

Participants included in the current study can be categorized into two groups. The first group included adult clients under some form of correctional supervision in the state of Indiana. The second group included justice-involved youth under some form of supervision by the juvenile justice system or the Department of Youth Services. Independent samples of clients were gathered from the different stages of the criminal and juvenile justice systems (i.e., for each IRAS and IYAS assessment). The samples for adults included (1) pre-trial, (2) community supervision, (3) prison intake, and (4) reentry. Notably, the community supervision sample is broken into two samples, the first were clients assessed by the complete IRAS CST and the second were clients assessed by the screening version of the community tool, the IRAS CSST. Further, a sixth sample included clients assessed by the IRAS Static Tool. The Static Tool is used to assess a client's risk in lieu of the CST, PIT, or SRT if a client meets one of the following conditions: (1) a severe mental illness prohibits a client from participating in a full assessment, (2) the client either absconded from a jurisdiction or is now incarcerated in another state, or (3) the client refused to participate in the assessment process. The sample for youth included (1) detention, (2) diversion, (3) disposition, (4) residential, and (5) reentry.

To identify clients for each sample several steps were taken. First, the Indiana Office of Court Services shared with UCCI data on all clients assessed by each of the 11 IRAS and IYAS tools between January 1, 2011, and May 30, 2017. This date range was chosen to allow for a sufficient amount of follow-up time to measure recidivism. Specifically, each client included in the sample was followed for a minimum of 3-years and with a maximum follow up time of just over 9-years. The last date recidivism data was collected was December 31, 2020.

Second, the Indiana Office of Court Services were interested in examining the validity of the various tools across sex (i.e., males and females), race (i.e., White, Black, and Other), and offense types (i.e., violent, property, sexual, substance, and other offenses). To accomplish this, clients were categorized into sex, race, and offense type groups based on information gathered from the Indiana Risk Assessment Application system. Once categorized, a power analysis was conducted to determine what the sufficient sample size would need to be to validate the various tools across groups. The power analysis revealed that the sample size should be at least 200. From there, a stratified random sampling strategy was used to capture a minimum of 200 clients for each sex, race, and offense type group. Importantly, the 200-client threshold was a minimum, so many groups contained a far larger sample than the minimum. In some instances, mainly for clients associated with sexual

offenses, less than 200 clients met the criteria of a specific group. In these instances, the cases were still included in the final sample, but validation analyses for the specific group could not be conducted.

The third step taken to form the samples was to identify the most recent IRAS or IYAS assessment for each client. That is, if a client was assessed by a tool on multiple occasions, the most recent assessment was used for the current study. Fourth, duplicate cases were removed when they were identified, as clients were often entered into the system more than once.

Fifth, a two-step matching process was taken to match assessment data to recidivism data. The first matching technique was an exact match of clients first name, last name, birth year, birth month, and the last four digits of their social security number between the assessment file and the data files in which recidivism measures were extracted. The second matching technique was used for cases in which exact matches could not be identified. Specifically, an approximate matching, or probabilistic matching, technique was conducted by utilizing the dtalink command in Stata (Kranker, 2018). This technique allows for various levels of matching confidence by matching cases separately on key variables – in this case these variables were first name, last name, birth month, birth year, and last four numbers of the social security number. Briefly, dtalink is a probabilistic linking method used when files cannot be linked with a unique identifier. This matching technique examines potential matching pairs (i.e., a case from the assessment file and a case from the recidivism file) by examining the probability that the pair is a match based on select variables. In this study, this matching technique helped match cases in which there were potential spelling errors across files (e.g., a client's first name spelled differently in one data file in comparison to the other data file) or data entry errors (e.g., a client's social security number was entered incorrectly into a database). Cases were identified as successful matches for the current study if (1) they reached a high probability of matching based on the key variables and (2) they were visually inspected by the research team and identified as likely matches. If cases could not be matched using either of these matching techniques, then they were not included in the validation analyses.

Importantly, an attempt was made to match each client in the IRAS/IYAS samples data files containing the specific recidivism measures examined. Notably, this process resulted in varying sample sizes for each outcome measure for the IRAS instruments with two main measures of recidivism (i.e., the PAT, CST, CSST, PIT, and SRT), while the IRAS Static and each IYAS tools only had sample sizes for their main outcome of interest. The reason for this is that a case could have been matched to one outcome file containing one measure of recidivism but was not matched to a second data file containing a second measure of recidivism. For example,

the IRAS SRT's outcomes of interest were a new conviction and a return to DOC. If a case was matched to the data files containing return to DOC data, but not for new conviction data, the client would have been marked as valid for the outcome return to DOC, but not the outcome of new conviction. Further, as discussed above, in some instances, it could not be determined whether a client was ever officially convicted or adjudicated of a new offense because of missing or unclear disposition outcomes. Table 2 details the sample sizes of each tool and each outcome. Specifically, Table 2 displays the total number of clients assessed by each of the IRAS and IYAS Tools prior to matching. It then shows the number of cases in which there was a successful match for each outcome to help visualize the matching process for each tool and outcome.

Table 2. IRAS and IYAS Sample Sizes Pre- and Post-Matching

Tool Name	Sample Size Pre-Matching	Sample Size Post-Matching (% Match)
IRAS PAT	14,315	Failure to Appear 1-year = 8,790 (61.40%) New Case Filed 1-year = 9,465 (66.12%)
IRAS CST	30,967	New Case Filed 3-years = 23,147 (74.65%) New Conviction 3-years = 23,894 (77.16%)
IRAS CSST	17,475	New Case Filed 3-years = 10,704 (61.25%) New Conviction 3-years = 11,117 (63.96%)
IRAS PIT	13,013	New Conviction 3-years = 11,367 (87.35%) Return to DOC any time post assessment = 12,853 (98.77%)
IRAS SRT	9,340	New Conviction 3-years = 7,963 (85.26%) Return to DOC 3-years = 9,286 (99.42%)
IRAS Static	398	New Conviction 3-years = 315 (79.15%)
IYAS DET	5,049	New Referral 3-years = 3,867 (76.59%)
IYAS DIV	8,471	New Referral 3-years = 4,955 (58.49%)
IYAS DIS	7,629	New Adjudication 3-years = 7,018 (91.99%)
IYAS RES	1,532	New Adjudication 3-years = 1,370 (89.43%)
IYAS RT	2,798	New Adjudication 3-years = 2,341 (83.67%)

*Notes:* IRAS = Indiana Risk Assessment System; IYAS = Indiana Youth Assessment System; PAT = Pre-trial Assessment Tool; CST = Community Supervision Tool; CSST = Community Supervision Screening Tool; PIT = Prison Intake Tool; SRT = Supplemental Reentry Tool; DET = Detention; DIV = Diversion; DIS = Disposition; RES = Residential; RT = Reentry

## Analytic Strategy

The goal of this project is to evaluate the predictive validity of six IRAS and five IYAS tools. To complete this goal, we will employ a variety of statistical techniques so that we can provide a detailed, holistic overview of each tool’s performance. To be specific, we will follow a four-step analytic process to assess each tool.

Step one: univariate descriptive statistics will be examined for each tool and each sample contained within each tool. The univariate statistics will include averages, frequencies, and ranges that examine client’s sex, race, offense type, age, risk level, risk score, risk and need domain scores, item scores, and recidivism rates.

Step two: bivariate analyses will examine the relationship between recidivism and the IRAS/IYAS items, risk level, total risk scores, and risk and need domains for each tool. Four types of bivariate analyses will be conducted. First, a distribution of total risk score by recidivism rate will be examined to visualize how recidivism

rates vary across total risk scores. Second, Pearson  $r$  correlations will be examined between each risk item, domain, total score, risk level and recidivism. Correlations are measures of association between two variables. Correlation values range from -1 to 1. A value of 0 indicates there is no association between the two variables, while a value of -1 or 1 indicates a perfect association between two variables. If a correlation is negative, it indicates that as the value of one variable increases, the other variable tends to decrease; whereas a positive correlation indicates that as one variable increases in value, the other variable tends to increase. Generally positive or negative correlations of 0.10 are considered weak, 0.20 moderate, and 0.30 strong (Gignac & Szodorai, 2016). Correlation values that fall between 0.10 and 0.30 are the industry standard for risk assessment validations studies (Latessa et al., 2009, 2018; Latessa et al., 2013; Lowenkamp, 2007; Schwalbe, 2008; Takahashi et al., 2013).

The third set of bivariate analyses will examine the level of association between risk level and recidivism through a chi-square ( $\chi^2$ ) analysis and measure of association using Cramer's  $V$ . The chi-square statistic identifies whether two variables have an association (i.e., risk level and recidivism), while Cramer's  $V$  identifies the strength of the association. Generally, a Cramer's  $V$  value of 0.10 is considered a weak association, a value of 0.30 is considered moderate, and a value of 0.50 is considered strong (Weisburd & Britt, 2014).

The final set of bivariate analyses will examine the receiver operator characteristic (ROC) area under the curve (AUC) values between risk level and recidivism, as well as risk/need domains and recidivism. AUCs assess the predictive strength of a risk assessment instrument by measuring the probability that you could correctly distinguish between an individual who recidivated and one who did not if all you knew were their risk scores/levels. Stated another way, the AUC value indicates the probability that the recidivist would be assessed as a higher risk level on a risk assessment than the non-recidivist. AUC values range from 0 to 1 with 0.50 representing the value associated with chance (i.e., the predictive accuracy of the tool is no better than flipping a coin). Values larger than 0.50 suggest that the risk assessment is a greater predictor of recidivism than chance, with larger values suggesting higher levels of predictive accuracy. When considering the strength of the AUC value, a value of 0.55 is considered weak, a value of 0.63 is considered moderate, and a value of 0.71 is considered strong (Rice & Harris, 2005). Recent validation studies of risk and need assessments generally find that the AUC values commonly range between 0.55 and 0.70 (Brennan et al., 2009; Dellar et al., 2022; Desmarais et al., 2021; Latessa et al., 2018; Orbis Partners, 2023; Wormith et al., 2015), although some validation analyses have identified AUC values that are smaller than 0.55 or larger than 0.70 (e.g., Brennan et al., 2009; Wormith et

al., 2012). Given that the majority of validation studies examining criminogenic risk and need assessments have AUC values that fall between 0.55 and 0.70, we use this range of values as the “industry standard” for acceptable predictive power. Stated another way, if the AUC value of a tool reaches at least 0.55, it will be considered as reaching the “industry standard” of predictive ability.

Step three: multivariate analyses will be conducted to examine the effect of risk scores and domain scores on recidivism, while adjusting for sex, race, offense type, and age. When recidivism is measured by a specified time period (e.g., a new conviction within 3-years), logistic regression models will be conducted. As such, logistic regression models will identify each risk-and-need assessment’s total score, as well as domain scores, effect on a client’s odds of recidivism while adjusting for other variables. Logistic regression models will also produce the model’s sensitivity, specificity, and correct classification values. The sensitivity statistic identifies how well the model can designate clients who recidivate. Higher sensitivity values suggest that the model produces few false negative results (e.g., individuals who appear unlikely to recidivate when in reality they do). Specificity identifies how well the model is able to predict clients who do not recidivate. Higher specificity values indicate there are few false positives (e.g., individuals who appear likely to recidivate but do not). The correct classification statistic signifies the overall rate of cases that were correctly identified as recidivist or as non-recidivist.<sup>8</sup> In certain instances, recidivism will be measured as any recidivism post-assessment. In these cases, survival analyses using Cox proportional hazard models (i.e., Cox regression) will be conducted, as opposed to logistic regression, to control for varying follow-up times across clients. Survival analyses identify the probability that a client will recidivate by a specified time while that client is at risk for recidivism (i.e., during their follow-up time in the current study). Table 3 provides a summary of the bivariate and multivariate analyses – and the interpretation of these analyses – that will be conducted for the current study.

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<sup>8</sup> For the sensitivity, specificity, and correct classification statistics, the threshold of positive outcomes is rounded to the nearest 5<sup>th</sup> percent based on base rate of a specified recidivism measure. For example, if 29% of the sample experienced a new conviction within 3-years of the assessment, the threshold for the sensitivity, specificity, and correct classification statistics would be 0.30.

Table 3. Summary of Bivariate and Multivariate Analyses

Analysis	Purpose/Interpretation	Range and Meaning of Values
Pearson Correlation ( $r$ )	Measure of association between two variables. Identifies the direction (i.e., positive or negative) and strength of association (i.e., values closer to 1 or -1 are stronger associations than those closer to 0).	<ul style="list-style-type: none"> <li>- Values range from -1 to 1</li> <li>- 0 = No Correlation</li> <li>- 1 = Perfect positive association</li> <li>- -1 = Perfect Negative Association</li> <li>- Positive values = positive association</li> <li>- Negative values = negative association</li> </ul>
Chi-Square ( $\chi^2$ ) and Cramer's $V$	<p>Chi-square analyses: Whether there is dependence (i.e., an association) between two variables</p> <p>Cramer's <math>V</math>: Strength of association between two variables</p>	<ul style="list-style-type: none"> <li>- Chi-square: Statistically significant values indicate there is dependence between two variables.</li> <li>- Cramer's <math>V</math>:               <ul style="list-style-type: none"> <li>○ 0.10 = Weak association</li> <li>○ 0.30 = Moderate association</li> <li>○ 0.50 = Strong association</li> </ul> </li> </ul>
Area Under the Curve (AUC)	Identifies how well a model (e.g., risk level) is distinguishing between classes (e.g., recidivist vs. non-recidivist). For the current study, it tells us the probability that the recidivist would be assessed as a higher risk level than a non-recidivist.	<ul style="list-style-type: none"> <li>- Values range from 0.00 to 1.00</li> <li>- 0.50 = Chance</li> <li>- 0.58 = Weak value</li> <li>- 0.63 = Moderate value</li> <li>- 0.71 = Strong value</li> <li>- AUC values in validation studies tend to fall between 0.55 and 0.70</li> </ul>
Logistic Regression	<ul style="list-style-type: none"> <li>- Odds Ratio (OR): Estimates probability, or odds, of an event (e.g., recidivism) taking place. It identifies whether a factor (e.g., risk level) predicts an event (e.g., recidivism) while controlling for other factors (e.g., race, sex, age).</li> <li>- Sensitivity: identifies percent of true positives (e.g., how well the model is identifying recidivist)</li> <li>- Specificity: identifies percent of true negatives (e.g., how well the model is identifying non-recidivist)</li> </ul>	<ul style="list-style-type: none"> <li>- OR &gt; 1: increased occurrence of an event (e.g., recidivism)</li> <li>- OR &lt; 1 = decreased occurrence of event (e.g., recidivism)</li> </ul>



- Correct Classification: overall rate of cases that were correctly classified (e.g., how well the model identified recidivist and non-recidivist)

Survival Analysis (Cox Regression)	Hazard Ratio (HR): Investigates the effect of one variable (e.g., risk score) on a time specified event (e.g., time to recidivism), while controlling for other variables (e.g., race, sex, age).	<ul style="list-style-type: none"> <li>- HR &gt; 1: increased risk of event (e.g., recidivism)</li> <li>- HR &lt; 1: decreased risk of event (e.g., recidivism)</li> </ul>
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Step four, three sets of supplementary analyses will be conducted to examine the predictive validity of the IRAS/IYAS tools. First, all the above analyses will be conducted across categories of sex, race, and offense type when applicable (i.e., there are at least 200 clients in the sample). As such, univariate, bivariate, and multivariate analyses will be repeated for each group. Given the number of groups (i.e., male, female, White, Black, Other races, violent offenders, property offenders, sex offenders, substance use offenders, and other offense type clients), the supplemental results will only be discussed when they differ substantively (e.g., meaningfully) in comparison to the results for the overall sample. When determining whether differences in correlations exist across groups, we will focus more on the size of the differences as opposed to statistical significance. This is because drastic differences in sample sizes among groups can lead to differences in results even when the differences are not substantive. As for AUCs, to determine whether the predictive validity of a tool differs across groups, we will examine whether significant overlap exists in the 95% confidence intervals of AUCs for two separate groups (Campbell et al., 2020; Cortes & Mohri, 2005). If overlap exists between confidence intervals it may suggest that the differences in AUC values between groups is not large. If overlap does not exist, this can suggest that the variation in AUC values between groups is substantial (Coretes & Mohri, 2005). Overall, substantive and significant differences in the predictive validity between groups were identified by examining whether there was overlap in the confidence intervals and then examining whether these differences appeared to be meaningful. Further, as mentioned above, the current study will mainly focus on the variation in the overall predictive validity across these multiple groups (i.e., how total score/risk level predicts recidivism); though, notable and substantial differences in items and domains will be noted. All results by sex, race, and offense type groups can be found in the Appendices.

Second, the above bivariate and multivariate analyses will be conducted with additional measures of recidivism for each tool (see above). For each of these additional recidivism measures, the results will only be discussed should they differ substantively from the main measures of recidivism. Third, AUC analyses will be

conducted across county types. Conducting analyses by county type will help provide insight into differences in the predictive validity across jurisdiction type. Notably, examination of county-level differences in the predictive validity will only occur for tools where assessments were conducted by county and a large enough sample size existed to examine differences. As such, county level analyses were conducted for the PAT, CST, and CSST and the IYAS DET, DIV, DIS, and RT tools. Data for the IRAS PIT and SRT, as well as the IYAS RES Tool<sup>9</sup> did not specify the local counties in which the assessments were conducted, while the IRAS Static Tool lacked sufficient sample sizes across counties. The results by county type will be noted throughout the report but are not tabled in the current report.<sup>10</sup>

## RESULTS

### IRAS – Pre-trial Assessment Tool

#### *PAT – Univariate Analyses*

Table 4 displays a variety of descriptive statistics for the PAT failure to appear (FTA) sample and the PAT new case filed sample. Across both samples, most justice-involved clients are male (~67%) and have an average age of about 35 years old. Around 60% of both the FTA and case filed samples identified as White, with about 35% identifying as Black and 4% identifying as another racial category. As for offense type, the most common offense category was substance use (~28%), followed closely by other offenses (~27%), violent offenses (~22%), and property offenses (~22%). Less than 0.5% of both samples contained clients charged with sexual offenses. Across both samples, the most common risk level was moderate risk (45.36% for the FTA sample and 43.34% for the case file sample), followed by low risk (32.51% of the FTA sample and 36.84% of the case file sample), and then high-risk clients (22.13% of the FTA sample and 19.82% of the case file sample). The average total risk score was 3.71 for the FTA sample and 3.50 for the case filed sample (out of a total possible score of 9), which would categorize clients as moderate risk. Finally, about 20% of clients failed to appear in court within 1-year of their IRAS assessment and 16.82% received a new case filed within 1-year of their PAT assessment.

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<sup>9</sup> Some county level data was available for the IYAS RES Tool; however, a large portion of assessments were missing data on the county in which the assessment took place. As such, there was not sufficient sample size of assessments that had valid county data to conduct analyses by county type.

<sup>10</sup> Tables and figures examining the alternative measures of recidivism and urban and rural counties are available upon request from the Indiana Office of Court Services.

Table 4. PAT Analytical Samples Descriptive Statistics

	FTA Sample		Case Filed Sample	
	%/mean (SD)	Range	%/mean (SD)	Range
Sex		0 – 1		0 – 1
Male	67.86%	--	67.52%	--
Female	32.14%	--	32.48%	--
Race		1 – 3		1 – 3
White	60.46%	--	60.36%	--
Black	35.70%	--	34.54%	--
Other	3.85%	--	5.10%	--
Age	34.73 (11.67)	15 - 81	35.12 (11.94)	15 - 85
Offense Type		1 – 5		1 – 5
Violent	21.81%	--	23.40%	--
Property	21.79%	--	20.38%	--
Sex	0.40%	--	0.41%	--
Substance	28.24%	--	28.31%	--
Other	27.77%	--	27.49%	--
Risk Level		0 – 2		0 – 2
Low	32.51%	--	36.84%	--
Moderate	45.36%	--	43.34%	--
High	22.13%	--	19.82%	--
Total Risk Score	3.71 (2.03)	0 – 9	3.50 (2.04)	0 - 9
Recidivism		0 – 1		0 – 1
FTA within 1yr	19.56%	--	--	--
New Case Filed 1yr	--	--	16.82%	--
N		8,790		9,465

Notes: PAT = Pre-trial Assessment tool; SD = Standard Deviation; FTA = Failure to Appear

Table 5 provides the average score for each of the seven items contained on the PAT. Notably, unlike other IRAS assessments, the PAT does not contain specific risk and need domains. The first item examined whether the client's first arrest occurred before the age of 33 (0 = arrested after age 33; 1 = arrested prior to age 33). Most clients in the FTA sample (mean = 0.90) and case filed sample (mean = 0.88) experienced their first arrest prior to age 33. The second item examined the number of FTA warrants the client experienced in the two years prior to their assessment (0 = none; 1 = one; 2 = two or more). The average score on this item was 0.35 for the FTA sample and 0.30 for the case filed sample. The third item assessed whether the client had received three or more jail sentences in their past (0 = less 3 jail sentences; 1 = 3 or more jail sentences) and the average score on this item was 0.38 for the FTA sample and 0.36 for the case filed sample. The fourth item examined the client's employment at the time of their arrest associated with the PAT (0 = employed full time; 1 = employed part-time; 2 = unemployed). The average score on this item for the FTA sample was 1.01 and the average score was 0.96 for the case filed sample. The fifth item examined the stability of each client's residence

at the time of their assessment (0 = lived in current residence for the past 6 months; 1 = has not lived at the same residence). The average score for this item was 0.37 for the FTA sample and 0.35 for the case filed sample. The final two items examine clients' drug use. The sixth item identifies whether clients have used illegal drugs within the past six months (0 = No; 1 = Yes) and the average score was 0.46 for the FTA sample and 0.44 for the case filed sample. Finally, the last item examined whether the client had a severe drug use problem (0 = No; 1 = Yes). The average score was 0.24 for the FTA sample and 0.22 for the case filed sample.

Table 5. PAT Item Descriptive Statistics

	FTA Sample		Case Filed Sample	
	Mean (SD)	Range	Mean (SD)	Range
First Arrest Before Age 33	0.90 (.30)	0 – 1	0.88 (.33)	0 – 1
# of FTA Past 2 Years	0.35 (.64)	0 – 2	0.30 (.61)	0 – 2
3+ Prior Jail Sentences	0.38 (.49)	0 – 1	0.36 (.48)	0 – 1
Employed at Arrest	1.01 (.93)	0 – 2	0.96 (.93)	0 – 2
Residential Stability	0.37 (.48)	0 – 1	0.35 (.48)	0 – 1
Drug Use Past 6 months	0.46 (.50)	0 – 1	0.44 (.50)	0 – 1
Severe Drug Problem	0.24 (.42)	0 – 1	0.22 (.41)	0 – 1
N	8,790		9,465	

Notes: PAT = Pre-trial Assessment tool; FTA = Failure to Appear; SD = Standard Deviation

### ***PAT – Bivariate Analyses***

Figure 1 and Figure 2 display a bivariate distribution of total risk score and recidivism rate. Specifically, Figure 1 displays the FTA rate within 1-year of the PAT assessment and Figure 2 displays the new case filed rate within 1-year of the assessment. The horizontal axis of these figures contains the PAT total score, while the vertical axis displays the recidivism percentage. Each dot within these figures identifies the recidivism rate of clients who were assessed at a specified total score. For example, about 15% of clients who scored a 1 on the PAT failed to appear within 1-year of the assessment, and just over 20% of clients who scored a 6 on the PAT failed to appear within 1-year of the assessment. Examining both figures, while some variation exists, there is a gradual increase in recidivism rates as the total risk score increases.

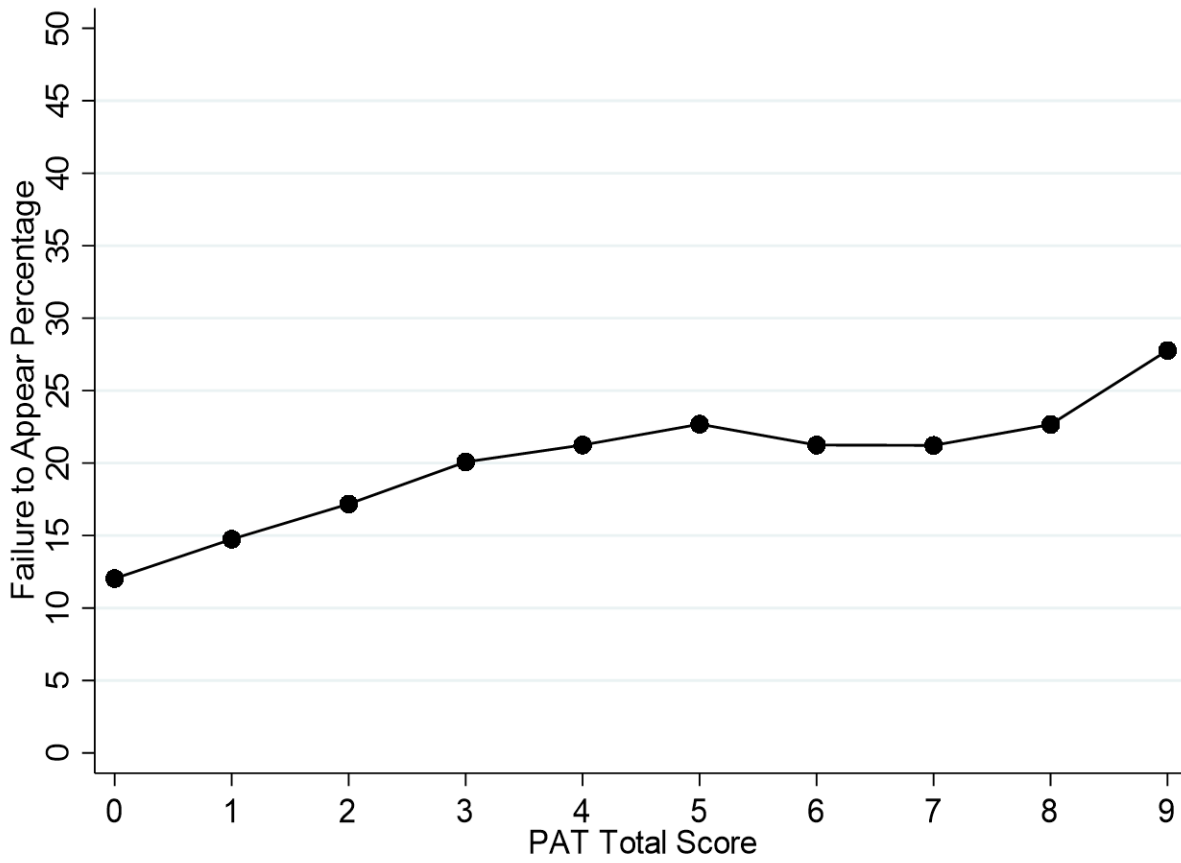


Figure 1. Failure to Appear Percentage within 1 Year of Assessment by Total PAT Risk Score (N = 8,790)  
Notes: PAT = Pre-trial Assessment Tool

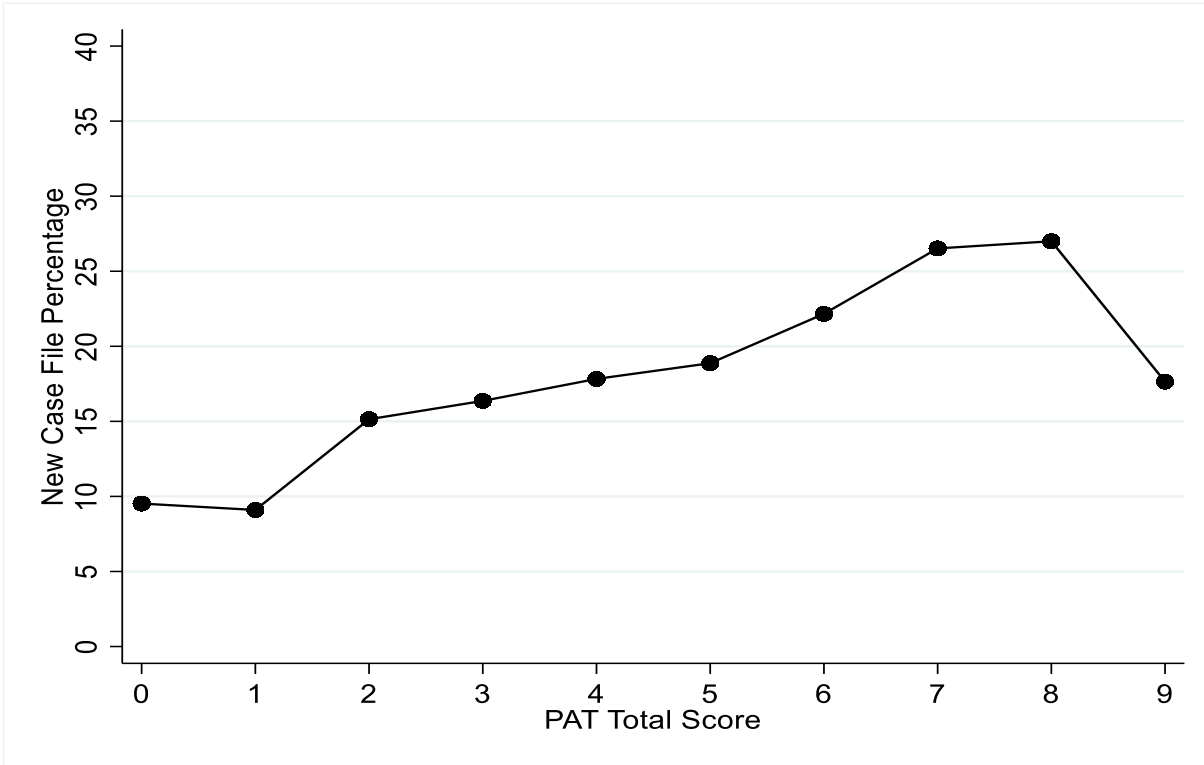


Figure 2. New Case Filed Percentage within 1 Year of Assessment by Total PAT Risk Score (N = 9,465)  
 Notes: PAT = Pre-trial Assessment Tool

Table 6 displays the correlations between each PAT item, PAT total score, PAT risk level, and recidivism. When examining FTA within 1-year as the measure of recidivism, five of the seven PAT items maintain a statistically significant and positive correlation with FTA. First arrest before age 33 ( $r = 0.04$ ;  $p < .001$ ), number of FTAs in the past two years ( $r = 0.05$ ;  $p < .001$ ), having 3 or more prior jail sentences ( $r = 0.03$ ;  $p < .05$ ), being unemployed at the time of arrest ( $r = 0.06$ ;  $p < .001$ ), and residential stability ( $r = 0.04$ ;  $p < .01$ ) all have a weak but significant relationship with FTA, suggesting that having a risk/need in these items was associated within an increase in FTA. The final two items on the PAT – drug use within the past six months and severe drug problem – were not significantly related to FTA. Both the PAT total score ( $r = 0.06$ ;  $p < .001$ ) and the PAT risk level ( $r = 0.06$ ;  $p < .001$ ) had significant, positive, but weak correlations with failing to appear within 1-year of the assessment. When recidivism was measured as a new case filed within 1-year, all seven PAT items maintained a statistically significant and positive association with recidivism. Moreover, the correlation between the PAT total score ( $r = 0.12$ ;  $p < .001$ ) and the PAT risk level ( $r = 0.11$ ;  $p < .001$ ) were noticeably higher when recidivism was measured as a new case filed as opposed to failure to appear.

Table 6. Correlation between Recidivism and the PAT

	FTA 1-Year (N = 8,790)	New Case Filed 1-Year (N = 9,465)
	Correlation ( <i>r</i> )	Correlation ( <i>r</i> )
First Arrest Before Age 33	0.04***	0.05***
# of FTA Past 2 Years	0.05***	0.06***
3+ Prior Jail Sentences	0.03*	0.08***
Employed at Arrest	0.06***	0.07***
Residential Stability	0.04**	0.06***
Drug Use Past 6 Months	0.02	0.07***
Severe Drug Problem	-0.01	0.07***
PAT Total Score	0.06***	0.12***
PAT Risk Level	0.06***	0.11***

Notes: FTA = Failure to Appear; PAT = Pre-trial Assessment Tool

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

Figures 3 and 4 display the distribution of recidivism rates by PAT risk level, as well as the results of the chi-square analyses and Cramer's *V* measure of association. Figure 3 displays that the percentage of clients who failed to appear in court within 1-year of their assessment was 15.85% for low risk clients, 21.19% for moderate risk clients, and 21.65% for high risk clients. The variation in recidivism rates differ in a statistically significant but very weak manner ( $\chi^2 = 37.14$ ;  $V = 0.07$ ). The failure to appear percentage for low risk clients is about 6 percentage points lower than moderate and high risk clients, but it is notable that the percentage point difference between moderate and high risk clients is only 0.46%. When recidivism is measured as a new case filed within 1-year, low risk clients experienced a new case filed in 12.25% of cases, moderate risk in 17.53% of cases, and high risk in 23.77% of cases. This relationship is also statistically significant with a weak strength of association ( $\chi^2 = 118.47$ ;  $V = 0.11$ ). However, there is a noticeable difference between the new case filed rates of low risk and high risk clients. The new case filed rate of low risk clients was 10.52 percentage points less than high risk clients.

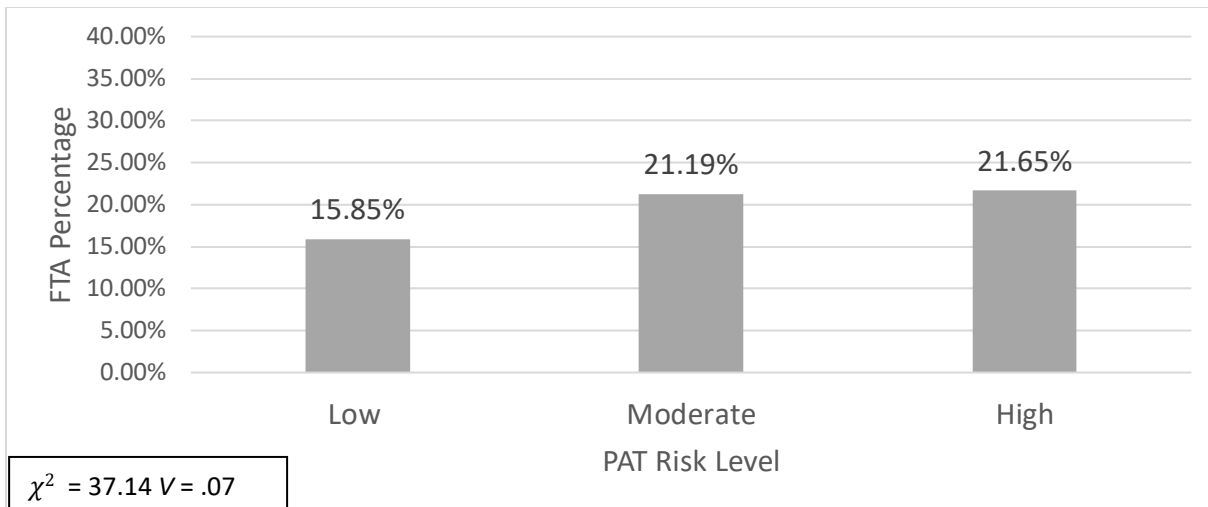


Figure 3. Failure to Appear Percentage within 1-year of Assessment by PAT Risk Level (N = 8,790).  
 Notes: PAT = Pre-trial Assessment Tool; FTA = Failure to Appear.

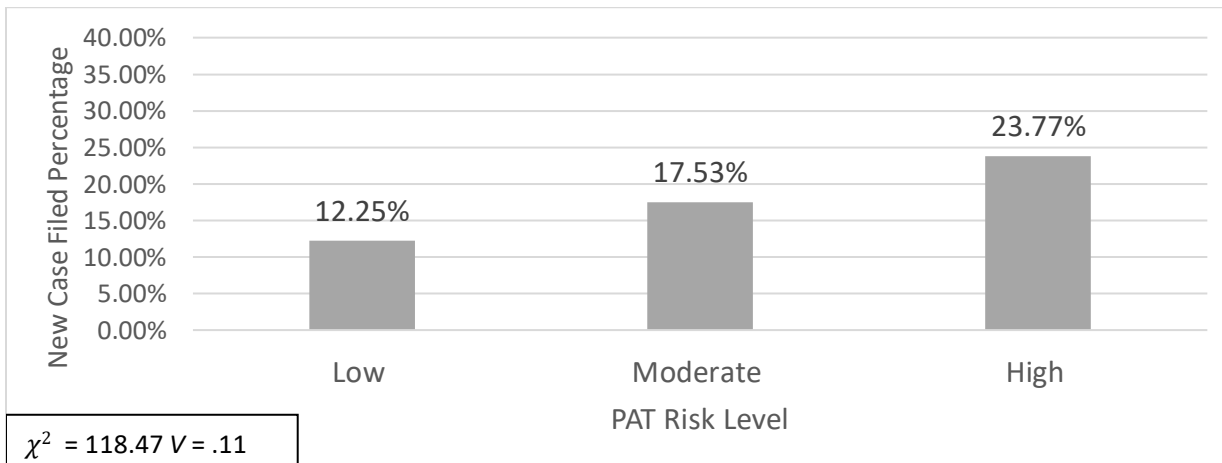


Figure 4. New Case Filed Percentage within 1-year of Assessment by PAT Risk Level (N = 9,465).  
 Notes: PAT = Pre-trial Assessment Tool

Table 7 displays the results of AUC analysis for the PAT risk level. Importantly, Table 7 displays these values for the total sample, as well as the across sex, race, and offense type groups. This is done because the PAT does not contain risk/need domains like other tools within the IRAS. When recidivism is measured as failure to appear within 1-year of the PAT assessment, the AUC value is 0.54 and statistically significant. When looking across sex, the PAT risk level is statistically significant for both males and females, but slightly higher for females (AUC = 0.57) than males (AUC = 0.53). Turning towards race, the AUC values are statistically significant for both White (AUC = 0.57) and Black (AUC = 0.53) clients but fails to reach statistical significance for clients of Other racial categories (AUC = 0.50). However, the difference in AUC values between Other clients and White and



Black clients was not statistically significant. Finally, across offense types, the AUC value for the PAT risk level is statistically significant for clients charged with violent offenses (AUC = 0.53), substance offenses (AUC = 0.55), and other offenses (AUC = 0.55), while failing to reach statistical significance for property offenses (AUC = 0.52). Similar to race, however, these differences were not statistically significant, suggesting that even though the AUC was not significant for property offenses, it did not differ in a statistically significant manner from the other offense categories.

When recidivism was measured as a new case filed within 1-year of the assessment, the AUC values were statistically significant for the total sample – as well as all sex, race, and offense type groups – and noticeably higher than when recidivism was measured as a failure to appear. The AUC value for the total sample was 0.58, while being slightly lower for males (AUC = 0.57) than for females (AUC = 0.61). The PAT had a statistically significant relationship with all racial categories as the AUC value was 0.59 for both White clients and clients of Other racial categories, and 0.55 for Black clients. Across offense type, the AUC value was 0.58 for property, substance, and clients charged of other offense types, and 0.57 for violent offenders. Note, clients charged with sexual offenses were not included for the PAT as there was not a large enough sample of these clients to conduct analyses.

Table 7. Area Under the Curve Analyses Between the PAT Risk Level and Recidivism

	FTA 1-Year (N = 8,790)		New Case Filed 1-Year (N = 9,465)	
	AUC	95% CI	AUC	95% CI
Sample	0.54*	[0.53 – 0.55]	0.58*	[0.57 – 0.59]
Sex				
Male	0.53*	[0.51 – 0.54]	0.57*	[0.55 – 0.58]
Female	0.57*	[0.54 – 0.59]	0.61*	[0.59 – 0.64]
Race				
White	0.57*	[0.55 – 0.59]	0.59*	[0.58 – 0.61]
Black	0.53*	[0.50 – 0.55]	0.55*	[0.52 – 0.57]
Other	0.50	[0.44 – 0.56]	0.59*	[0.53 – 0.66]
Offense Type				
Violent	0.53*	[0.51 – 0.56]	0.57*	[0.54 – 0.60]
Property	0.52	[0.49 – 0.55]	0.58*	[0.55 – 0.61]
Substance	0.55*	[0.52 – 0.58]	0.58*	[0.56 – 0.61]
Other	0.55*	[0.52 – 0.58]	0.58*	[0.55 – 0.60]

Notes: FTA = Failure to Appear; AUC = Area Under the Curve; PAT = Pre-trial Assessment Tool; CI = Confidence Interval

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

**PAT – Multivariate Analyses**

Table 8 contains the results of logistic regression models with the PAT total score predicting a failure to appear within 1-year and a new case filed within 1-year of clients’ assessment, while adjusting for sex, race, age, and offense type. The PAT total score is positively and statistically significantly associated with both a failure to appear (*OR* = 1.11; *p* < .001) and a new case filed (*OR* = 1.16; *p* < .001), suggesting that with a one score increase in total risk score on the PAT, the odds of failing to appear in court increases by 11%, on average, and the odds of experiencing a new case filed increases by 16%, on average, within 1-year of assessment. The bottom of Table 8 displays the sensitivity, specificity, and correct classification for each logistic regression model. When recidivism was measured as failure to appear, the sensitivity was 52.76%, specificity was 62.20%, and correct classification was 60.35%. When recidivism was measured as a new case filed, the sensitivity statistic was 70.92%, specificity was 45.10%, and the correct classification statistics was 49.45%.

Table 8. Logistic Regression of the PAT Total Score Predicting Recidivism

	FTA 1-Year (N = 8,790)		Case File 1-Year (N = 9,465)	
	OR	95% CI	OR	95% CI
PAT Total Score	1.11***	[1.08 – 1.14]	1.16***	1.13 – 1.19
Female	--	--	--	--
Male	0.98	[0.87 – 1.10]	1.29***	1.15 – 1.46
White	--	--	--	--
Black	1.70***	[1.52 – 1.91]	1.02	0.91 – 1.15
Others	2.54***	[1.97 – 3.25]	0.93	0.72 – 1.22
Violent	--	--	--	--
Property	1.22*	[1.05 – 1.43]	1.19*	1.01 – 1.40
Sex	0.45	[0.16 – 1.29]	0.79	0.33 – 1.92
Substance	0.74***	[0.64 – 0.87]	0.90	0.77 – 1.05
Other	0.74***	[0.63 – 0.86]	0.83*	0.71 – 0.98
Age	0.99	[0.99 – 1.00]	0.99**	0.98 – 0.99
Model $\chi^2$	213.63***		179.97***	
Sensitivity	52.76%		70.92%	
Specificity	62.20%		45.10%	
Correct Classification	60.35%		49.45%	

Notes: PAT = Pre-trial Assessment Tool; FTA = Failure to Appear; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification are determined based on a threshold level of 0.20.

\**p* < .05; \*\**p* < .01; \*\*\**p* < .001, two-tailed tests

### ***PAT – Supplemental Analyses***

The next step for examining the predictive validity of the PAT was to examine the univariate, bivariate, and multivariate analyses across sex, race, and offense types. The tables by group can be found in Appendix A. Examining the outcome of FTA within 1-year, some noteworthy item level differences were identified across sex. Specifically, the item “severe drug problem” was negatively associated with a FTA for males ( $r = -0.03$ ;  $p < .05$ ) but not statistically associated with a FTA for females. However, turning to the overall predictive validity of the tool across sex, race, and offense types, no substantial differences were found. When examining the outcome of a new case filed within 1-year, significant and substantial differences were found across sex and race. Specifically, the PAT was found to be a stronger predictor of a new case filed for females in comparison to males, as the AUC value for females (AUC = 0.61) was found to be significantly different than the AUC value for males (AUC = 0.57). Similarly, the AUC value for White clients (AUC = 0.59) was found to be significantly larger than the AUC value for Black clients (AUC = 0.55).

The second set of supplemental analyses examined the outcomes of FTA and a new case filed within 2-years of the assessment. No significant or substantial differences were identified in the predictive validity of the PAT when examining the outcomes within 2-years of the assessment in comparison to 1-year of the assessment. The final series of supplemental analyses examined whether significant variation was found in the predictive validity across urban and rural counties. The current study identified no significant or substantial differences in the predictive validity of the PAT for either outcome examined.

### **IRAS – Community Supervision Tool**

#### ***CST – Univariate Analyses***

Table 9 displays a variety of descriptive statistics for the CST new case filed sample and the CST new conviction sample. Across both samples, the majority of clients are male (~60%) and have an average age of about 38 years old. Around 45% of both the case file and conviction samples identified as White, with about 38% identifying as Black and 15% identifying as another racial category. As for offense type, the most common offense category was substance use (~27%), followed closely by other offenses (~25%), property offenses (~24%), and violent offenses (~21%). Across both samples, just under 3% of clients were convicted of a sexual offense. Examining the distribution of risk levels, around 36% of clients were assessed as low risk, with about 35% being assessed as moderate risk, about 26% being assessed as high risk, and just under 3% being assessed as very high risk. As a reminder, only males can be categorized as very high risk on the CST. The average total

risk score across both samples was around 17, which would categorize clients as moderate risk. Finally, 29.52% received a new case filed within 3-years and 29.70% were convicted of a new crime within 3-years of their CST assessment.

Table 9. CST Analytical Samples Descriptive Statistics

	Case File Sample		Conviction Sample	
	%/mean (SD)	Range	%/mean (SD)	Range
Sex		0 – 1		0 – 1
Male	60.63%	--	60.39%	--
Female	39.37%	--	39.61%	--
Race		1 – 3		1 - 3
White	45.66%	--	46.32%	--
Black	38.63%	--	38.63%	--
Other	15.51%	--	15.05%	--
Age	38.57 (13.40)	17 - 90	38.65 (13.46)	17 - 90
Offense Type		1 – 5		1 – 5
Violent	20.74%	--	20.91%	--
Property	24.25%	--	24.15%	--
Sex	2.89%	--	2.86%	--
Substance	27.28%	--	27.09%	--
Other	24.85%	--	24.98%	--
Risk Level		0 – 3		0 – 3
Low	35.78%	--	36.02%	--
Moderate	34.91%	--	34.93%	--
High	26.35%	--	26.13%	--
Very High <sup>1</sup>	2.96%	--	2.92%	--
Total Risk Score	17.02 (7.38)	0 - 43	16.96 (7.39)	0 - 43
Recidivism	--	--	--	--
New Case Filed 3 Years	29.52%	0 – 1	--	--
New Conviction 3 Years	--	--	29.70%	0 – 1
N		23,147		23,894

Notes: CST = Community Supervision Tool; SD = Standard Deviation; <sup>1</sup>Very High Risk is only a risk category for males.

Table 10 displays the average domain scores for each of the seven risk and need domains included on the IRAS CST. Notably, the average scores remain consistent across the two samples, never differing by more than about 0.02. The average score on the Criminal History domain was around 3.45, with the possible domain scores ranging from 0 to 8. As for the Education, Employment, and Financial Situation domain, the average score was around 3.25 with the possible domain score ranging from 0 to 6. For the Family and Social Support domain, the average score was about 1.42 within a domain that ranges from 0 to 5. The average score for the Neighborhood Problems domain was 1.10 with the highest possible score being 3. The Substance Use domain had an average score of about 2.52 with 6 being the highest possible score on this domain. As for the Peer Associations domain, the average score was about 2.20, with the highest possible score being 8. Finally, the

average score on the Criminal Attitudes and Behavioral Problems domain was about 3.07 with the scores ranging from 0 to 13. Appendix B1 displays the average score of each item included on the IRAS CST for each sample.

Table 10. CST Domain Descriptive Statistics

	Case Filed Sample		Conviction Sample	
	Mean (SD)	Range	Mean (SD)	Range
Criminal History	3.45 (2.30)	0 - 8	3.43 (2.30)	0 - 8
Edu., Emp., & Fin. Situation	3.25 (1.75)	0 - 6	3.24 (1.74)	0 - 6
Family & Social Support	1.43 (1.35)	0 - 5	1.42 (1.35)	0 - 5
Neighborhood Problems	1.10 (1.17)	0 - 3	1.10 (1.17)	0 - 3
Substance Use	2.52 (1.44)	0 - 6	2.51 (1.44)	0 - 6
Peer Associations	2.21 (1.74)	0 - 8	2.20 (1.74)	0 - 8
Criminal Att. & Beh. Problems	3.07 (2.22)	0 - 13	3.06 (2.22)	0 - 13
N	23,147		23,894	

Notes: CST = Community Supervision Tool; SD = Standard Deviation; Edu. = Education; Emp. = Employment; Fin. = Financial; Att. = Attitudes; Beh. = Behavior.

### ***CST – Bivariate Analyses***

Figure 5 and Figure 6 display a bivariate distribution of total risk score and recidivism rate. Specifically, Figure 5 displays the new case filed rate within 3-years and Figure 6 displays the new conviction rate within 3-years. The horizontal axis of these figures contains the CST total score, while the vertical axis displays the recidivism percentage. Examining both figures, while some variation exists, there is a gradual increase in recidivism rates as the total risk score increases. To illustrate, 21.27% of clients who scored 10 on the CST experienced a new case filed within 3-years, while 43.30% of clients who scored 30 on the CST experienced a new case filed within 3-years.

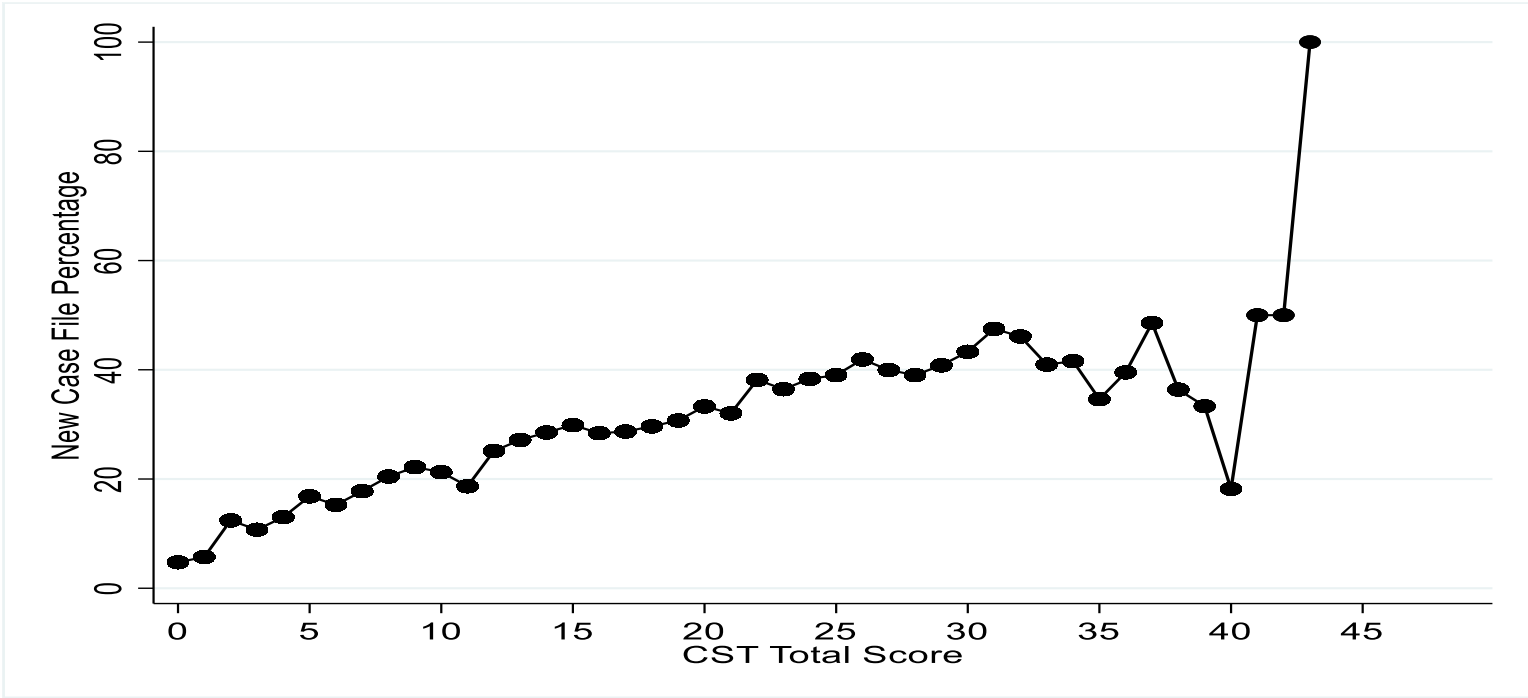


Figure 5. New Case Filed Percentage within 3-years of Assessment by CST Total Score (N = 23,147)  
 Notes: CST = Community Supervision Tool

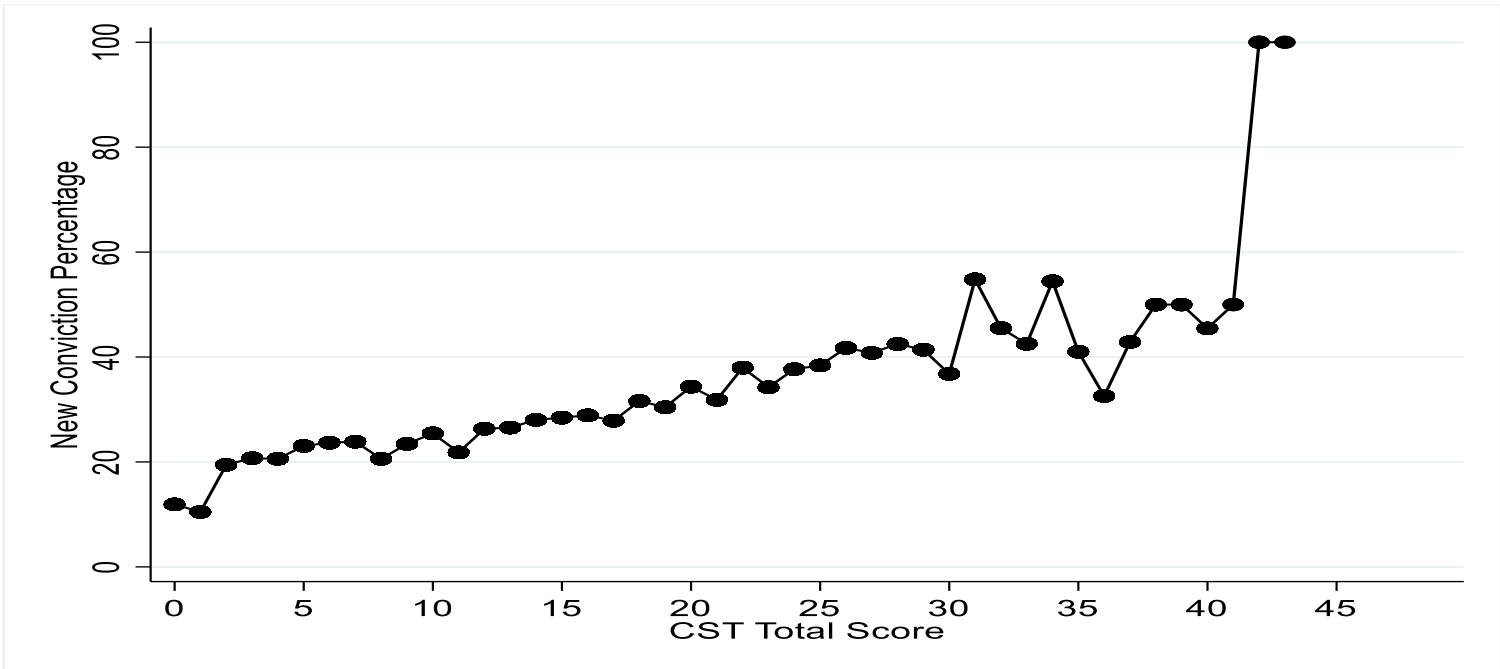


Figure 6. New Conviction Percentage within 3-years of Assessment by CST Total Score (N = 23,894)  
 Notes: CST = Community Supervision Tool

Table 11 displays the correlations between each CST item, CST domain, CST risk level, CST total score and recidivism. Across both measures of recidivism, each item maintains a statistically significant and positive relationship with recidivism. As a reminder, a positive correlation indicates that as the CST item (or domain, risk level, or total score), increases, recidivism also tends to increase. Further, the larger the correlation, the more consistent the pattern. Examining the CST domains when considering a new case filed within 3-years, the Criminal History domain has the strongest relationship with recidivism ( $r = 0.14$ ;  $p < .001$ ), followed closely by the Education, Employment, and Financial Situation domain ( $r = 0.12$ ;  $p < .001$ ), Peer Associations domain ( $r = 0.12$ ;  $p < .001$ ), Substance Use domain ( $r = 0.11$ ;  $p < .001$ ), and Criminal Attitudes and Behavioral Patterns domain ( $r = .10$ ;  $p < .001$ ). The Family and Social Support domain ( $r = 0.08$ ;  $p < .001$ ) and Neighborhood Problems Domain ( $r = 0.07$ ;  $p < .001$ ) had the weakest correlation with a new case filed. The correlation between the CST total risk and new case filed approached a modest correlation ( $r = 0.18$ ;  $p < .001$ ), as did the relationship between the CST risk level and new case filed ( $r = 0.17$ ;  $p < .001$ ).

When recidivism is measured as a new conviction, the Criminal Attitudes and Behavioral Patterns domain has the strongest relationship with new conviction ( $r = 0.13$ ;  $p < .001$ ) out of the seven domains, followed by the Peer Associations domain ( $r = 0.11$ ;  $p < .001$ ), the Education, Employment, the Financial Support domain ( $r = 0.10$ ;  $p < .001$ ), the Substance Use domain ( $r = 0.09$ ;  $p < .001$ ) and the Family and Social Support Domain ( $r = 0.08$ ;  $p < .001$ ). The correlation between the Criminal History domain and new conviction ( $r = 0.07$ ;  $p < .001$ ) is noticeably weaker in comparison to when recidivism was measured as a new case filed ( $r = 0.14$ ;  $p < .001$ ). The Neighborhood Problem domain maintains the weakest correlation with new conviction ( $r = 0.04$ ;  $p < .001$ ) of the seven domains. Finally, the CST total score correlation ( $r = 0.15$ ;  $p < .001$ ) and the CST risk level correlation ( $r = 0.14$ ;  $p < .001$ ) remain significantly related to recidivism but are slightly weaker when recidivism is measured as new conviction in comparison to when it is measured as a new case filed.



Table 11. Correlation between Recidivism and the CST

	New Case Filed 3- years (N = 23,147)	New Conviction 3-years (N = 23,894)
	Correlation (r)	Correlation (r)
<i>Criminal History Domain</i>	0.14***	0.07***
Most Serious Arrest Under 18	0.11***	0.06***
Number Prior Felony Convictions	0.09***	0.05***
Prior Sentence to Jail or Correctional Facility	0.09***	0.04***
Official Misconduct while Incarcerated	0.10***	0.04***
Prior Sentence to Community Supervision	0.07***	0.03***
Community Supervision Revoked for Technical Violation	0.09***	0.04***
<i>Education, Employment, and Financial Domain</i>	0.12***	0.10***
Highest Education	0.07***	0.04***
Ever Suspended/Expelled	0.13***	0.07***
Employed at Time of Arrest	0.04***	0.03***
Currently Employed/School	0.08***	0.09***
Better Use of Time	0.04***	0.07***
Current Financial Situation	0.06***	0.07***
<i>Family and Social Support Domain</i>	0.08***	0.08***
Parents have Criminal Record	0.09***	0.06***
Satisfied w/ Marital or Equivalent Situation	0.01*	0.03***
Emotional Support from Family and Others	0.04***	0.04***
Satisfaction w/ Support from Family and Others	0.04***	0.04***
Stability of Residence	0.06***	0.06***
<i>Neighborhood Problems Domain</i>	0.07***	0.04***
High Crime Area	0.05***	0.02*
Drug Readily Available in Neighborhood	0.07***	0.04***
<i>Substance Use Domain</i>	0.11***	0.09***
Age First Began Regularly Using Alcohol	0.05***	0.03***
Most Recent Period of Abstinence from Alcohol	0.02***	0.04***
Ever Used Illegal Drugs	0.09***	0.05***
Drug Use Caused Problems	0.09***	0.08***
Drug Use Caused Problems w/ Employment	0.04***	0.03***
<i>Peer Associations Domain</i>	0.12***	0.11***
Criminal Friends	0.09***	0.07***
Contact w/ Past Criminal Peers	0.09***	0.07***
Gang Membership	0.06***	0.04***
Criminal Activities	0.11***	0.13***
<i>Criminal Attitudes and Behavioral Patterns Domain</i>	0.10***	0.13***
Criminal Attitudes	0.08***	0.10***
Express Concern about Others	0.03***	0.04***
Feels Lack of Control over Events	0.03***	0.08***
Sees No Problem in Telling Lies	0.04***	0.05***

Engages in Risk Taking Behavior	0.09***	0.10***
Walks Away from Fights	0.07***	0.07***
Believes in “Do Unto Others Before They Do Unto You”	0.04***	0.04***
CST Total Score	0.18***	0.15***
CST Risk Level	0.17***	0.14***

Notes: CST = Community Supervision Tool

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

Figures 7 and 8 display the distribution of recidivism rates by the CST risk level, as well as the results of the chi-square analyses and Cramer’s  $V$  measure of association. Figure 7 shows that the percentage of clients receiving a new case filed within 3-years of their assessment is 20.72% for low risk clients, 30.37% for moderate risk, 39.02% for high risk, and 43.73% for very high risk clients. The variation in recidivism rates differ in a statistically significant manner ( $\chi^2 = 635.26$ ;  $V = 0.17$ ). These recidivism rates reveal a large and noteworthy difference between low risk clients and high and very high risk clients. Specifically, low risk clients’ new case filed rate is 18.30 percentage points less than high risk clients and a 23.01% less than very high risk clients. A similar pattern emerges when recidivism is measured as a new conviction (see Figure 8), as low risk clients experienced a new conviction in 22.92% of cases, moderate risk in 29.20% of cases, high risk in 37.82% of cases, and very high risk in 46.56% of cases. This relationship is also statistically significant with a weak strength of association ( $\chi^2 = 482.45$ ;  $V = 0.14$ ). Again, there is a noticeable difference between the new conviction rates of low risk and high/very high-risk clients. Low risk clients’ conviction rate is 14.90% lower than high risk clients and 23.64% lower than very high risk clients.

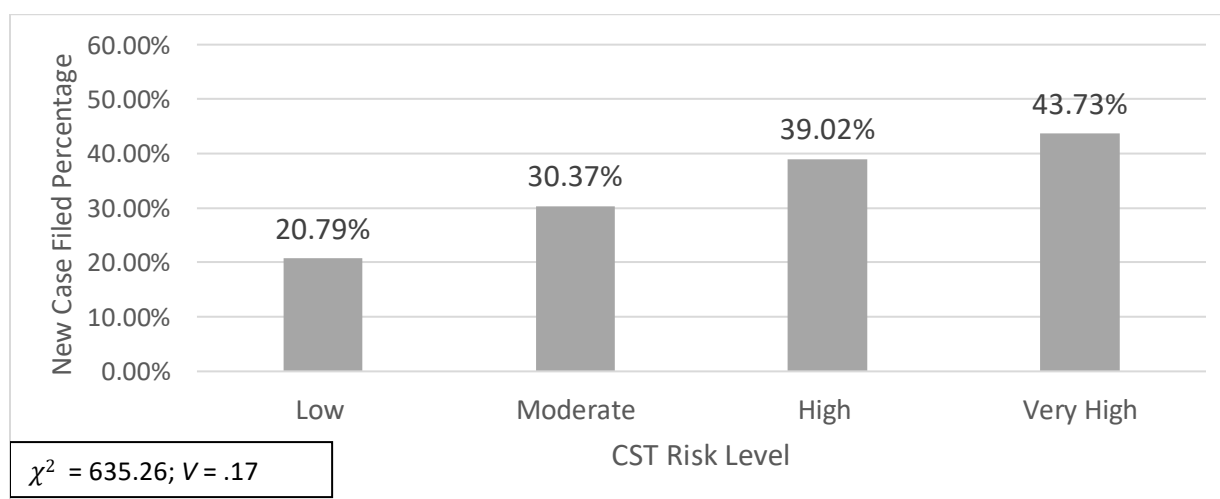


Figure 7. New Case Filed Percentage within 3-years of Assessment by CST Risk Level (N = 23,147).

Notes: CST = Community Supervision Tool

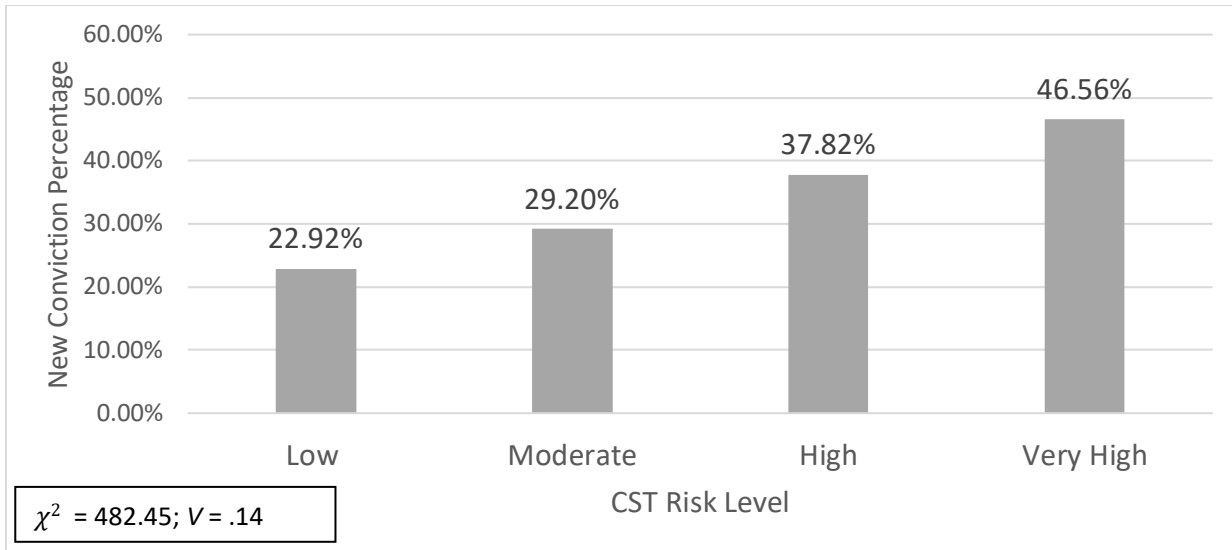


Figure 8. New Conviction Percentage within 3-years of Assessment by CST Risk Level (N = 23,894).  
 Notes: CST = Community Supervision Tool

The final series of bivariate analyses are displayed in Table 12. The table displays the AUC statistics for the CST risk level, as well as each domain contained under the CST assessment. First, when recidivism was measured as a new case filed within 3-years of the assessment, the AUC value for the CST risk level was 0.60. Examining the CST risk and need domains, all maintained significant AUC values with criminal history having an AUC value of 0.59. The Education, Employment, and Financial Situation domain (AUC = 0.59), Substance Use domain (AUC = 0.57), Peer Associations domain (AUC = 0.58) and Criminal Attitudes and Behavioral Problems domain (AUC = 0.57) had values similar to that of the Criminal History domain. The Family and Social Support domain (AUC = 0.55) and Neighborhood Problems domain (AUC = 0.54) had the smallest AUC values of the risk and need domains.

Second, when recidivism was measured as a new conviction within 3-years, the AUC value was 0.58. All the risk and need domains maintained statistically significant AUC values with new conviction. The largest AUC value of the risk and need domains was 0.58 for the Criminal Attitudes and Behavioral Problems domain. The Peer Association domain has an AUC value of 0.57, while the Education, Employment, and Financial Situation domain and the Substance use domains had AUC values of 0.56. Finally, the AUC value for the Family and Social Support domain was 0.55, the AUC value was 0.54 for the Criminal History domain, and the Neighborhood Problems domain had the smallest AUC value of 0.52.

Table 12. Area Under the Curve Analyses Between the CST Risk Level and Recidivism

IRAS CST	New Case Filed 3-Years (N = 23,147)		New Conviction 3-Years (N = 23,894)	
	AUC	95% CI	AUC	95% CI
CST Risk Level	0.60*	[0.59 – 0.61]	0.58*	[0.57 – 0.59]
Criminal History	0.59*	[0.58 – 0.60]	0.54*	[0.53 – 0.55]
Edu., Emp., & Fin. Situation	0.57*	[0.56 – 0.58]	0.56*	[0.56 – 0.57]
Family & Social Support	0.55*	[0.54 – 0.56]	0.55*	[0.54 – 0.55]
Neighborhood Problems	0.54*	[0.53 – 0.55]	0.52*	[0.51 – 0.53]
Substance Use	0.57*	[0.56 – 0.57]	0.56*	[0.55 – 0.56]
Peer Associations	0.58*	[0.57 – 0.58]	0.57*	[0.56 – 0.57]
Criminal Att. & Beh. Problems	0.57*	[0.56 – 0.57]	0.58*	[0.57 – 0.59]

Notes: AUC = Area Under the Curve; IRAS = Indiana Risk Assessment System; CST = Community Supervision Tool; CI = Confidence Intervals; Edu. = Education; Emp. = Employment; Fin. = Financial; Att. = Attitude; Beh. = Behavior.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

### ***CST – Multivariate Analyses***

Table 13 contains the results of the logistic regression models with the CST total score predicting a new case filed within 3-years and a new conviction within 3-years, while controlling for sex, race, age, and offense type. The CST total score is positively and significantly associated with both a new case filed ( $OR = 1.05$ ;  $p < .001$ ) and a new conviction ( $OR = 1.04$ ;  $p < .001$ ), suggesting that with a one score increase in total risk score on the CST, the odds of experiencing a new case filed increases by 5%, on average, and the odd of experiencing a new conviction increases by 4%, on average, within 3-years of assessment. The bottom of Table 13 displays the sensitivity, specificity, and correct classification for each logistic regression model. When recidivism was measured as a new case filed, the sensitivity, specificity, and correct classification all hovered around 60%, while these values were about 58% when recidivism was measured as new conviction.

Table 13. Logistic Regression of the CST Total Score Predicting Recidivism

	New Case Filed 3-Years (N = 23,147)		New Conviction 3-Years (N = 23,894)	
	OR	95% CI	OR	95% CI
CST Total Score	1.05***	[1.05 – 1.06]	1.04***	[1.04 – 1.05]
Female	--	--	--	--
Male	1.24***	[1.17 – 1.32]	1.11**	[1.04 – 1.18]
White	--	--	--	--
Black	1.02	[0.96 – 1.09]	0.92**	[0.86 – 0.98]
Others	0.94	[0.86 – 1.03]	0.86**	[0.76 – 0.96]
Violent	--	--	--	--
Property	1.14**	[1.05 – 1.24]	1.13**	[1.04 – 1.22]
Sex	1.02	[0.86 – 1.22]	0.98	[0.83 – 1.18]
Substance	0.93	[0.85 – 1.01]	0.98	[0.85 – 1.00]
Other	0.64***	[0.59 – 0.70]	0.70***	[0.64 – 0.76]
Age	0.98***	[0.97 – 0.98]	0.99***	[0.98 – 0.99]
Model $\chi^2$	1262.79***		801.87***	
Sensitivity	60.08%		57.82%	
Specificity	60.64%		58.77%	
Correct Classification	60.48%		58.49%	

Notes: CST = Community Supervision Tool; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.30.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

Table 14 displays the results of the logistic regression models with the CST risk and need domains predicting recidivism. When recidivism was measured as a new case filed, all seven domains have a statistically significant and positive relationship with recidivism, suggesting that as risk scores in these domains increase, individuals' odds of experiencing a new case filed within 3-years also increase, on average. Six of the seven risk and need domains remain statistically significant predictors of recidivism when it is measured as new conviction within 3-years. The only domain that fails to achieve statistical significance is the Neighborhood Problems domain. The sensitivity, specificity, and correct classification percentages are around 60 or 61 percent when recidivism is measured as a new case filed, while they are just under 60 percent when recidivism is measured as a new conviction.

Table 14. Logistic Regression of the CST Domains Predicting Recidivism

	New Case Filed 3-Years (N = 23,147)		New Conviction 3-Years (N = 23,894)	
	OR	95% CI	OR	95% CI
<b>CST Domains</b>				
Criminal History	1.12***	[1.10 – 1.13]	1.03***	[1.01 – 1.04]
Edu., Emp., & Fin. Situation	1.04***	[1.02 – 1.06]	1.05***	[1.03 – 1.07]
Family & Social Support	1.04***	[1.02 – 1.07]	1.03*	[1.01 – 1.05]
Neighborhood Problems	1.05**	[1.02 – 1.08]	0.99	[0.96 – 1.01]
Substance Use	1.06***	[1.04 – 1.09]	1.05***	[1.03 – 1.07]
Peer Associations	1.03**	[1.01 – 1.05]	1.03**	[1.01 – 1.06]
Criminal Att. & Beh. Problems	1.02**	[1.01 – 1.04]	1.08***	[1.07 – 1.10]
Female	--	--	--	--
Male	1.17***	[1.10 – 1.25]	1.11**	[1.05 – 1.18]
White	--	--	--	--
Black	1.02	[0.95 – 1.09]	0.95	[0.89 – 1.01]
Others	0.96	[0.87 – 1.04]	1.02	0.93 – 1.11
Person	--	--	--	--
Property	1.10*	[1.01 – 1.20]	1.14**	[1.05 – 1.24]
Sex	0.93	[0.78 – 1.11]	1.02	[0.85 – 1.21]
Substance	0.92*	[0.84 – 0.99]	0.93	[0.86 – 1.01]
Other	0.64***	[0.59 – 0.70]	0.69***	[0.64 – 0.76]
Age	0.98***	[0.97 – 0.98]	0.99***	[0.98 – 0.99]
Model $\chi^2$	1351.89***		845.40***	
Sensitivity	61.40%		57.57%	
Specificity	60.41%		59.27%	
Correct Classification	60.60%		58.76%	

Notes: CST = Community Supervision Tool; CI = Confidence Interval; OR = Odds Ratio; CI = Confidence Interval; Edu. = Education, Emp. = Employment; Fin. = Financial; Att. = Behavioral; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.30.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

### **CST – Supplemental Analyses**

The next step for examining the predictive validity of the CST was to examine the univariate, bivariate, and multivariate analyses by sex, race, and offense types. The results of these analyses can be found in Appendix B. Examining the outcome of a new case filed within 3-years of the assessment no substantial differences were identified across sex or offense types in the CSTs overall predictive validity; however, it was found that the CST was a stronger predictor of new case filed for White clients in comparison to Black clients. To illustrate, the AUC value for White clients (AUC = 0.61) was significantly different than the AUC value for Black clients (AUC = 0.58). When recidivism was measured as a new conviction, significant differences were found across offense types. Specifically, it was found that the CST was a stronger predictor of new conviction for clients convicted of substance use related offenses (AUC = 0.61) than clients convicted of violent offenses (AUC = 0.57). Additionally,

for both measures of recidivism the Substance Use domain had a significantly weaker AUC value for Black clients than it did for White and Other clients.

Turning towards the second series of supplemental analyses, the bivariate and multivariate analyses were repeated with the recidivism measures of any new case filed and any new conviction post-assessment. As a reminder, survival analyses were conducted in place of logistic regression models to control for the fact that justice-involved clients had varying follow-up times. No substantial differences were found in the predictive validity of the tool when recidivism was measured as a new case filed any time post-assessment (in comparison to a new case filed within 3-years). However, when recidivism was measured as any new conviction, substantial differences were found when comparing the results against those when recidivism was measured as a new conviction within 3-years. Specifically, when recidivism was measured as any new conviction, the AUC value (AUC = 0.60) and correlation value ( $r = 0.19$ ) were significantly higher than when recidivism was measured as a new conviction within 3-years. This suggests that the CSTs overall ability to predict a new conviction gets slightly stronger as clients follow up time is extended beyond 3 years. The final series of supplemental analyses examined the predictive validity of the IRAS CST for urban and rural counties. Consistent with the PAT, no significant or substantial differences were found in the CSTs predictive validity across urban and rural counties.

## **IRAS – Community Supervision Screening Tool**

### ***CSST – Univariate Analyses***

The next stage of the analyses examined the screening version of the Community Supervision Tool. The CSST consists of nine items and no risk or need domains. As a reminder, the CSST categorizes clients as either low risk or high risk. Table 15 provides the descriptive statistics of the case file and conviction sample. Across both samples, around 60% of clients assessed by the CSST were male. About half of each sample were categorized as White, about 36% as Black, and around 13% as another racial category. The average age of clients assessed by the CSST was around 38 years old. Regarding the type of offenses clients were convicted of, the most common offense types were substance use offenses (around 29%) and other offenses (around 28%). The next most common offense type was property offenses (around 23%) and violent offenses (about 18%). Across both samples, less than 1% of clients were convicted of sexual offenses. Turning towards risk level and score, just over half of the samples (about 54%) were assessed as low risk with the remaining assessed as high risk. The average score across both samples was around 2.80 which categorizes clients on the boarder of low and

high risk. Finally, the new case filed rate was 25.73% and the new conviction rate was 21.82% within 3-years of the CSST assessment.

Table 15. CSST Analytical Samples Descriptive Statistics

	Case File Sample		Conviction Sample	
	%/mean (SD)	Range	%/mean (SD)	Range
Sex		0 - 1		0 - 1
Male	59.76%	--	59.37%	--
Female	40.24%	--	40.63%	--
Race		1 - 3		1 - 3
White	50.53%	--	51.70%	--
Black	36.23%	--	35.58%	--
Other	13.24%	--	12.71%	--
Age	37.76 (13.74)	17 - 86	37.86 (13.80)	17 - 86
Offense Type		1 - 5		1 - 5
Violent	18.43%	--	18.60%	--
Property	23.58%	--	23.36%	--
Sex	0.40%	--	0.40%	--
Substance	29.47%	--	29.36%	--
Other	28.11%	--	28.27%	--
Risk Level		0 - 1		0 - 1
Low	54.21%	--	54.72%	--
High	45.79%	--	45.28%	--
Total Risk Score	2.85 (2.23)	0 - 12	2.82 (2.22)	0 - 12
Recidivism		0 - 1		0 - 1
New Case Filed 3yr	25.73%	--	--	---
New Conviction 3yr	--	--	21.82%	--
N		10,704		11,177

Notes: CSST = Community Supervision Screening Tool; SD = Standard Deviation.

Table 16 provides the average score for each CSST item. The first item examines each client's most serious arrest under the age of 18 (0 = no arrest; 1 = misdemeanor arrest; 2 = felony arrest). Across both samples, the average score on this item was around 0.27. The second item examined the number of prior adult felony convictions (0 = none; 1 = one or two; 2 = three or more). The average score on this item was around 0.36 for both samples. The third item focused on whether clients received official misconduct while incarcerated as an adult (0 = No; 1 = Yes). This item was rarely endorsed as the average score on the third item was about 0.08 for both samples. The fourth item assessed whether the client had been previously sentenced to community supervision as an adult (0 = No; 1 = Yes) and the average score on this item was around 0.49. The fifth item identified the client's highest education level (0 = High school degree or higher; 1 = Less than a high school degree or GED) and the average score on this item was about 0.38. The sixth item examined whether the client



was employed or in school at the time of assessment (0 = Full-time, disabled, or retired; 1 = Not Employed or employed part-time). Across both samples the average score on this item was about 0.38. The seventh item identified whether the client’s financial situation was good or poor (0 = Good; 1 = Poor) and the average item on this score was about 0.43. The eighth item examined whether drug use ever caused legal problems (0 = No; 1 = Yes). The average score on this item was 0.23. The final item assessed whether individuals walk away from fights (0 = Yes; 1 = Sometimes; 2 = Rarely) and the average score on this item was 0.21.

Table 16. CSST Item Descriptive Statistics

	Case Filed Sample		Conviction Sample	
	Mean (SD)	Range	Mean (SD)	Range
Most Serious Arrest Under Age 18	0.27 (0.56)	0 - 2	0.27 (0.56)	0 - 2
# of Prior Adult Felony Convictions	0.37 (0.64)	0 - 2	0.36 (0.63)	0 - 2
Received Misconduct while Incarcerated	0.08 (0.27)	0 - 1	0.08 (0.27)	0 - 1
Prior Sentence to Comm. Supervision	0.49 (0.50)	0 - 1	0.49 (0.50)	0 - 1
Highest Education	0.38 (0.48)	0 - 1	0.38 (0.48)	0 - 1
Currently Employed/School	0.38 (0.49)	0 - 1	0.38 (0.49)	0 - 1
Current Financial Situation	0.43 (0.49)	0 - 1	0.43 (0.49)	0 - 1
Drug Use Caused Legal Problems	0.23 (0.42)	0 - 1	0.23 (0.42)	0 - 1
Walks Away from a Fight	0.21 (0.45)	0 - 2	0.21 (0.45)	0 - 2
N	10,704		11,177	

Notes: CSST = Community Supervision Tool; SD = Standard Deviation; Comm. = Community

### **CSST – Bivariate Analyses**

Figure 9 and Figure 10 display a bivariate distribution of total risk score and recidivism rate. Specifically, Figure 9 displays the new case filed rate within 3-years and Figure 10 displays the new conviction rate within 3-years. The horizontal axis of these figures contains the CSST total score, while the vertical axis displays the recidivism percentage. Examining both figures, while some variation exists, there is a gradual increase in recidivism rates as the total risk score increases. It should be noted that the recidivism rate for individuals who scored 12 on the CSST, the highest possible risk score, was 0%. However, only two clients in both the case file and conviction sample scored a 12 on the CSST, as such, the 0% is based on two clients.

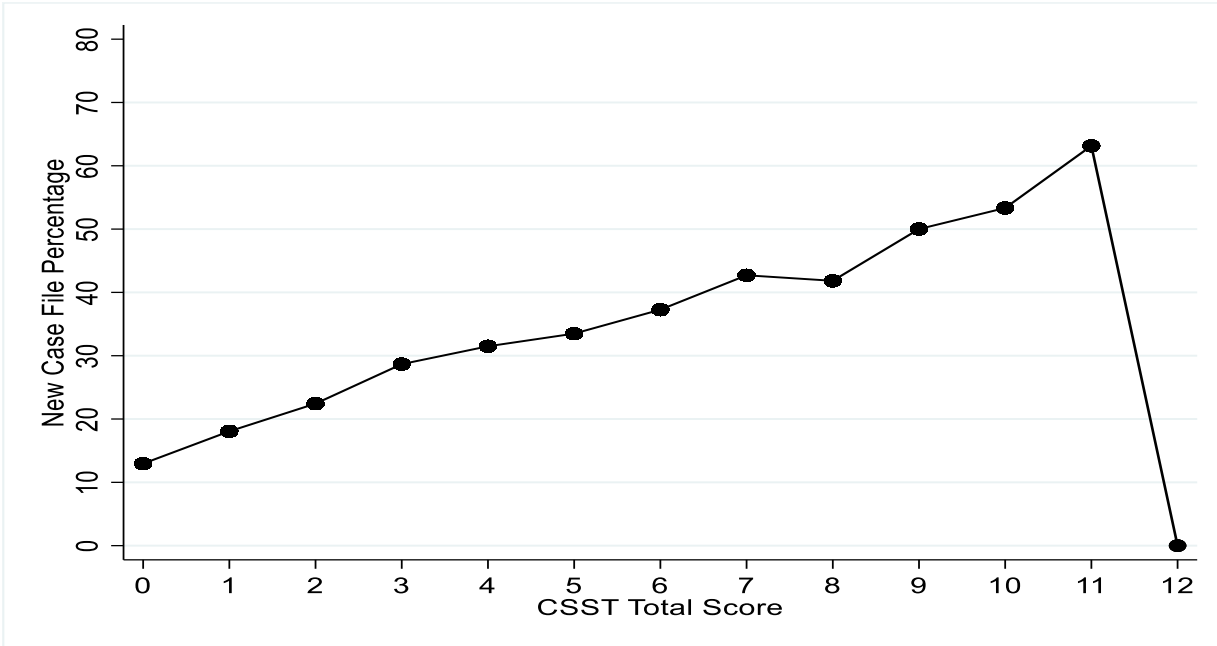


Figure 9. New Case Filed Percentage within 3-years of Assessment by CSST Total Score (N = 10,704)  
 Notes: CSST = Community Supervision Screening Tool

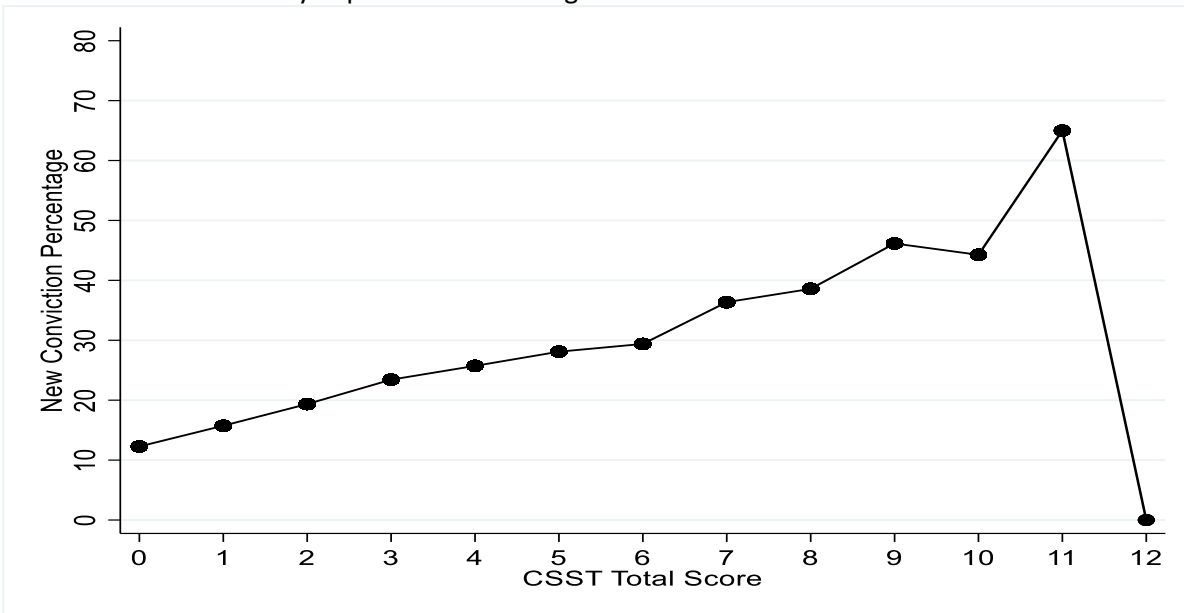


Figure 10. New Conviction Percentage within 3-years of Assessment by CSST Total Score (N = 11,177)  
 Notes: CSST = Community Supervision Screening Tool

Table 17 displays the correlations between each CSST item, CSST total score, and CSST risk level, and recidivism. When examining a new case filed within 3-years, all nine items maintain a statistically significant and positive correlation. Specifically, the strongest correlations among the CSST items were “Most Serious Arrest Under Age 18” ( $r = 0.14$ ;  $p < .001$ ) and “Number of Prior Adult Felony Convictions” ( $r = 0.14$ ;  $p < .001$ ), followed

closely by “Received Official Misconduct While Incarcerated ( $r = 0.12; p < .001$ ), and “Currently Employed or in School” ( $r = 0.11; p < .001$ ). The other items, including “Prior Sentence to Community Supervision” ( $r = 0.09; p < .001$ ), “Highest Education” ( $r = 0.09; p < .001$ ), “Current Financial Situation” ( $r = 0.09; p < .001$ ), “Drug Use Caused Legal Problems” ( $r = 0.07; p < .001$ ), and “Walks Away from Fights” ( $r = 0.08; p < .001$ ) had statistically significant but slightly weaker correlations with a new case filed after 3-years. Further, both the CSST total score ( $r = 0.20; p < .001$ ) and risk level ( $r = 0.17; p < .001$ ) were significantly correlated with a new case filed. When recidivism was measured as a new conviction within 3-years of the assessment, all nine items maintained a statistically significant and positive correlation with recidivism. The CSST total score ( $r = 0.18; p < .001$ ) and the CSST risk level ( $r = 0.14; p < .001$ ) were also statistically and positively correlated with new conviction.

Table 17. Correlation between Recidivism the CSST

	New Case Filed 3-Years (N = 10,074) Correlation ( $r$ )	New Conviction 3-Years (N = 11,177) Correlation ( $r$ )
Most Serious Arrest Under Age 18	0.14***	0.12***
Number of Prior Adult Felony Convictions	0.14***	0.12***
Received Official Misconduct while Incarcerated	0.12***	0.10***
Prior Sentence to Community Supervision	0.09***	0.07***
Highest Education	0.09***	0.08***
Currently Employed/School	0.11***	0.09***
Current Financial Situation	0.09***	0.09***
Drug Use Caused Legal Problems	0.07***	0.09***
Walks Away from a Fight	0.08***	0.05***
CSST Total Score	0.20***	0.18***
CSST Risk Level	0.17***	0.14***

Notes: CSST = Community Supervision Screening Tool

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed test.

Figures 11 and 12 display the distribution of recidivism rates by the CSST risk level, as well as the results of the chi-square analyses and Cramer’s  $V$  measure of association. Figure 11 displays that 18.77% of low risk clients received a new case filed within 3-years. In comparison, 33.97% of clients assessed as high risk on the CSST received a new case filed within 3-years of the assessment. As such, the new case filed rate for low risk clients was 15.20 percentage points lower than in recidivism rate for high risk clients ( $\chi^2 = 321.52; V = 0.17$ ). Figure 12 shows the new conviction rate of low and high risk clients assessed by the CSST. Low risk clients experienced a new conviction in 16.50% of cases, while high risk clients were convicted in 28.26% of cases. As

such, high risk clients recidivism rate was 11.76 percentage points higher than low risk, which was a statistically significant ( $\chi^2 = 224.41$ ;  $V = 0.14$ ).

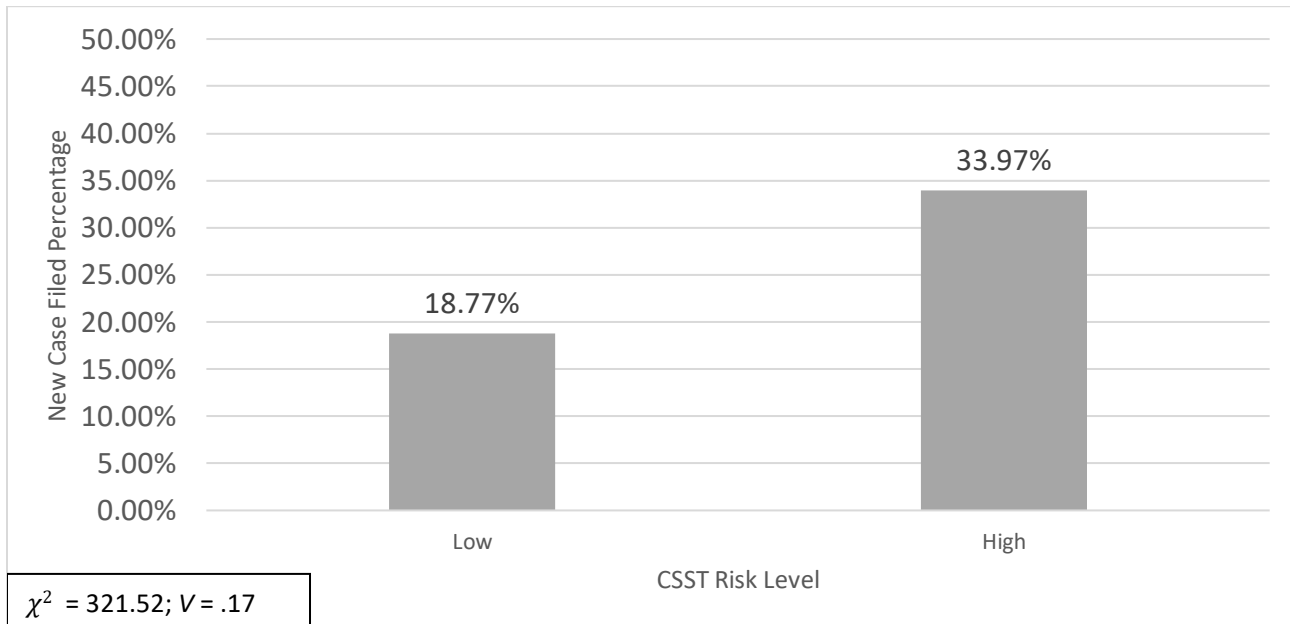


Figure 11. New Case Filed Percentage within 3-years of Assessment by CSST Risk Level (N = 10,704).  
Notes: CSST = Community Supervision Screening Tool

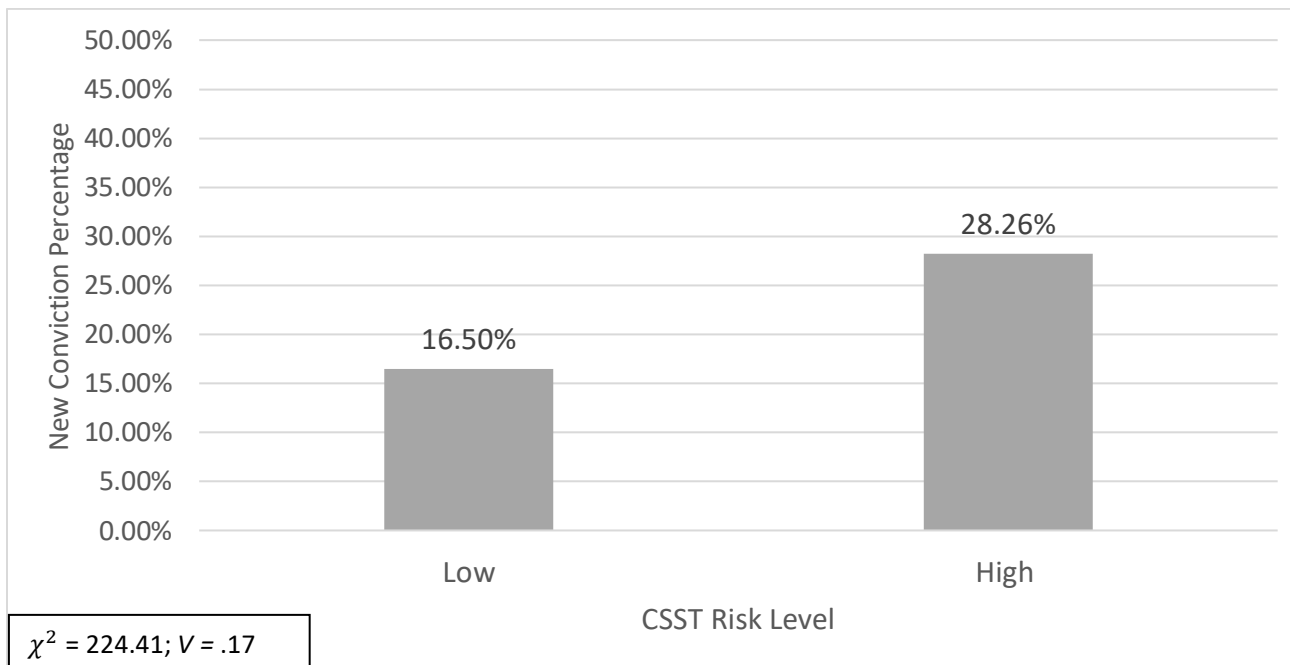


Figure 12. New Conviction Percentage within 3-years of Assessment by CSST Risk Level (N = 11,177).  
Notes: CSST = Community Supervision Screening Tool

Table 18 displays the results of AUC values for the CSST risk level predicting recidivism. The table displays the AUC values for the total sample, as well as the subsamples for sex, race, and offense type (the remaining results by sex, race, and offense types for the CSST can be found in Appendix C). When recidivism is measured as a new case filed within 3-years of the assessment, the AUC value is 0.60 and statistically significant for the total sample. When looking across sex, the CSST risk level is statistically significant for both males and females, but slightly higher for males (AUC = 0.61) than females (AUC = 0.58). As for race, the AUC values are statistically significant for all races. Specifically, the AUC value is highest for White clients (AUC = 0.61) and similar for Black clients (AUC = 0.58) and clients of Other racial categories (AUC = 0.58). Across offense types, the AUC value for the CSST risk level is statistically significant for the four offense types examined. Explicitly, the AUC value is highest for property offenders (AUC = 0.61) and substance use offenders (AUC = 0.61), followed by violent offenders (AUC = 0.58) and clients convicted of other offenses (AUC = 0.58).

Table 18 also displays the AUC values when recidivism is measured as a new conviction. The results remain relatively similar to when recidivism was measured as a new case filed, as the CSST risk level had a significant AUC value for the total sample, as well as all race, sex, and offense type groups. However, the AUC values were, generally, slightly lower when recidivism was measured as a new conviction as opposed to a new case filed. For the total sample, the AUC value was 0.58, while the AUC value was 0.59 for males and 0.57 for females. Regarding race, the AUC value was highest for clients of Other racial categories with an AUC value of 0.61, followed by White clients (AUC = 0.59) and Black clients (AUC = 0.57). The AUC value remained highest for property offenders (AUC = 0.60) when examining offense type, followed by violent offenders (AUC = 0.58), clients convicted of other offenses (AUC = 0.58), and substance use offenders (AUC = 0.57). Note, clients charged with sexual offenses were not include for the CSST as there was not a large enough sample of these clients to conduct analyses.

Table 18. Area Under the Curve Analyses Between the CSST Risk Level and Recidivism

	New Case Filed 3-Years (N = 10,074)		New Conviction 3-Years (N = 11,177)	
	AUC	95% CI	AUC	95% CI
Analytical Sample	0.60*	[0.59 – 0.61]	0.59*	[0.57 – 0.60]
Sex				
Males	0.61*	[0.59 – 0.62]	0.59*	[0.58 – 0.61]
Females	0.58*	[0.56 – 0.60]	0.57*	[0.55 – 0.58]
Race				
White	0.61*	[0.60 – 0.63]	0.59*	[0.58 – 0.61]
Black	0.59*	[0.57 – 0.61]	0.57*	[0.55 – 0.58]
Other	0.58*	[0.55 – 0.61]	0.61*	[0.57 – 0.64]
Offense Type				
Violent	0.58*	[0.55 – 0.60]	0.58*	[0.56 – 0.61]
Property	0.61*	[0.59 – 0.63]	0.60*	[0.58 – 0.62]
Substance	0.61*	[0.59 – 0.63]	0.57*	[0.55 – 0.59]
Other	0.58*	[0.56 – 0.61]	0.58*	[0.56 – 0.60]

Notes: AUC = Area Under the Curve; CSST = Community Supervision Screening Tool; CI = Confidence Interval  
 \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

### **CSST – Multivariate Analyses**

Table 19 contains the results of the logistic regression models with the CSST total score predicting a new case filed and new conviction within 3-years of the assessment, while controlling for sex, race, age, and offense type. The CSST total score is positively and significantly associated with both a new case filed ( $OR = 1.20$ ;  $p < .001$ ) and a new conviction ( $OR = 1.18$ ;  $p < .001$ ), suggesting that with a one score increase in total risk score on the CSST, the odds of receiving a new case filed increases by 20%, on average, and the odds of experiencing a new conviction increases by 18%, on average, within 3-years of assessment. The bottom of Table 19 displays the sensitivity, specificity, and correct classification for each logistic regression model. When recidivism was measured as a new case filed, the sensitivity was 65.43%, the specificity was 61.27%, and correct classification was 61.27%. When recidivism was measured as a new conviction, the sensitivity statistic was 66.91%, specificity was 54.11%, and the correct classification statistics was 56.90%.

Table 19. Logistic Regression of the CSST Total Score Predicting Recidivism

	New Case Filed 3-Years		New Conviction 3-Years	
	OR	95% CI	OR	95% CI
CSST Total Score	1.20***	[1.18 – 1.22]	1.18***	[1.15 – 1.20]
Female	--	--	--	--
Male	1.14**	[1.04- 1.25]	1.16**	[1.06- 1.28]
White	--	--	--	--
Black	1.31***	[1.19 – 1.44]	1.14*	[1.03 – 1.26]
Others	0.96	[0.83 – 1.12]	1.01	[0.87 – 1.17]
Violent	--	--	--	--
Property	1.20**	[1.05 – 1.38]	1.28***	[1.12 – 1.47]
Sex	1.66	[0.88 – 3.12]	1.73	[0.93 – 3.22]
Substance	0.90	[0.79 – 1.03]	0.94	[0.82 – 1.07]
Other	0.85*	[0.74 – 0.97]	0.78***	[0.67 – 0.89]
Age	0.98***	[0.97 – 0.98]	0.98***	[0.98 – 0.99]
Model $\chi^2$	710.43***		501.42***	
Sensitivity	65.43%		66.91%	
Specificity	59.82%		54.11%	
Correct Classification	61.27%		56.90%	
N	10,704		11,177	

Notes: CSST = Community Supervision Screening Tool; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification are determined based on a threshold level of 0.25 for a new case filed and 0.20 for New Conviction.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two-tailed tests

### CSST – Supplemental Analyses

The next step for examining the predictive validity of the CSST was to examine the univariate, bivariate, and multivariate analyses by sex, race, and offense types. The results of these analyses can be found in Appendix C. Although some variation existed in the results across sex, race, and offense types, the differences were not found to be substantial. However, a couple item level differences across sex and race that are worth noting. Explicitly, when examining the correlations across sex, the item “most serious arrest under 18” had a noticeably higher correlation for males than females. For example, the correlation with new conviction was  $r = 0.14$  ( $p < .001$ ) for males and  $r = 0.06$  ( $p < .01$ ) for females. As for race, the item “ever received an official misconduct while incarcerated had much higher correlations with recidivism for White and Black clients than Other clients. To illustrate, the correlation was  $r = 0.13$  ( $p < .001$ ) for White clients,  $r = 0.11$  ( $p < .001$ ) for Black clients, and  $r = 0.03$  ( $p > .05$ ) for Other clients.

Turning towards the second series of supplemental analyses, the bivariate and multivariate analyses were repeated with the recidivism measures of any new case filed and any new conviction post-assessment. No significant and/or substantive differences were found in the validity of the CSST when examining these two

alternative measures of recidivism. The final series of supplemental analyses examined the predictive validity of the IRAS CSST for urban and rural counties. When recidivism was measured as a new case filed, it was identified that the AUC value for urban counties (AUC = 0.61) was significantly larger than the AUC value for rural counties (AUC = 0.57). Notably, the AUC value for rural counties was still statistically significant. Further, when recidivism was measured as a new conviction, no difference was identified in the AUC values for urban and rural counties.

## **IRAS – Prison Intake Tool**

### ***PIT – Univariate Analyses***

Table 20 displays the univariate descriptive statistics for clients assessed by the IRAS PIT. The samples included on the IRAS PIT are a new conviction sample and a return to DOC sample. Across both samples, around 78% of clients were male, with around 60% being White, 35% being Black, and around 4 to 6% being Other racial categories. The average age for these clients was about 36 years old. The most common type of offenses clients were convicted of across both samples was substance use offenses (~28%), followed closely by other offenses (25.77% for the conviction sample and 26.55% for the return to DOC sample), violent offenses (~24%), and property offenses (~20%). Just over 1% of clients in both samples were convicted of a sexual related offense. Regarding risk level, around 28% of both samples were assessed as low risk, 39% as moderate risk, 28% as high risk, and 4% as very high risk. As a reminder, only males can be assessed as very high risk on the IRAS PIT. The average score on the IRAS PIT was around 14 for both samples, which categorizes clients as moderate risk. For the new conviction sample, 15.69% experienced a new conviction within 3-years of the PIT assessment, whereas 7% of the DOC sample returned to DOC at any time after their assessment.



Table 20. PIT Analytical Samples Descriptive Statistics

	Conviction Sample		DOC Sample	
	%/mean (SD)	Range	%/mean (SD)	Range
Sex		0 - 1		0 - 1
Male	78.06%	--	77.93%	--
Female	21.94%	--	22.07%	--
Race		1 - 3		1 - 3
White	61.55%	--	59.91%	--
Black	34.10%	--	33.53%	--
Other	4.35%	--	6.56%	--
Age	35.99 (11.53)	16 - 90	36.02 (11.62)	16 - 90
Offense Type		1 - 5		1 - 5
Violent	23.91%	--	24.34%	--
Property	20.74%	--	20.23%	--
Sex	1.17%	--	1.08%	--
Substance	28.42%	--	27.80%	--
Other	25.77%	--	26.55%	--
Risk Level		0 - 3		0 - 3
Low	27.42%	--	28.76%	--
Moderate	39.09%	--	38.89%	--
High	29.12%	--	28.14%	--
Very High <sup>1</sup>	4.37%	--	4.21%	--
Total Risk Score	14.08 (6.11)	0 - 36	13.87 (6.14)	0 - 36
Recidivism		0 - 1		0 - 1
New Conviction 3 Years	15.69%	--	--	--
Any Return to DOC	--	--	7.00%	--
N		11,367		12,853

Notes: PIT = Prison Intake Tool; SD = Standard Deviation; DOC = Department of Correction; <sup>1</sup> Very High Risk is only a risk category for males.

Table 21 provides the average score and range of potential scores on the PIT risk and need domains across both the conviction and DOC samples. The domains included on the PIT are Criminal History, School Behavior and Employment, Family and Social Support, Substance Abuse and Mental Health, and Criminal Lifestyle. The average score on the Criminal History domain was just under 4 with possible scores ranging from 0 to 10. As for the School Behavior and Employment domain, the average score was about 3.4, out of a total possible score of 4, for both the conviction and DOC samples. The average score was about 2.25 (out of 6 possible) on the Family and Social Support domain for both samples. For the Substance Abuse and Mental Health domain, the average score was about 1.50 out of 5 possible points for both samples. Finally, the average score

was about 2.75 (out of 11 possible) for the Criminal Lifestyle domain for both the conviction and DOC samples. Average scores for each item included on the IRAS PIT are included in Appendix D.

Table 21. PIT Domains Descriptive Statistics

	Conviction Sample		DOC Sample	
	Mean (SD)	Range	Mean (SD)	Range
Criminal History	3.96 (2.62)	0 – 10	3.85 (2.63)	0 – 10
School Behavior & Employment	3.43 (2.26)	0 – 7	3.40 (2.26)	0 – 7
Family & Social Support	2.26 (1.52)	0 – 6	2.25 (1.51)	0 – 6
Substance Abuse & Mental Health	1.53 (1.18)	0 – 5	1.50 (1.18)	0 – 5
Criminal Lifestyle	3.85 (1.95)	0 - 11	2.73 (1.95)	0 - 11
N	11,367		12,853	

Notes: PIT = Prison Intake Tool; DOC = Department of Correction; SD = Standard Deviation

### ***PIT – Bivariate Analyses***

Figure 13 and Figure 14 display a bivariate distribution of total risk score and recidivism rates. Specifically, Figure 13 displays the new conviction rate within 3-years and Figure 14 displays the return to DOC rate any time after the assessment. The horizontal axis of these figures contains the PIT total score, while the vertical axis displays the recidivism percentage. Figure 13 shows that, while variation exists, there is a gradual increase in new conviction rates as the PIT total score increases until the scores begin to move into the 30s. Figure 14 shows a similar pattern as the return rates to DOC gradually increase as PIT scores increase, before declining when the PIT score reaches 27. Notably, for each score above 30 (i.e., 31, 32, 33, 34, 35, and 36) less than 20 clients were assessed for each of those scores on the PIT.

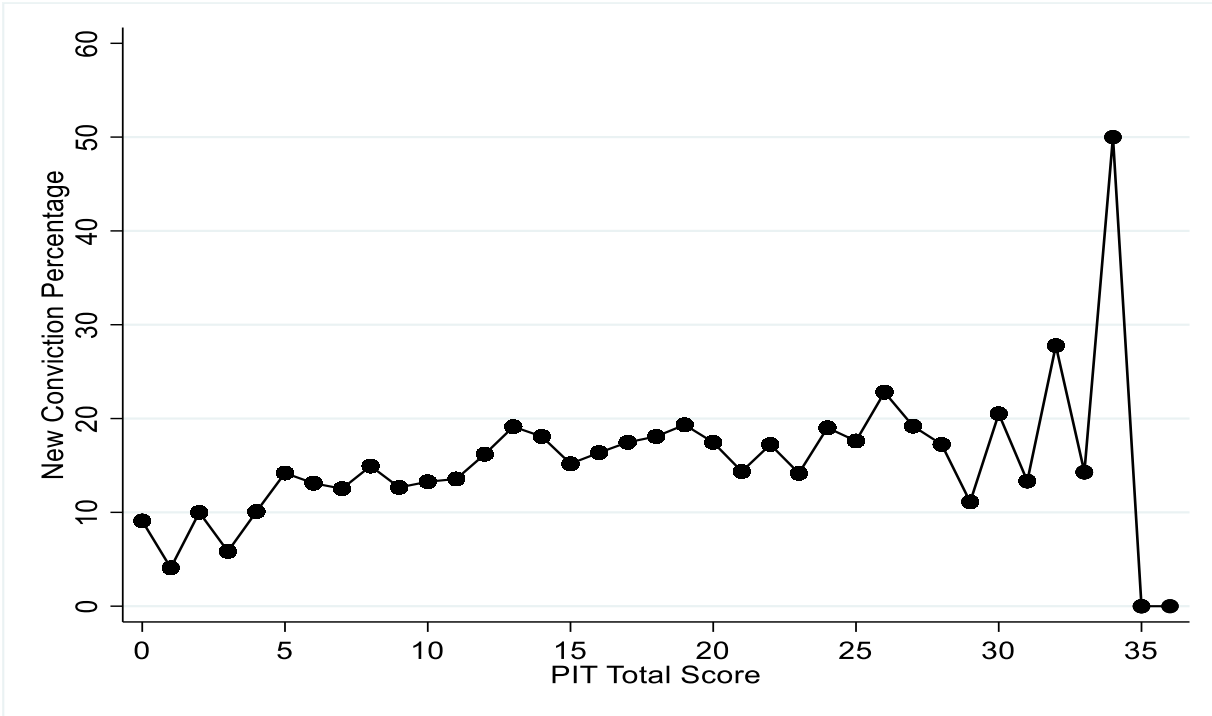


Figure 13. New Conviction Percentage within 3-years of Assessment by PIT Total Score (N = 11,367)  
 Notes: PIT = Prison Intake Tool

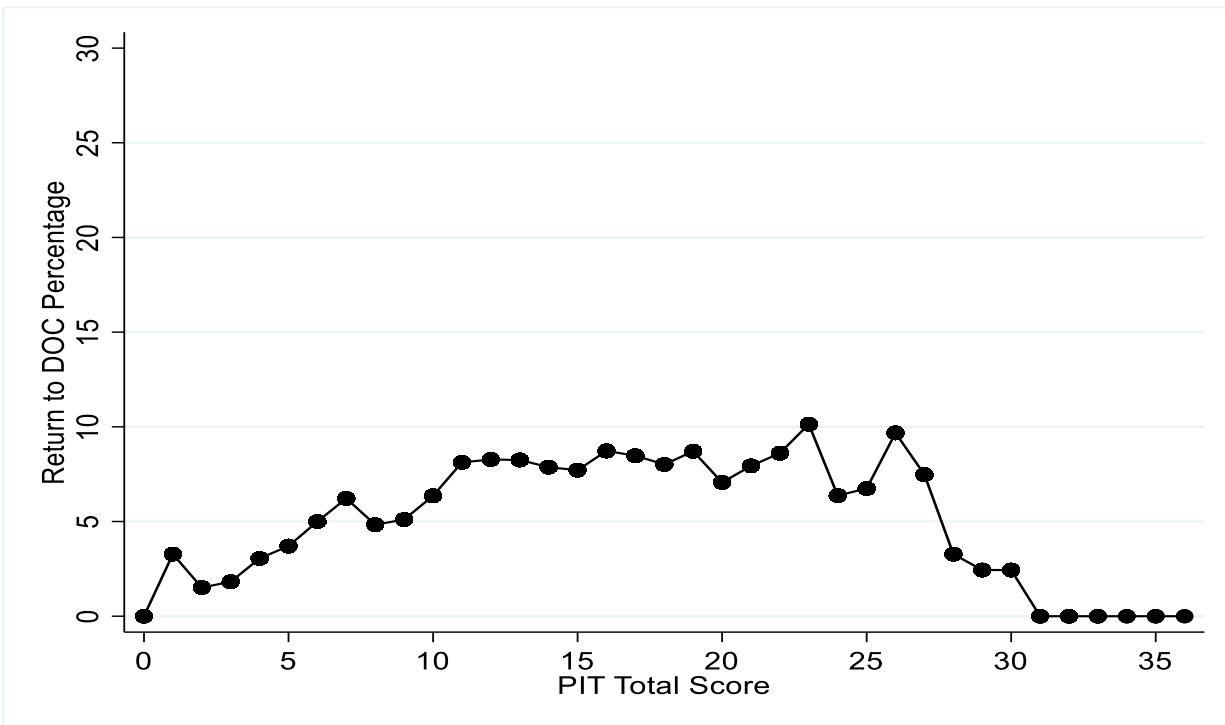


Figure 14. Return to DOC Percentage Any Time Post Assessment by PIT Total Score (N = 12,853)  
 Notes: PIT = Prison Intake Tool; DOC = Department of Correction.

Table 22 displays the correlations between each PIT item, PIT domain, PIT risk level, PIT total score and recidivism. When recidivism was measured as a new conviction within 3-years of the assessment, only 14 of 31 items had a positive and significant correlation with new conviction. Notably, three items – “Arrest for violent offense as an adult” ( $r = -0.03; p < .01$ ), “Satisfaction with Current Support” ( $r = -0.02; p < .05$ ), and “Feels lack of control over events” ( $r = -0.03; p < .01$ ) – had a statistically significant and negative correlation with new conviction, suggesting that as scores on these items increased the new conviction rate tended to decrease, on average. Altogether, 14 of the 31 items on the PIT had a non-significant correlation with new conviction. Examining the risk and need domains, only the Criminal History domain ( $r = 0.07; p < .001$ ) and the Substance Abuse and Mental Health domain ( $r = 0.06; p < .001$ ) had statistically significant and positive correlations with new conviction. The domains of School Behavior and Employment ( $r = 0.02; p > 0.05$ ), Family and Social Support ( $r = 0.01; p > .05$ ), and Criminal Lifestyle ( $r = 0.01; p > 0.05$ ) had non-significant correlations with new conviction. Both the IRAS PITs total score ( $r = 0.05; p < .001$ ) and risk level ( $r = 0.05; p < .001$ ) had statistically significant, positive, and weak correlations with new conviction.

Similar results were found when recidivism was measured as any return to DOC, as only 11 of 31 items on the PIT had a positive and statistically significant relationship with recidivism. One item (“Arrest for violent offense as an adult”) had a statistically significant and negative relationship with return to DOC ( $r = -0.03; p < .001$ ). The other 19 items on the PIT had non-significant correlations with recidivism. Regarding the PIT risk and need domains, the Criminal History domain ( $r = 0.06; p < .001$ ), the School Behavior and Employment domain ( $r = 0.02; p < .05$ ), and the Substance Abuse and Mental Health domain ( $r = 0.03; p < .01$ ) had a statistically significant and positive association with return to DOC, while the Family and Social Support domain ( $r = 0.01; p > .05$ ) and the Criminal Lifestyle domain ( $r = 0.01; p > .05$ ) had non-significant correlations with return to DOC. Both the PIT total score ( $r = 0.04; p < .001$ ) and risk level ( $r = 0.04; p < .001$ ) had statistically significant, positive, and very weak correlations with return to DOC.

Table 22. Correlation between Recidivism and the PIT

	New Conviction 3-years (N = 11,367)	Any Return to DOC (N = 12,853)
	Correlation (r)	Correlation (r)
Age at Assessment	0.02*	-0.01
<i>Criminal History Domain</i>	0.07***	0.06***
Most Serious Arrest Under Age 18	0.05***	0.03**
Prior Juvenile Commitment	0.05***	0.03***
# of Prior Adult Felony Convictions	0.06***	0.06***
Violent Offense Arrest as Adult	-0.03**	-0.03***
# of Prior Prison Commitments	0.04***	0.07***
Received Misconduct while Incarcerated	0.06***	0.06***
Ever Had Escape Attempt	0.06***	0.03***
<i>School Behavior &amp; Employment Domain</i>	0.02	0.02*
Ever Expelled/Suspended from School	0.08***	0.05***
Employed at Time of Arrest	-0.00	-0.00
Employed Full-Time Pre-Arrest	-0.01	0.00
Attitudes Towards Boss/Employer	-0.01	0.00
Longest Employment Last 2 Years	0.01	0.02*
Better Use of Time	0.01	-0.00
<i>Family &amp; Social Support Domain</i>	0.01	0.01
Current Marital Status	0.02*	0.00
Living Situation Prior to Incarceration	0.02	0.01
Stability of Pre-Incarceration Residence	0.02*	0.01
Emotional & Personal Support Available	-0.01	0.01
Satisfaction with Current Support	-0.02*	0.00
<i>Substance Abuse &amp; Mental Health Domain</i>	0.06***	0.03**
Most Recent Alcohol Abstinence Period	0.01	-0.01
Age at First Illegal Drug Use	0.05***	0.05***
Employment Problems Due to Drug Use	0.04***	0.01
Health Problems Due to Drug Use	0.04***	0.03**
Mental Illness/Disorder Diagnosis	0.02	-0.01
<i>Criminal Lifestyle Domain</i>	0.01	0.01
Criminal Activities	0.01	0.02
Gang Membership	0.01	0.01
Ability to Control Anger	-0.00	-0.01
Uses Anger to Intimidate Others	-0.00	-0.01
Acts Impulsively	0.02	0.01
Feels Lack of Control Over Events	-0.03**	-0.01
Walks Away from a Fight	0.03***	0.02*
PIT Total Score	0.05***	0.04***
PIT Risk Level	0.05***	0.04***

Notes: PIT = Prison Intake Tool; DOC = Department of Correction  
 \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests

Figures 15 and 16 display the distribution of recidivism rates by the PIT risk level, as well as the results of the chi-square analyses and Cramer’s *V* measure of association. Figure 15 shows that the percentage of clients who experienced a new conviction within three years of their assessment is 12.54% for low risk clients, 16.36% for moderate risk, 17.31% for high risk, and 18.51% for very high risk clients. The variation in recidivism rates differed in a statistically significant but very weak manner ( $\chi^2 = 34.41$ ;  $V = 0.06$ ). Overall, while new conviction rates generally increase as risk level increases, low risk clients new conviction rate is only 5.97 percentage points lower than very high risk clients. Figure 16 displays the chi-square results when recidivism was measured as a return to DOC any time after the assessment. The return to DOC rates were 5.11% for low risk clients, 7.70% for moderate risk clients, 8.10% for high risk clients, and 6.10% for very high risk clients. As such, while these recidivism rates differ in a statistically significant manner ( $\chi^2 = 31.38$ ;  $V = 0.05$ ), the recidivism rates do not differ by more than 3% across risk levels.

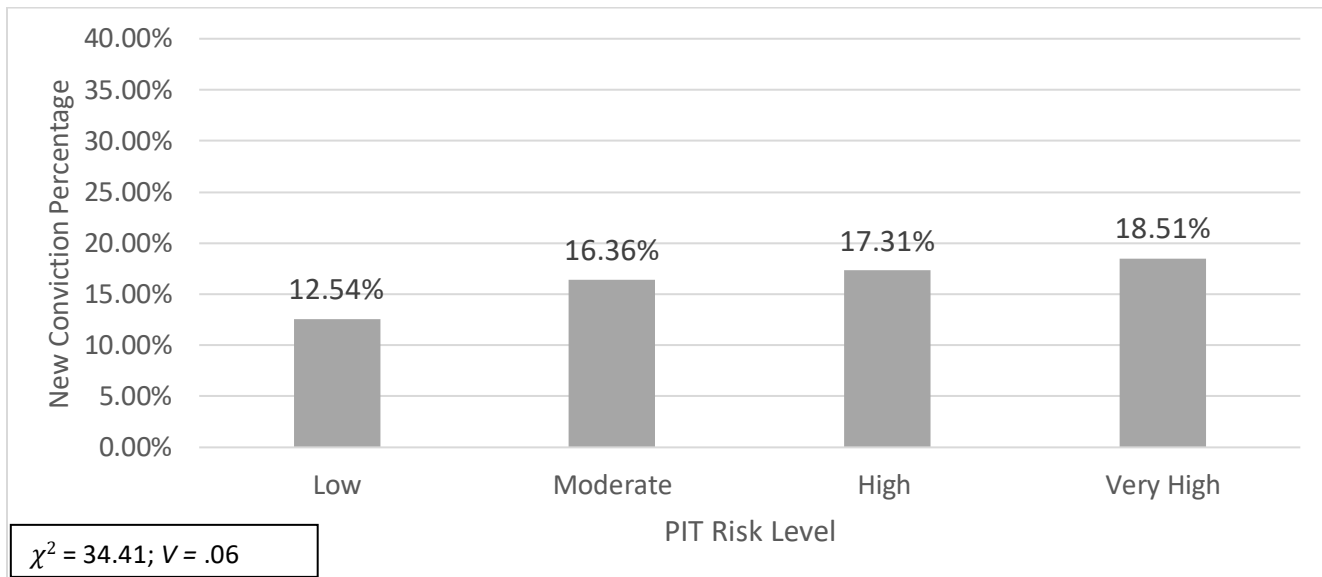


Figure 15. New Conviction Percentage within 3-years of Assessment by PIT Risk level (N = 11,367).  
Notes: PIT = Prison Intake Tool

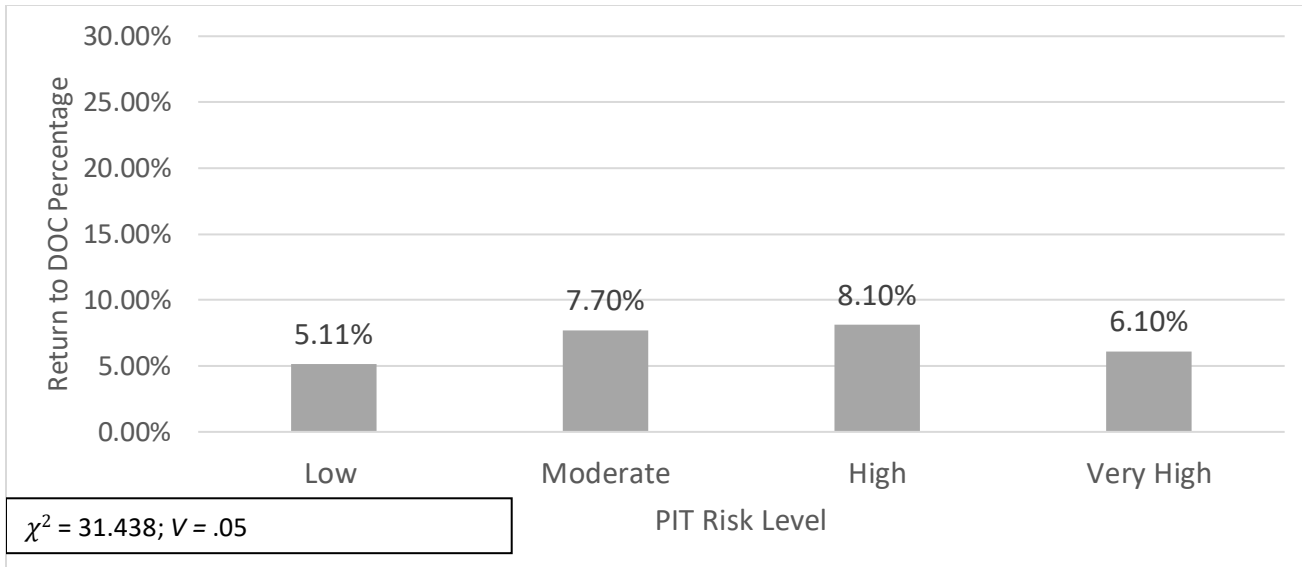


Figure 16. Return to DOC Percentage Any Time Post-Assessment by PIT Risk Level (N = 12,853).

Notes: PIT = Prison Intake Tool; DOC = Department of Correction

The final series of bivariate analyses examined the AUC relationship between the PIT risk level and recidivism, as well as each of the five risk and need domains and recidivism. The results of these analyses are displayed in Table 23. The first series of results examined the AUC values of the PIT risk level, and its domains, predicting a new conviction within three years of the assessment. The PIT risk level was found to have a significant AUC value of 0.55. Looking across the risk and need domains, the Criminal History domain (AUC = 0.56), School Behavior and Employment domain (AUC = 0.52), and the Substance Abuse and Mental Health domain (AUC = 0.54) had AUC values that were statistically significant predictors of new conviction. The Criminal Lifestyle and Family and Social Support domains were found to be non-significant predictors of new conviction (AUC = 0.51).

When measuring recidivism as any return to DOC after the assessment, the results remained largely consistent when compared to recidivism being measured as a new conviction. Specifically, the overall PIT risk level had a statistically significant AUC value of 0.54, while the Criminal History (AUC = 0.57), School Behavior and Employment (AUC = 0.52), and the Substance Abuse and Mental Health (AUC = 0.53) had statistically significant AUC values. The Family and Social Support (AUC = 0.51) and Criminal Lifestyle domain (AUC = 0.52) again had non-significant AUC values when predicting any return to DOC.

Table 23. Area Under the Curve Analyses Between the PIT Risk Level and Recidivism

IRAS PIT	New Conviction 3-Years (N = 11,367)		Any Return to DOC (N = 12,853)	
	AUC	95% CI	AUC	95% CI
PIT Risk Level	0.55*	[0.53 – 0.55]	0.54*	[0.52 – 0.56]
Criminal History	0.56*	[0.54 – 0.57]	0.57*	[0.56 – 0.59]
School Behavior & Employment	0.52*	[0.50 – 0.53]	0.52*	[0.50 – 0.54]
Family & Social Support	0.51*	[0.50 – 0.52]	0.51	[0.49 – 0.53]
Substance Abuse & Mental Health	0.54*	[0.53 – 0.56]	0.53*	[0.51 – 0.55]
Criminal Lifestyle	0.51	[0.49 – 0.52]	0.52*	[0.50 – 0.53]

Notes: AUC = Area Under the Curve; IRAS = Indiana Risk Assessment System; PIT = Prison Intake Tool; DOC = Department of Correction; CI = Confidence Intervals.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests

### ***PIT – Multivariate Analyses***

Table 24 displays the results of the logistic regression model of the PIT total score predicting new conviction within three years, while controlling for other factors. It also displays the results of the survival analysis with the PIT total score predicting any return to DOC, while controlling for other factors and accounting for differing follow up periods. The results of the logistic regression with the PIT total score predicting new conviction indicate that the PIT total score is a statistically significant predictor of new conviction (OR = 1.02;  $p < .001$ ) suggesting that with every one score increase in the PIT score, the odds of a new conviction increase by 2%, on average. The bottom of Table 24 shows the sensitivity, specificity, and correct classification statistics for the logistic regression model. The sensitivity statistic was 61.02%, the specificity was 53.03%, and the correct classification statistic was 54.28%. Turning to the survival model, the PIT total score was a statistically significant predictor of return to DOC (HR = 1.15;  $p < .001$ ), which indicates that as the PIT total score increases the hazard for a new admission to DOC increased by 15%, on average.



Table 24. Logistic Regression of the PIT Total Score Predicting New Conviction and Survival Model Predicting Return to DOC

	New Conviction 3-Years (N = 11,367)		Any Return to DOC (N = 12,853)	
	OR	95% CI	HR	95% CI
PIT Total Score	1.02***	[1.01 – 1.03]	1.02***	[1.01 – 1.03]
Female	--	--	--	--
Male	1.29***	[1.13 – 1.47]	0.96	[0.82 – 1.12]
White	--	--	--	--
Black	0.89*	[0.79 – 0.99]	0.95	[0.83 – 1.10]
Others	0.75*	[0.57 – 0.98]	0.49***	[0.34 – 0.71]
Violent	--	--	--	--
Property	2.09***	[1.79 – 2.44]	1.91***	[1.56 – 2.34]
Sex	2.54***	[1.69 – 3.81]	3.24***	[2.04 – 5.13]
Substance	1.47***	[1.26 – 1.71]	1.62***	[1.32 – 1.98]
Other	1.23*	[1.05 – 1.44]	1.16	[0.94 – 1.44]
Age	0.98***	[0.98 – 0.99]	0.99***	[0.98 – 0.99]
Model $\chi^2$	217.73***		131.46***	
Sensitivity	61.02%		--	
Specificity	53.03%		--	
Correct Classification	54.28%		--	

Notes: PIT = Prison Intake Tool; OR = Odds Ratio; HR = Hazard Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests

Finally, Table 25 displays the logistic regression and survival model results of the PIT risk and need domains predicting recidivism, while controlling for other factors. When predicting a new conviction within 3-years, only two of the five risk and need domains had a statistically significant and positive relationship with recidivism. Specifically, a one score increase in the Criminal History domain was associated with a 7% increase in the odds of experiencing a new conviction within three years (OR = 1.07;  $p < .001$ ) and a one score increase in the Substance Abuse and Mental Health domain was associated with an average increase of 10% in the odds of experiencing a new conviction within three years (OR = 1.10;  $p < .001$ ). The Criminal Lifestyle domain had a statistically significant but negative relationship with a new conviction (OR = 0.96;  $p < .01$ ), suggesting that an increase in the Criminal Lifestyle domain was associated with decreased odds of experiencing a new conviction, on average. The Family and Social Support and School Behavior and Employment domains had non-significant associations with conviction. The sensitivity statistic of this model was 63.77%, the specificity statistic was 53.38%, and the Correct Classification statistic was 55.01%. The survival model predicting any return to DOC found that only the Criminal History had a significant and positive association with a return to DOC (HR = 1.11;

$p < .001$ ). The Criminal Lifestyle domain had a statistically significant but negative relationship with a return to DOC (HR = 0.96;  $p < .05$ ). The other three domains of School Behavior and Employment, Family and Social Support, and Substance Abuse and Mental Health had a non-significant relationship with return to DOC.

Table 25. Logistic Regression of the PIT Domains Predicting New Conviction and Survival Model Predicting Any Return to DOC

PIT Domains	New Conviction 3-Years (N = 11,367)		Any Return to DOC (N = 12,853)	
	OR	95% CI	HR	95% CI
Criminal History	1.07***	[1.05 – 1.10]	1.11***	[1.08 – 1.14]
School Behavior & Employment	0.99	[0.97 – 1.02]	0.99	[0.96 – 1.03]
Family & Social Support	1.02	[0.98 – 1.05]	1.01	[0.97 – 1.06]
Substance Abuse & Mental Health	1.10*	[1.05 – 1.15]	1.01	[0.95 – 1.08]
Criminal Lifestyle	0.96*	[0.93 – 0.99]	0.96*	[0.92 – 1.00]
Female	--	--	--	--
Male	1.22**	[1.06 – 1.40]	0.86	[0.73 – 1.01]
White	--	--	--	--
Black	0.89	[0.80 – 1.01]	0.91	[0.78 – 1.05]
Others	0.77	[0.58 – 1.01]	0.52**	[0.36 – 0.76]
Violent	--	--	--	--
Property	2.02***	[1.73 – 2.36]	1.83***	[1.49 – 2.24]
Sex	2.31***	[1.53 – 3.48]	2.86***	[1.80 – 4.55]
Substance	1.42***	[1.22 – 1.66]	1.57***	[1.28 – 1.92]
Other	1.22*	[1.04 – 1.43]	1.15	[0.93 – 1.42]
Age	0.98***	[0.97 – 0.98]	0.98***	[0.98 – 0.99]
Model $\chi^2$	262.08***		171.63***	
Sensitivity	63.77%		--	
Specificity	53.38%		--	
Correct Classification	55.01%		--	

Notes: PIT = Prison Intake Tool; CI = Confidence Interval; OR = Odds Ratio; HR = Hazard Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; two-tailed tests.

### **PIT – Supplemental Analyses**

The next step for examining the predictive validity of the PIT was to examine the univariate, bivariate, and multivariate analyses by sex, race, and offense types. The results of these analyses can be found in Appendix D. Examining the outcome of a new conviction within 3-years of the assessment no significant differences were identified in the PITs overall predictive validity across sex or offense types; however, it was found that the PIT was a stronger predictor of new conviction for White and Other clients in comparison to Black clients. To illustrate, the AUC value for White individuals (AUC = 0.56) and Other clients (AUC = 0.59) were significantly different than the AUC value for Black individuals, which was non-significant. Examining the risk and need

domains, further racial differences were found with the Criminal History domain, as the AUC values was noticeably lower and non-significant for Black clients (AUC = 0.52) in comparison to White (AUC = 0.58) and Other clients (AUC = 0.61). Importantly, when recidivism was measured as any return to DOC, no significant or substantial differences were identified across sex, race, and offense types. Further, the Criminal History domain was a statistically significant predictor of recidivism for Black clients when recidivism was measured as a return to DOC (AUC = 0.57).

Turning towards the second series of supplemental analyses, the bivariate and multivariate analyses were repeated with the recidivism measures of any new conviction post-assessment. No significant differences were found in the predictive validity of the tool when recidivism was measured as a new conviction any time post-assessment (in comparison to a new conviction within 3-years). Finally, as a reminder, PIT assessments were conducted by the Department of Correction, as such, variation across counties could not be examined with the PIT.

## **IRAS – Supplemental Reentry Tool**

### ***SRT – Univariate Statistics***

Table 26 provides a summary of the descriptive statistics for both the SRT conviction and SRT DOC samples. Across both samples, about 88% of clients were males and the majority of clients were White (64.41% for the conviction sample and 62.03% for the DOC sample). Further, about 32% of both samples were Black, with about 3% of the conviction sample and 6% of the DOC sample being categorized as another racial category. The average age of clients in both SRT samples was about 37 years old. The most common offense category in which clients were convicted of were violent offenses (27.80% for the conviction sample and 28.94% for the DOC sample), followed by substance offenses (~27%), other offenses (~21%), and property offenses (~21%). Just over 2% of clients in both samples were convicted of sexual offenses. Around 38% of both samples were assessed as moderate risk, with the next most common risk level being high risk (27.16% for the convictions sample, 26.28% for the DOC sample). About 21% of the conviction sample and 19% of the DOC sample was assessed as low risk, and about 14% were assessed as very high risk. Unlike the IRAS CST or PIT, both males and females can be assessed as very high risk on the SRT. The average score on the SRT across both samples was around 14, which categorizes clients as moderate risk. Finally, within 3-years of the SRT assessment, 23.63% of the conviction sample experienced a new conviction and 22.25% returned to DOC.

Table 26. SRT Analytical Samples Descriptive Statistics

	Conviction Sample		DOC Sample	
	%/mean (SD)	Range	%/mean (SD)	Range
Sex		0 – 1		0 - 1
Male	87.53%	--	88.14%	--
Female	12.47%	--	11.86%	--
Race		1 – 3		1 – 3
White	64.41%	--	62.03%	--
Black	32.46%	--	31.60%	--
Other	3.13%	--	6.38%	--
Age	37.20 (11.48)	17 – 85	37.28 (11.68)	17 – 85
Offense Type		1 – 5		1 – 5
Violent	28.80%	--	28.94%	--
Property	21.46%	--	20.47%	--
Sex	2.39%	--	2.11%	--
Substance	27.56%	--	27.51%	--
Other	20.78%	--	20.97%	--
Risk Level		0 – 3		0 – 3
Low	19.45%	--	21.09%	--
Moderate	38.82%	--	38.83%	--
High	27.16%	--	26.28%	--
Very High	14.57%	--	13.81%	--
Total Risk Score	14.14 (5.94)	0 – 37	13.87 (5.98)	0 – 37
Recidivism		0 – 1		0 – 1
New Conviction 3 Years	23.63%	--	--	--
Return to DOC 3 Years	--	--	22.25%	--
N		7,963		9,286

Notes: SRT = Supplemental Reentry Tool; SD = Standard Deviation; DOC = Department of Correction

There are four risk and need domains contained within the SRT. The four domains are the Criminal History domain, the Education, Employment, and Social Support domain, the Substance Abuse and Mental Health domain, and the Criminal Attitudes and Behavioral Patterns domain. Table 27 provides the average scores within these domains across both samples. The average score for the Criminal History domain was just under 5, with the scores on the domain ranging from 0 to 12. Similarly, the average score on the Education, Employment, and Social Support domain was around 4.60 with the scores ranging from 0 to 9. On the Substance Abuse and Mental Health domain, the average score was around 0.80 with scores ranging from 0 to 4. Finally, the average score on the Criminal Attitudes and Behavioral Patterns domain was about 3.70 with scores ranging from 0 to 19. The average scores on each item contained within the SRT are displayed in Appendix E.

Table 27. SRT Domain Descriptive Statistics

	Conviction Sample		DOC Sample	
	Mean (SD)	Range	Mean (SD)	Range
Criminal History	4.88 (2.73)	0 – 12	4.69 (2.75)	0 – 12
Edu., Emp., & Social Support	4.68 (2.03)	0 – 9	4.60 (2.06)	0 – 9
Substance Abuse & Mental Health	0.81 (0.89)	0 – 4	0.79 (0.88)	0 – 4
Criminal Att. & Behavioral Patterns	3.69 (2.98)	0 – 19	3.70 (2.99)	0 – 19
N	7,963		9,286	

Notes: SRT = Supplemental Reentry Tool; DOC = Department of Correction; SD = Standard Deviation; Edu. = Education; Emp. = Employment; Att. = Attitudes.

**SRT – Bivariate Analyses**

Figure 17 and Figure 18 display a bivariate distribution of total risk score and recidivism percentage. Specifically, Figure 17 displays the new conviction rate within 3-years of the assessment and Figure 18 displays the return to DOC rate within 3-years of the assessment. The horizontal axis of these figures contains the SRT total score, while the vertical axis displays the recidivism percentage. Examining both figures, while some variation exists, there is a gradual increase in recidivism rates as the total risk score increases. It should be noted that the sample size for clients who scored over 30 on the SRT is small (<20) for each individual score (e.g., 17 people scored a 31, 3 people scored a 34), which may explain the sharp inclines and declines in recidivism percentages seen on the far-right end of the horizontal axis.

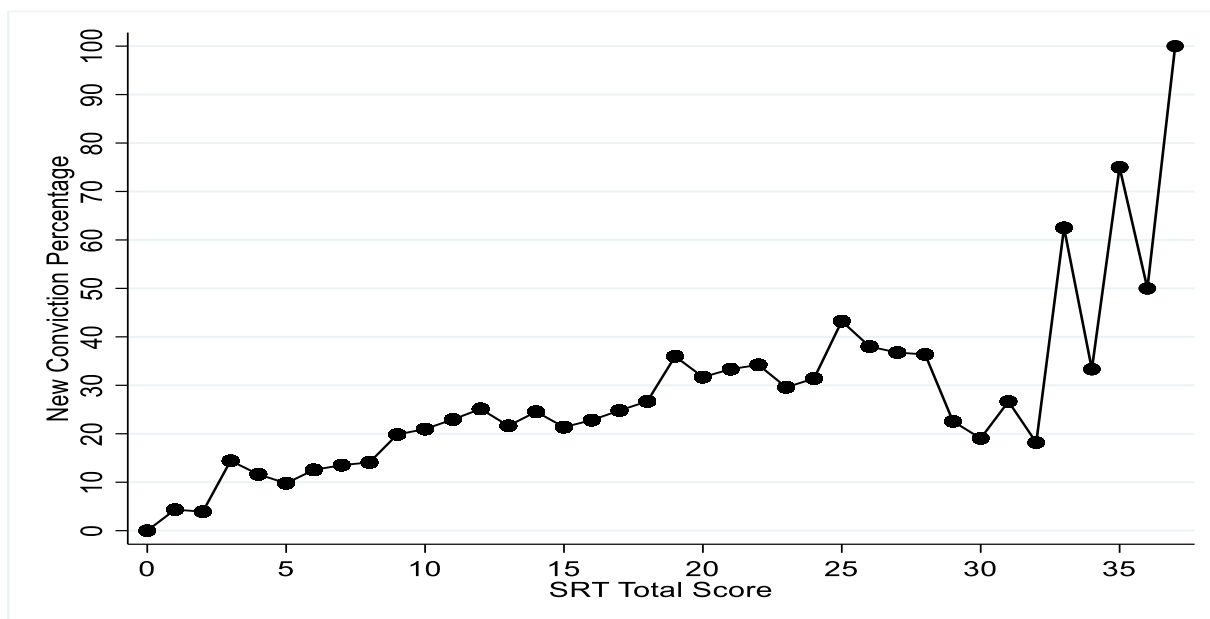


Figure 17. New Conviction Percentage within 3-Years of Assessment by SRT Total Score (N = 7,963)

Notes: SRT = Supplemental Reentry Tool

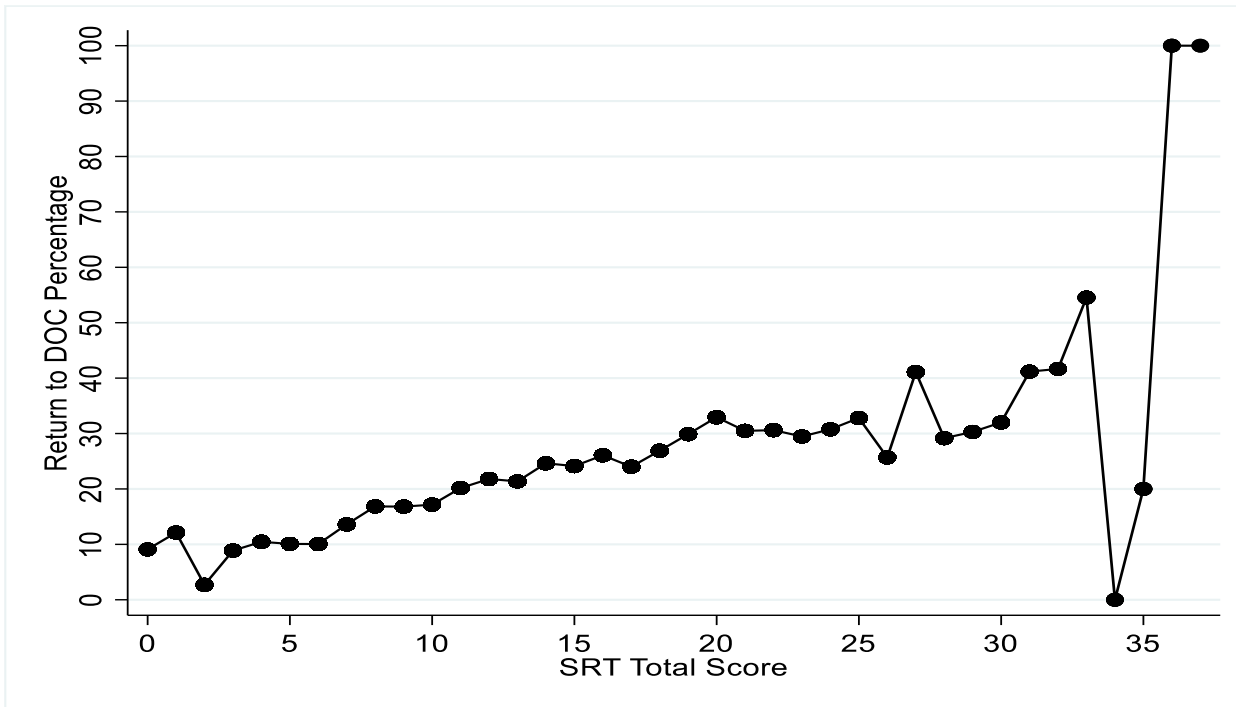


Figure 18. Return to DOC Percentage within 3-Years of Assessment by SRT Total Score (N = 9,286)  
 Notes: SRT = Supplemental Reentry Tool; DOC = Department of Correction.

Table 28 displays the correlations between each SRT item, SRT domain, SRT risk level, SRT total score and recidivism. When recidivism was measured as a new conviction within 3-years of the assessment, 26 of 32 items had a positive and significant correlation with new conviction, while 6 of the 32 items on the SRT had a non-significant correlation with new conviction. Examining the risk and need domains, all four had a statistically significant and positive correlation with new conviction. Specifically, the Criminal History domain had the strongest correlation ( $r = 0.15; p < .001$ ), followed by the Education, Employment, and Social Support domain ( $r = 0.09; p < .001$ ) and the Criminal Attitudes and Behavioral Patterns domain ( $r = 0.09; p < .001$ ), with the Substance Abuse and Mental Health domain having the weakest correlation with new conviction ( $r = 0.04; p < .001$ ). Both the IRAS SRT total score ( $r = 0.16; p < .001$ ) and risk level ( $r = 0.15; p < .001$ ) had statistically significant correlations with new conviction.

A relatively consistent pattern emerged when recidivism was measured as return to DOC within 3-years of the assessment, as 23 of the 32 items had a statistically significant and positive correlation with recidivism, while 8 items had a non-significant correlation with return to DOC. One item, “Current Offense Drug Related,” had a statistically significant and negative correlation with recidivism ( $r = -0.05; p < .001$ ). Notably, this item had a non-significant correlation with new conviction. As for the risk and need domains, the Criminal History domain ( $r = 0.18; p < .001$ ), the Education, Employment, and Social Support domain ( $r = 0.10; p < .001$ ), the Substance

Abuse and Mental health domain ( $r = 0.03$ ;  $p < .01$ ), and the Criminal Attitudes and Behavioral Patterns domain ( $r = 0.07$ ;  $p < .001$ ) maintained statistically significant and positive correlations with return to DOC. Finally, the correlation between the SRT total score and return to DOC ( $r = 0.16$ ;  $p < .001$ ) and the SRT risk level and return to DOC ( $r = 0.15$ ;  $p < .001$ ) were consistent with when recidivism was measured as new conviction.

Table 28. Correlation between Recidivism and the SRT

	New Conviction 3-years (N = 7,963)	Return to DOC 3-years (N = 9,286)
	Correlation ( <i>r</i> )	Correlation ( <i>r</i> )
Age at Time of Assessment	0.05***	0.05***
<i>Criminal History Domain</i>	0.15***	0.18***
Most Serious Arrest Under Age 18	0.11***	0.12***
Age at First Arrest or Charge	0.12***	0.15***
Prior Commitment as a Juvenile to DYS	0.11***	0.16***
Current Offense Drug Related	0.00	-0.05***
Number of Prior Felony Convictions	0.10***	0.10***
Number of Prior Prison Commitments	0.08***	0.13***
Received Infraction for Violence While Incarcerated	0.06***	0.10***
Ever Absconded from Community Supervision as Adult	0.08***	0.07***
<i>Education, Employment, &amp; Social Support Domain</i>	0.09***	0.10***
Ever Suspended/Expelled from School	0.12***	0.15***
Employed at Time of Arrest	0.02	0.03**
Ever Quit Job Prior to Having Another	0.04***	0.01
Employed Full-Time Just Prior to Incarceration	0.04***	0.04***
Longest Length of Employment Past Two Years	0.06***	0.06***
Current Marital Status	0.03**	0.06***
Living Situation Prior to Incarceration	0.02*	0.03***
<i>Substance Abuse &amp; Mental Health Domain</i>	0.04***	0.03*
Most Recent Period of Abstinence form Alcohol	0.01	0.01
Problems with Employment due to Drug Use	0.03*	-0.01
Problems with Health due to Drug Use	0.01	-0.01
Ever Diagnosed with Mental Illness/Disorder	0.04***	0.07***
<i>Criminal Attitudes and Behavioral Patterns Domain</i>	0.09***	0.07***
Gang Membership	0.06***	0.06***
Criminal Activities	0.08***	0.07***
Ability to Control Anger	0.07***	0.04***
Uses Anger to Intimidate Others	0.04***	0.03**
Walks Away from a Fight	0.06***	0.05***
Problem Solving Ability	0.05***	0.02
Acts Impulsively	0.06***	0.04***
Feels Lack of Control Over Events	0.01	0.01
Criminal Attitudes	0.07***	0.06***
Believes that is Possible to Overcome Past	0.01	-0.01
Expresses Concern about Others	0.05***	0.02
“Do Unto Others Before They Do Unto You”	0.03*	0.03*
SRT Total Score	0.16***	0.16***
SRT Risk Level	0.15***	0.15***

Notes: SRT = Supplemental Reentry Tool; DOC = Department of Correction.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.



Figures 19 and 20 display the distribution of recidivism rates by the SRT risk level, as well as the results of the chi-square analyses and Cramer’s V measure of association. Figure 19 shows that the percentage of clients who experienced a new conviction within three years of their assessment is 12.46% for low risk clients, 23.00% for moderate risk, 27.18% for high risk, and 33.62% for very high risk clients. The variation in recidivism rates differ in a statistically significant manner ( $\chi^2 = 187.41$ ;  $V = 0.15$ ). Overall, new conviction rates increase as risk level increases, and low risk client’s new conviction rate is 21.16 percentage points lower than very high risk clients. Figure 20 displays the chi-square results when recidivism was measured as a return to DOC within 3-years of the assessment. The return to DOC rates were 12.56% for low risk clients, 20.60% for moderate risk clients, 27.50% for high risk clients, and 31.67% for very high risk clients. These recidivism rates differ in a statistically significant manner across risk level ( $\chi^2 = 216.47$ ;  $V = 0.15$ ). Similar to when recidivism was measured as a new conviction, there is a substantial difference in return to DOC rates for low risk clients compared to high and very high risk clients, as low risk clients recidivism percentage was 14.94 percentage points lower than high risk and 21.11 percentage points lower than very high risk clients.

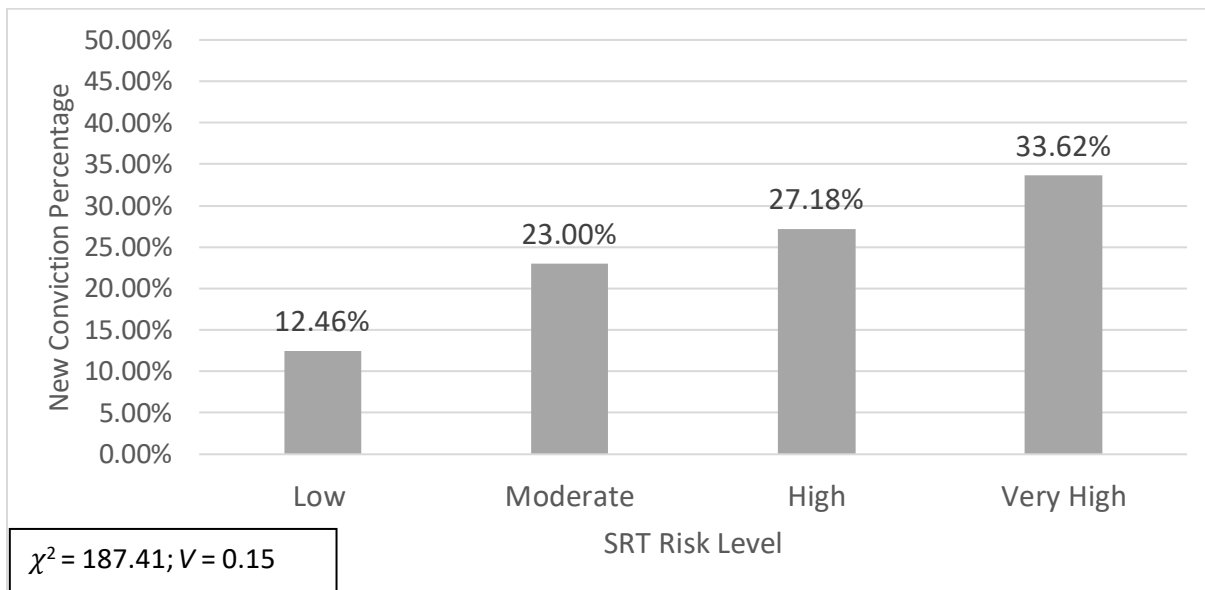


Figure 19. New Conviction Percentage within 3-years of Assessment by SRT Risk Level (N = 7,963).

Notes: SRT = Supplemental Reentry Tool

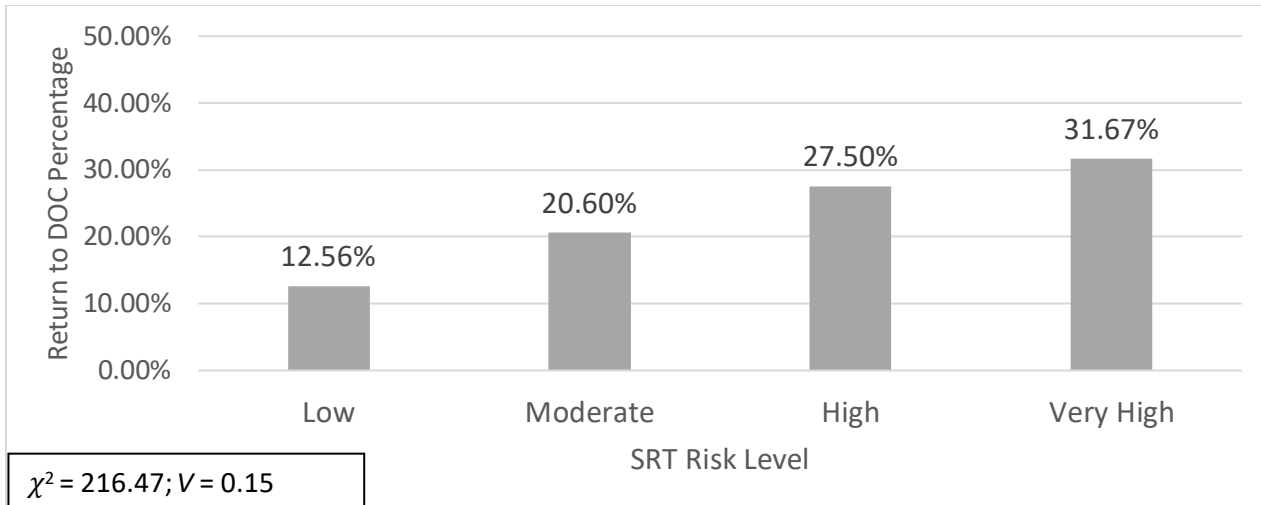


Figure 20. Return to DOC Percentage within 3-years of Assessment by SRT Risk Level (N = 9,286).  
 Notes: SRT = Supplemental Reentry Tool; DOC = Department of Correction

Table 29 presents the results of AUC analyses examining the ability of the SRT risk level and risk and need domains to predict new conviction and return to DOC within 3-years of the assessment. When predicting new conviction within 3-years, the SRT risk level had a statistically significant AUC value of 0.60. The four risk and need domains also were found to be significant predictors of new conviction, with AUC values of 0.60 for the Criminal History domain, 0.56 for the Education, Employment, and Social Support domain, 0.56 for the Criminal Attitudes and Behavioral Patterns domain, and 0.53 for the Substance Abuse and Mental Health domain. The results remained mostly consistent when recidivism was measured as return to DOC within 3-years, as the SRT risk level had an AUC value of 0.60. The four domains also significantly predicted return to DOC with the Criminal History domain having an AUC value of 0.62, the Education, Employment, and Social Support domain having an AUC value of 0.57, the Criminal Attitudes and Behavioral Patterns having an AUC value of 0.55, and the Substance Abuse and Mental Health domain having an AUC value of 0.52.

Table 29. Area Under the Curve Analyses Between the SRT Risk Level and Recidivism

IRAS SRT	New Conviction 3-Years (N = 7,963)		Return to DOC 3-Years (N = 9,286)	
	AUC	95% CI	AUC	95% CI
SRT Risk Level	0.60*	[0.58 – 0.61]	0.60*	[0.59 – 0.61]
Criminal History	0.60*	[0.59 – 0.62]	0.62*	[0.61 – 0.64]
Edu., Emp., & Social Support	0.56*	[0.54 – 0.57]	0.57*	[0.56 – 0.58]
Substance Abuse & Mental Health	0.53*	[0.52 – 0.54]	0.52*	[0.51 – 0.53]
Criminal Att. & Behavioral Patterns	0.56*	[0.55 – 0.58]	0.55*	[0.53 – 0.56]

Notes: AUC = Area Under the Curve; SRT = Supplemental Reentry Tool; DOC = Department of Correction; CI = Confidence Intervals; Edu. = Education; Emp. = Employment; Att. = Attitudes.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### ***SRT – Multivariate Analyses***

Table 30 contains the results of the logistic regression models with the SRT total score predicting a new conviction within 3-years and return to DOC within 3-years of the assessment, while controlling for sex, race, age, and offense types. The SRT total score is positively and significantly associated with both a new conviction and return to DOC ( $OR = 1.06$ ;  $p < .001$ ) suggesting that with a one score increase in total risk score on the SRT, the odds of experiencing a new conviction and the odds of returning to DOC increases by 6%, on average, within 3-years of the assessment. The bottom of Table 30 displays the sensitivity, specificity, and correct classification for each logistic regression model. When recidivism was measured as a new conviction, the sensitivity statistic was 54.62%, the specificity statistic was 62.97%, and correct classification was 60.99%. For return to DOC, the sensitivity statistic was 72.07%, the specificity statistic was 50.40%, and the correct classification rate was 55.22%.

Table 30. Logistic Regression of the SRT Total Score Predicting Recidivism

	New Conviction 3-Years (N = 7,963)		Return to DOC 3-Years (N = 9,286)	
	OR	95% CI	OR	95% CI
SRT Total Score	1.06***	[1.05 – 1.07]	1.06***	[1.05 – 1.07]
Female	--	--	--	--
Male	1.53***	[1.28 – 1.82]	1.41***	[1.18 – 1.68]
White	--	--	--	--
Black	0.85**	[0.76 – 0.96]	1.08	[0.98 – 1.21]
Others	0.67*	[0.48 – 0.93]	0.36***	[0.28 – 0.49]
Violent	--	--	--	--
Property	1.34***	[1.15 – 1.56]	0.71***	[0.61 – 0.81]
Sex	1.45*	[1.04 – 2.03]	0.91	[0.66 – 1.25]
Substance	1.22**	[1.05 – 1.42]	0.58***	[0.51 – 0.66]
Other	1.12	[0.96 – 1.32]	0.49***	[0.42 – 0.56]
Age	0.97***	[0.97 – 0.98]	0.98***	[0.42 – 0.56]
Model $\chi^2$	348.65***		489.41***	
Sensitivity	76.30%		72.07%	
Specificity	41.95%		50.40%	
Correct Classification	50.07%		55.22%	

Notes: SRT = Supplemental Reentry Tool; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Table 31 displays the results of the logistic regression models with the SRT risk and need domains predicting recidivism. When recidivism was measured as new conviction, three of the four risk domains have a statistically significant and positive relationship with recidivism, suggesting that as risk scores in the Criminal History domain (OR = 1.12;  $p < .001$ ), Education, Employment, and Social Support domain (OR = 1.04;  $p < .01$ ), and the Criminal Values and Behavioral Patterns domain (1.02;  $p < .05$ ) increase, clients odds of experiencing a new conviction within 3-years also increase, on average. The Substance Abuse and Mental Health domain was a non-significant predictor of new conviction. For the new conviction model, the sensitivity statistic was 57.33%, the specificity statistic was 63.13%, and the correct classification rate was 61.76%. When recidivism was measured as return to DOC, only two of the four risk and need domains significantly predicted recidivism. The Criminal History domain (OR = 1.16;  $p < .001$ ) and the Employment, Education, and Social Support domain (OR = 1.05;  $p < .001$ ) had significant associations with return to DOC, while the Substance Abuse and Mental Health domain and Criminal Values and Attitudes domain were non-significant predictors of return to DOC. The sensitivity statistic for the DOC model was 72.65%, the specificity statistic was 53.05%, and the correct classification rate was 57.41%.

Table 31. Logistic Regression of the SRT Domains Predicting Recidivism

	New Conviction 3-Years (N = 7,963)		Return to DOC 3-Years (N = 9,286)	
	OR	95% CI	OR	95% CI
<b>SRT Domains</b>				
Criminal History	1.12***	[1.09 – 1.14]	1.16***	[1.14 – 1.18]
Education, Employment, & Social Support	1.04**	[1.01 – 1.08]	1.06***	[1.03 – 1.09]
Substance Abuse & Mental Health	1.01	[0.95 – 1.08]	1.02	[0.96 – 1.08]
Criminal Attitudes and Behavioral Patterns	1.02*	[1.00 – 1.04]	0.99	[0.97 – 1.01]
Female	--	--	--	--
Male	1.44***	[1.20 – 1.73]	1.33**	[1.11 – 1.59]
White	--	--	--	--
Black	1.28**	[1.10 – 1.50]	1.02	[0.92 – 1.15]
Others	0.68*	[0.49 – 0.95]	0.41	[0.31 – 0.55]
Violent	--	--	--	--
Property	1.28**	[1.10 – 1.49]	0.64***	[0.55 – 0.74]
Sex	1.37	[0.98 – 1.92]	0.80	[0.58 – 1.11]
Substance	1.13	[0.97 – 1.31]	0.50***	[0.43 – 0.57]
Other	1.09	[0.93 – 1.28]	0.46***	[0.39 – 0.53]
Age	0.97***	[0.97 – 0.98]	0.98***	[0.97 – 0.98]
Model $\chi^2$	383.27***		606.70***	
Sensitivity	77.26%		72.65%	
Specificity	42.79%		53.05%	
Correct Classification	50.94%		57.41%	

Notes: SRT = Supplemental Reentry Tool; CI = Confidence Interval; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### **SRT – Supplemental Analyses**

Examining the predictive validity of the SRT across sex, race, and offense types revealed no significant or substantial differences when recidivism was measured as a return to DOC (see Appendix E). However, a significant difference was identified when recidivism was measured as a new conviction within 3-years of the assessment. Specifically, it was identified that the predictive ability of the SRT was significantly stronger for clients convicted of offenses categorized as other than for clients convicted of substance related offenses. To illustrate, there was a significant difference between the AUC values, as the AUC value for other offenders was 0.64 and only 0.54 for substance use offenders. Notably, the AUC value was still statistically significant for clients convicted of substance related offenses.

Turning towards the second series of supplemental analyses, the bivariate and multivariate analyses were repeated with each measure of recidivism (i.e., new conviction and return to DOC) measured as any occurrence post-assessment. No significant differences were found in the predictive validity of the tool when

recidivism was measured as a new conviction or return to DOC any time post-assessment (in comparison to a new conviction or return to DOC within 3-years). Finally, as a reminder, SRT assessments were conducted by the Department of Correction, as such, variation across counties could not be examined with the SRT for the current sample.

## **IRAS – Static Tool**

### ***Static – Univariate Analyses***

Table 32 displays a variety of descriptive statistics for clients assessed by the IRAS Static Tool who had valid measures of new conviction. As a reminder, unlike the other IRAS tools, the validity of the Static Tool is only being assessed based on one outcome – new conviction. The conviction sample for the Static Tool contained 315 clients. Of the 315 clients, 82.22% were male. Most of the sample was White (67.94%) or Black (30.16%), with only a small portion being an Other racial category (1.90%). The average age for this sample was about 38 years old. As for offense type, the most common type of offenses clients were convicted of was substance offenses (34.60%), followed by violent offenses (23.49%), other offenses (21.59%) and property offenses (20.00%). Only one individual (0.32%) was convicted of a sexual offense who was assessed by the Static Tool. There was a relatively even distribution of clients assessed as low risk (35.87%) and moderate risk (36.19%), with 21.90% being assessed as high risk, and 6.03% being assessed as very high risk. The average score on the Static Tool was 2.85, which categorizes clients as moderate risk.

Table 32. Static Tool Descriptive Statistics

	Conviction Sample	
	%/mean (SD)	Range
Sex		0 – 1
Male	82.22%	--
Female	17.78%	--
Race		1 – 3
White	67.94%	--
Black	30.16%	--
Other	1.90%	--
Age	39.24 (12.32)	19 – 80
Offense Type		1 – 5
Violent	23.49%	--
Property	20.00%	--
Sex	0.32%	--
Substance	34.60%	--
Other	21.59%	--
Risk Level		0 – 3
Low	36.87%	--
Moderate	36.19%	--
High	21.90%	--
Very High	6.03%	--
Total Risk Score	2.85 (2.00)	0 – 9
Recidivism		0 – 1
New Conviction 3-Years	40.32%	--
N		315

Notes: SD = Standard Deviation

Table 33 provides the average score for each of the eight items included on the Static Tool. Notably, like the IRAS PAT and CSST, the Static Tool does not contain specific risk and need domains. The first item simply identified the client's age at the time of the assessment (0 = 26 or older; 1 = 25 or younger). The average score on this item was 0.19, suggesting that most clients were 26 or older at the time of the assessment. The second item examined whether the client assessed had two or more convictions for adult misdemeanors (0 = No; 1 = Yes). The average score on this item was a 0.70. The third item assessed whether the client had three or more prior felony convictions as an adult (0 = No; 1 = Yes) and the average score on this item was a 0.28. The fourth item identified whether the current arrest was for a violent offense (0 = No; 1 = Yes) and the average score was just under 0.50. The fifth item identified the number of times the client had previously been sentenced to prison (0 = None; 1 = One or two; 2 = Three or four; 3 = Five or more). On average, the score on this item was 0.56 suggesting that most of the sample had been sentenced to prison two times or less. The sixth item captured the number of prison misconducts the client had received (0 = None; 1 = One or two; 2 = Three or more), with the

average score on this item being 0.30. The final two items on the Static Tool assess whether the client absconded from community supervision in the past (0 = No; 1 = Yes) and whether they attempted to escape from secure confinement in the past (0 = No; 1 = Yes). The average score on the absconding from community supervision item was 0.30 and the average score on the attempted escape from secure confinement was 0.04.

Table 33. Static Tool Item Descriptive Statistics

	Conviction	
	Mean (SD)	Range
Age at Time of Assessment	0.19 (.39)	0 – 1
2+ Convictions for Misdemeanors as Adult	0.70 (.46)	0 – 1
Three Prior Adult Felony Convictions	0.28 (.45)	0 – 1
Arrest for Violence	0.49 (.50)	0 – 1
Number of Times Previously Sent to Prison	0.56 (.77)	0 – 3
Number of Prison Misconducts	0.30 (.64)	0 – 2
Absconded from Community Supervision	0.30 (.46)	0 – 1
Attempted Escape from Secure Confinement	0.04 (.19)	0 – 1
N		315

Notes: SD = Standard Deviation

### **Static Tool – Bivariate Analyses**

Figure 21 displays the bivariate distribution of total risk score and new conviction rate within three years. The horizontal axis of this figure displays the Static Tools total score, and the vertical axis displays the new conviction rate within 3-years of the assessment. As a reminder, each dot displays the recidivism rates for clients who scored at the specified risk score on the Static Tool. Figure 21 displays no discernable pattern between risk score and new conviction percentage, as the conviction percentage seems to rise and fall across the varying Static Tool scores.



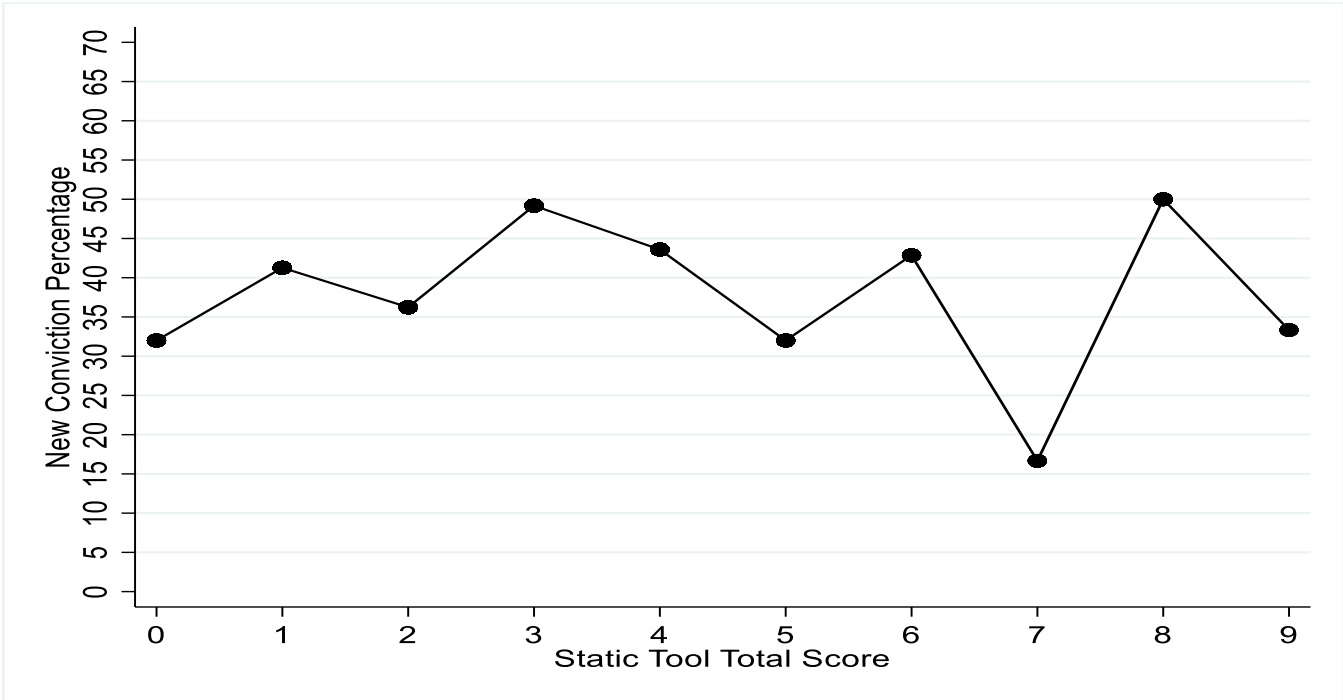


Figure 21. New Conviction Percentage within 3-Years of Assessment by Static Tool Total Score (N = 315)

Table 34 displays the correlations between each Static Tool item, Static Tool total score, and Static Tool risk level and new conviction. As can be seen in Table 34, none of the eight Static Tool items has a statistically significant correlation with new conviction. Further, the Static Tool total score ( $r = 0.01$ ;  $p > 0.05$ ) and the Static Tool risk level ( $r = -0.02$ ;  $r > 0.05$ ) also had non-significant correlations with new conviction.

Table 34. Correlation between Recidivism and the Static Tool (N = 315)

	New Conviction 3-Years (N = 315) Correlation ( <i>r</i> )
Age at Time of Assessment	-0.04
2+ Convictions for Misdemeanors as Adult	0.05
Three Prior Adult Felony Convictions	0.02
Arrest for Violence	-0.00
Number of Times Previously Sent to Prison	0.04
Number of Prison Misconducts	-0.03
Absconded from Community Supervision	-0.01
Attempted Escape from Secure Confinement	0.01
Static Total Score	0.01
Static Risk Level	-0.02

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Figure 22 displays the distribution of new conviction rates by the Static Tool risk level, as well as the results of the chi-square analysis and Cramer’s *V* measure of association. Figure 22 shows that 40.71% of low

risk clients experienced a new conviction within 3-years of the assessment, 41.23% of moderate risk, 39.13% of high risk, and 36.84% of very high risk clients experienced a new conviction. As such, high and very risk clients had the lowest recidivism rates among the risk categories, and the overall new conviction percentage was separated by less than 5% across the four risk categories. This association was found to be non-significant ( $\chi^2 = 0.14$ ;  $V = 0.02$ ).

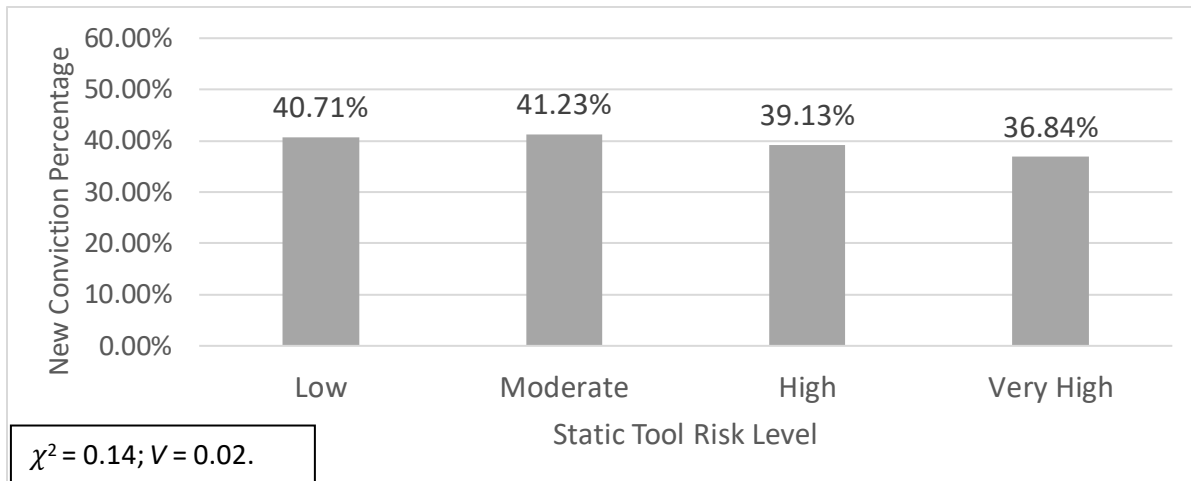


Figure 22. New Conviction Percentage within 3-years of Assessment by Static Risk Level (N = 315).

Table 35 displays the results of AUC analysis for the Static Tool risk level predicting new conviction within 3-years. The table also shows the AUC values for males and White clients. None of the other groups of sex, race, and offense types are displayed because these groups did not have a large enough sample to conduct validation analyses (the remaining results for males and White clients assessed by the Static Tool can be found in Appendix F). The results found that the Static Tool was not a non-significant predictor of recidivism for the total sample (AUC = 0.49;  $p > 0.05$ ). Further, the tool was a non-significant predictor of both males and White clients.

Table 35. Area Under the Curve Analyses Between the Static Tool Risk Level and Recidivism

	New Conviction 3-Years (N = 315)	
IRAS Static Tool	AUC	95% CI
Analytical Sample	0.49	[0.43 – 0.55]
Sex		
Males	0.50	[0.43 – 0.57]
Females	--	--
Race		
White	0.50	[0.43 – 0.57]
Black	--	--
Other	--	--

Notes: AUC = Area Under the Curve; CI = Confidence Interval. AUCs were not calculated for females, Black, or Other clients, nor across offense types, due to a lack of sample sizes.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### **Static Tool – Multivariate Analyses**

Table 36 presents the results of a logistic regression model with the Static Tool total score predicting new conviction while controlling for sex, race, age, and offense type. The results show that Static Tool Total score was a non-significant predictor of new conviction (OR = 1.00;  $p > 0.05$ ), suggesting that a one score increase in total score is not associated with a significant increase or decrease in the odds of experiencing a new conviction within 3-years of the assessment. The sensitivity, specificity, and correct classification statistics of this model were all between 55 and 60%.

Table 36. Logistic Regression of the Static Tool Total Score Predicting Recidivism

	Conviction 3-Years (N = 315)	
	OR	95% CI
Static Total Score	1.01	[0.89 – 1.14]
Female	--	--
Male	0.80	[0.43 – 1.50]
White	--	--
Black	0.82	[0.48 – 1.40]
Other	--	--
Violent	--	--
Property	1.49	[0.74 – 2.99]
Sex	--	--
Substance	0.61	[0.32 – 1.16]
Other	0.70	[0.35 – 1.41]
Age	0.98*	[0.96 – 0.99]
Model $\chi^2$	16.06*	
Sensitivity	59.20%	
Specificity	56.83%	
Correct Classification	57.79%	

Notes: OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification are determined based on a threshold level of 0.40; The other racial category and sex offense category are excluded due to small sample sizes.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### Static Tool – Supplemental Analyses

Unlike the previous IRAS tools, variation in the predictive validity could not be examined across the majority of sex, race, and offense type groups. As mentioned above, the tool was found to be a non-significant predictor of new conviction for males and White clients (see Appendix F). None of the other groups assessed by the Static Tool could be examined due to small sample sizes. Further, recidivism measured as any conviction post-assessment, the tool remained a non-significant predictor of recidivism. Finally, due to the small sample size, we could not examine the validity of the tool across county type.

## IYAS – The Detention Tool

### DET – Univariate Results

Table 37 displays the univariate results for the DET Tool new referral sample. As described above, each IYAS tool only contained one sample focusing on one outcome. As such, youth in the DET Tool referral sample were mostly male (64.44%), with the most common racial category being White youth (54.66%), followed by Black youth (34.94%) and the Other racial category (10.41%). The average age of youth in this sample was just

over 16 years old. For the DET Tool sample, most youth's most serious offense charge was categorized as an other offense type (39.03%). The second most common offense type was violent offenses (26.03%), followed by property offenses (23.34%), and substance offenses (11.60%). There were no youth charged with a sexual offense in the DET sample. Just over 40% of youth were assessed as moderate risk on the DET Tool, while just over 30% (32.40%) were assessed as high risk and just under 30% (27.56%) were assessed as low risk. The average score on the DET Tool was 3.79 which categorizes males as moderate risk and females as either low risk or moderate risk. Finally, 15.26% of the sample received a new referral within 3-years of the assessment.

Table 37. DET Tool Analytical Sample Descriptive Statistics

	Referral Sample	
	%/mean (SD)	Range
Sex		0 - 1
Male	64.44%	--
Female	35.56%	--
Race		1 - 3
White	54.65%	--
Black	34.94%	--
Other	10.41%	--
Age	16.10 (1.75)	8 - 19
Offense Type		1 - 5
Violent	26.03%	--
Property	23.34%	--
Substance	11.60%	--
Other	39.03%	--
Risk Level		0 - 2
Low	27.56%	--
Moderate	40.04%	--
High	32.40%	--
Total Risk Score	3.79 (1.44)	0 - 7
Recidivism		--
New Referral 3-Years	15.26%	0 - 1
N		3,861

Notes: DET = Detention; SD = Standard Deviation

Table 38 shows the average score for the DET Tool sample on each of the six items included on the tool. The first item assessed whether the youth had a prior record in which he or she was adjudicated for a misdemeanor or felony offense (0 = No; 1 = Yes) and the average score on this item was 0.43. As for the second item, it assessed the seriousness of the current charge (0 = Status; 1 = Misdemeanor; 2 = Felony). On average, youth scored a 1.17 on this item, suggesting most of the youth's current charges were either a misdemeanor or felony. Item three asked whether each youth's first documented contact with the juvenile justice system

occurred before or after the age of 16 (0 = 16 or older; 1 = 15 or younger). The average score on this item was 0.74. The fourth item examined whether the youth’s family member(s) have been arrested (0 = No; 1 = Yes) and the average score on this item was 0.74. The fifth item on the DET Tool assessed whether youth had difficulty controlling anger (0 = No; 1 = Yes) and just under half (mean = 0.48) were evaluated as having trouble controlling their anger. Finally, the last item examined whether youth had negative attitudes towards the juvenile justice system (0 = No; 1 = Yes). The average score on this item was 0.23.

Table 38. DET Tool Item Descriptive Statistics

	Referral	
	Mean (SD)	Range
Prior Offenses	0.43 (0.49)	0 – 1
Current Charge	1.17 (0.62)	0 – 2
First Contact Juvenile Justice System	0.74 (0.44)	0 – 1
Family Members Arrested	0.74 (0.44)	0 – 1
Difficulty Controlling Anger	0.48 (0.50)	0 – 1
Negative Attitude Towards JJ System	0.23 (0.42)	0 – 1
N		3,861

Notes: DET = Detention; SD = Standard Deviation

### ***DET – Bivariate Analysis***

Figure 23 displays the bivariate distribution of total risk score and new referral rate within three years. The horizontal axis of this figure displays the DET Tools total score, and the vertical axis displays the new referral rate within 3-years of the assessment. As a reminder, each dot displays the recidivism rates for individuals who scored at the specified risk score on the DET Tool. The figure shows that there is a gradual increase in new referral rate as an the DET Tool total score increases.

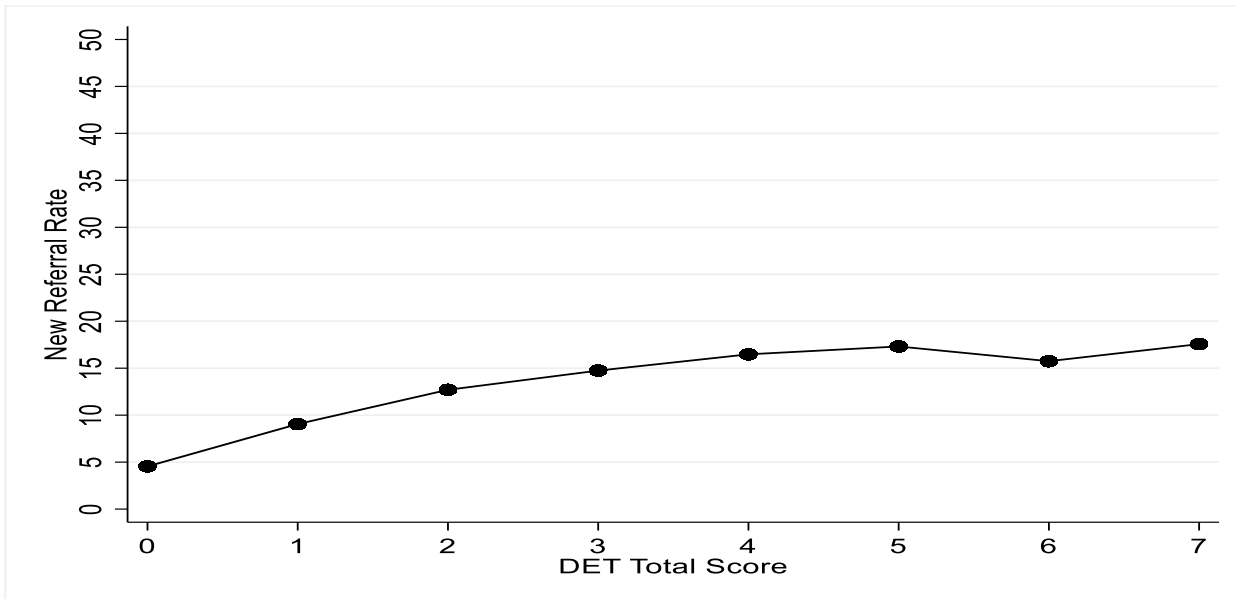


Figure 23. New Referral Percentage within 3-Years of Assessment by DET Tool Total Score (N = 3,861)  
 Notes: DET = Detention.

Table 39 displays the correlations between each DET Tool item, DET Tool total score, and DET Tool risk level and new referral within 3-years of the assessment. The table shows that three of the six items on the DET Tool had a significant and positive correlation with new referral, while the other three had a non-significant relationship with new referral. Specifically, the three items with a statistically significant and positive correlation are “1<sup>st</sup> contact with juvenile justice system” ( $r = 0.08; p < .001$ ), “Family member(s) arrested” ( $r = 0.05; p < .01$ ), and “difficulty controlling anger” ( $r = 0.05; p < .01$ ). The three items that did not have a statistically significant relationship with new referral were “prior offenses” ( $r = 0.00; p > .05$ ), “current charge” ( $r = -0.01; p > .05$ ), and “negative attitudes towards juvenile justice system” ( $r = -0.00; p > 0.05$ ). Both the DET Tool total score ( $r = 0.05; p < .001$ ) and the DET Tool risk level ( $r = 0.04; p < 0.01$ ) were significantly and positively correlated with a new referral within 3-years of the assessment.

Table 39. Correlations between Recidivism and the DET Tool

	New Referral 3-Years (N = 3,861)
	Correlation (r)
Prior Offenses	0.00
Current Charge	-0.01
First Contact Juvenile Justice System	0.08***
Family Members Arrested	0.05**
Difficulty Controlling Anger	0.05**
Negative Attitude Towards JJ System	-0.00
DET Total Score	0.05**
DET Risk Level	0.04*

Notes: DET = Detention

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Figure 24 shows the new referral rates by the DET Tool risk level. As such, the vertical axis is the new referral rate and the horizontal axis contains the three risk levels on the DET Tool. Low risk youth had a new referral rate of 12.73%, moderate risk had a new referral rate of 15.64%, and high risk youth had a new referral rate of 16.85%. As such, while the new referral rates grew as risk level increased and varied in a statistically significant manner ( $\chi^2 = 7.91$ ;  $V = 0.05$ ), there was only a marginal difference in new referral rates between low risk and high risk youth (4.12%).

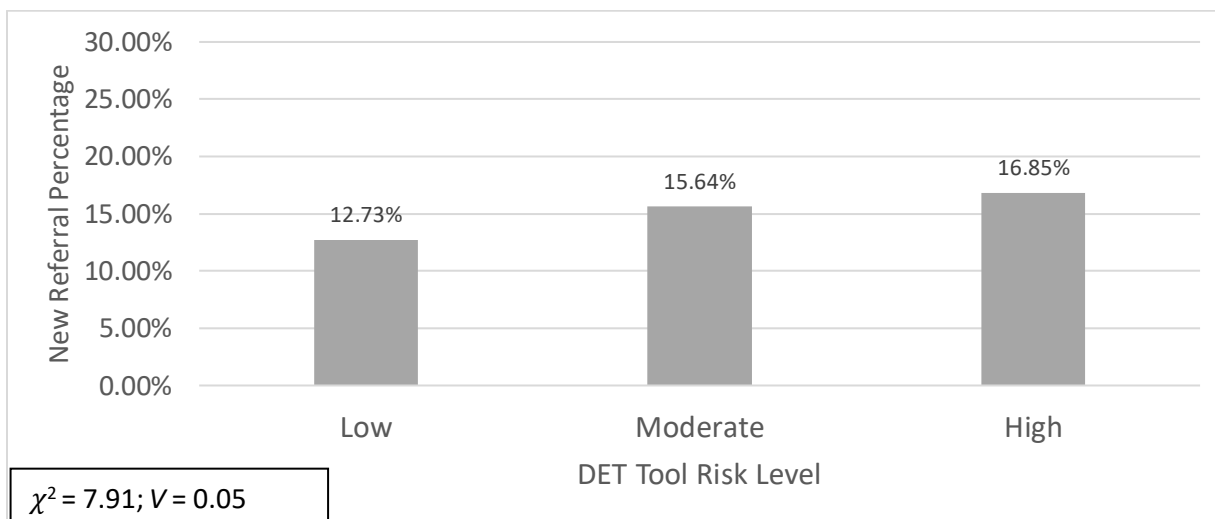


Figure 24. New Referral Percentage within 3-years of Assessment by DET Tool Risk Level (N = 3,861).

Notes: DET = Detention

Table 40 displays the AUC results with the DET Tool risk level predicting new referral within 3-years. Given that the DET assessment does not contain risk and need domains and only individual items, Table 40 displays the AUC values for the total sample as well as each group of sex, race, and offense types. The AUC



values were statistically significant for the total sample (AUC = 0.53), male youth (AUC = 0.54), Black youth (AUC = 0.55), property offenders (AUC = 0.56), and youth charged with other offenses (AUC = 0.54). As such, the AUC values were non-significant for female youth, White youth, youth of Other racial categories, violent offenders, and substance use offenders. Though comparison of AUC values suggests that they non-significant AUC values do not differ in a substantial manner from the other groups. The remaining results across sex, race, and offense types can be found in Appendix G.

Table 40. Area Under the Curve Analyses Between the DET Tool Risk Level and Recidivism

	New Referral 3-Years (N = 3,861)	
IYAS DET	AUC	95% CI
Total Sample	0.53*	[0.51 – 0.56]
Sex		
Males	0.54*	[0.51 – 0.57]
Females	0.52	[0.48 – 0.56]
Race		
White	0.51	[0.48 - 0.55]
Black	0.55*	[0.51 – 0.59]
Other	0.55	[0.47 – 0.63]
Offense Type		
Violent	0.49	[0.44 – 0.54]
Property	0.56*	[0.51 – 0.60]
Substance	0.55	[0.48 - 0.62]
Other	0.54*	[0.50 – 0.58]

Notes: AUC = Area Under the Curve; DET = Detention; IYAS = Indiana Youth Assessment System; CI = Confidence Interval.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### **DET – Multivariate Analyses**

Table 41 contains the results of a logistic regression model with the DET Tool total score predicting a new referral within 3-years of the assessment, while controlling for sex, race, and offense types. The results found that the DET Tool total score was significantly and positively associated with a new referral (OR = 1.12;  $p < .01$ ), suggesting that for each one-point increase on the DET Tool total score, youth’s odds of experiencing a new referral increases by an average of 12%. The sensitivity, specificity, and correct classification statistics ranged between 56.71% and 60.37%.

Table 41. Logistic Regression of the DET Total Score Predicting Recidivism

	Referral 3-Years (N = 3,861)	
	OR	95% CI
DET Total Score	1.12**	[1.05 – 1.20]
Female	--	--
Male	1.08	[0.90 – 1.31]
White	--	--
Black	1.07	[0.88 – 1.30]
Others	0.90	[0.65 – 1.23]
Violent	--	--
Property	1.22	[0.95 - 1.58]
Substance	1.64**	[1.08 - 2.28]
Other	1.14	[0.91 – 1.43]
Age	0.81***	[0.77 – 0.85]
Model $\chi^2$	89.85***	
Sensitivity	56.71%	
Specificity	61.03%	
Correct Classification	60.37%	

Notes: DET = Detention; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification are determined based on a threshold level of 0.20.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### ***DET – Supplemental Analysis***

The first step of the supplemental analyses was to examine the predictive validity of the IYAS DET Tool across sex, race, and offense types (see Appendix G). As displayed in Table 40, although variation in the results did exist, exploration of this variation revealed the differences in AUC values were not statistically significant. The second step was to examine the predictive validity of the DET Tool using alternate measures of recidivism. For the DET Tool, the two alternate measures of recidivism examined were any new referral post-assessment and a new adjudication within 3-years of the assessment. The results revealed no significant or substantial differences when examining the alternate outcomes. Finally, the results revealed no significant differences in the predictive ability of the DET Tool across urban and rural counties.

### **IYAS – Diversion Tool**

#### ***DIV – Univariate Analyses***

The main outcome of interest for the IYAS DIV Tool was a new referral within 3-years of the assessment. Table 42 shows that the majority of youth in the sample were male (56.96%) and the average age of youth in this sample was around 16 years old. The most common racial category was White (46.69%), followed by Black

(31.05%) and Other youth (22.26%). Youth in this sample were most commonly charged with other offenses (35.67%), with property offenses (26.16%) being the next most common. Youth were charged with violent offenses (19.36%) and substance offenses (18.81%) at a similar rate, while no youth were charged with sexual offenses. Just over half of youth assessed by the DIV Tool were moderate risk (50.04%) and there was a very similar rate of low (25.35%) and high risk (24.61%) youth. The average score on the DIV Tool was 2.91 which categorized both males and females as moderate risk. Finally, 14.11% of youth in the DIV sample received a new referral within 3 years of their assessment.

Table 42. DIV Tool Analytical Sample Descriptive Statistics

	Referral Sample	
	%/mean (SD)	Range
Sex		0 – 1
Male	56.96%	--
Female	43.04%	--
Race		1 – 3
White	46.69%	--
Black	31.05%	--
Other	22.26%	--
Age	16.05 (1.77)	7 – 19
Offense Type		1 – 5
Violent	19.36%	--
Property	26.16%	--
Substance	18.81%	--
Other	35.67%	--
Risk Level		0 - 2
Low	25.35%	--
Moderate	50.04%	--
High	24.61%	--
Total Risk Score	2.91 (1.71)	0 – 7
Recidivism		0 – 1
New Referral 3-Years	14.11%	--
N		4,954

Notes: DIV = Diversion; SD = Standard Deviation

Table 43 presents the average score on each of the six items contained on the DIV Tool. The first question asks whether a youth has any prior offenses on their record (0 = No; 1 = Yes). The average score on this item was 0.25. The second question assessed the seriousness of the youth’s current charge (0 = Status; 1 = Misdemeanor; 2 = Felony) and the third item examined the age of the youth’s first contact with the juvenile justice system (0 = 16 or older; 1 = 15 or younger). The average score on the second item was 0.94 and the average score on the third item was 0.64. The fourth item asked whether youth had previously been placed on

probation (0 = No; 1 = Yes) and the average score on this item was 0.25. Next, the fifth item asked whether the youth's family member(s) have been arrested (0 = No; 1 = Yes) and the average score on this item was 0.61. Finally, the sixth item on the DIV Tool looked at whether parents have a difficult time supervising the youth (0 = No; 1 = Yes), and the average score on this item was 0.23.

Table 43. DIV Tool Item Descriptive Statistics

	Referral	
	Mean (SD)	Range
Prior Offenses	0.25 (0.43)	0 - 1
Current Charge	0.94 (0.56)	0 - 2
First Contact with Juvenile Justice System	0.64 (0.48)	0 - 1
Prior Probation	0.25 (0.43)	0 - 1
Family Members Arrested	0.61 (0.49)	0 - 1
Parents Have Difficult Time Supervising	0.23 (0.42)	0 - 1
N		4,954

Notes: DIV = Diversion; SD = Standard Deviation

### ***DIV – Bivariate Analyses***

Figure 25 displays the distribution of new referral rates within 3-years of the assessment by total score on the DIV Tool. The figure shows a gradual increase in new referral rates as the total score on the DIV Tool increases. Specifically, for youth that scored 0 on the tool, the new referral rate was just below 5%, while the new referral rate was about 20% for youth who scored a 4 on the tool and about 24% for youth that scored a 7 on the tool.

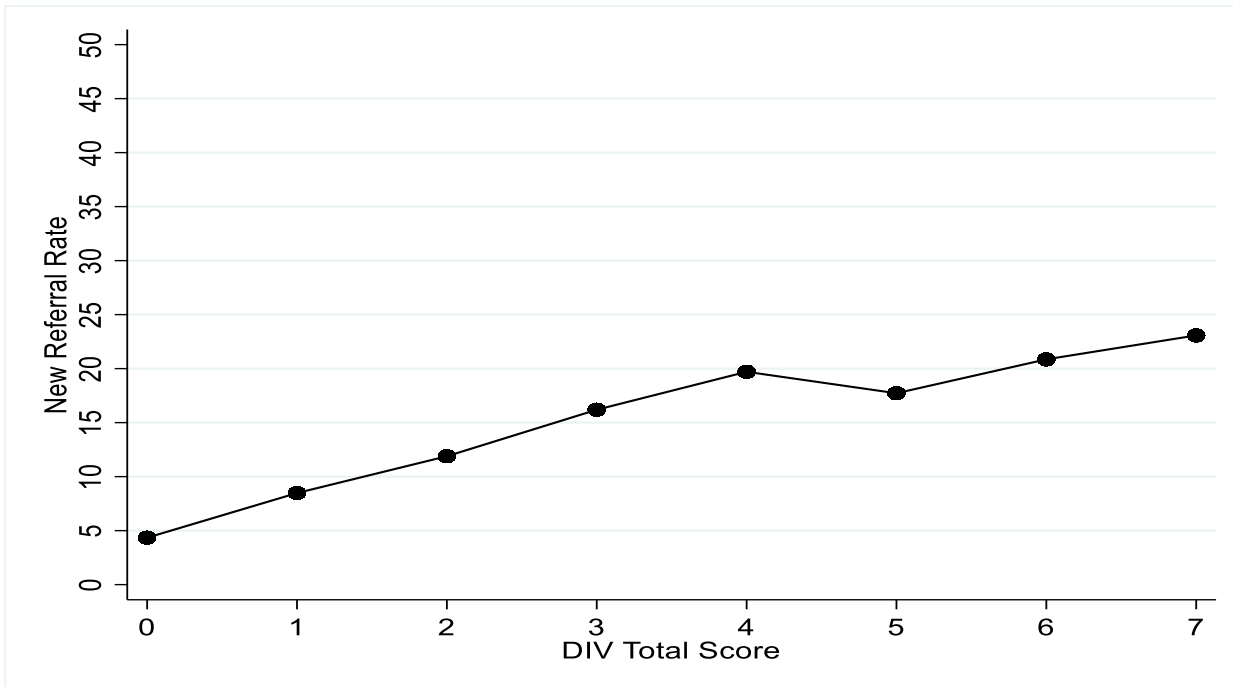


Figure 25. New Referral Percentage within 3-Years of Assessment by DIV Total Score (N = 4,954)  
 Notes: DIV = Diversion.

Table 44 displays the correlations between each DIV Tool item, DIV Tool total score, and DIV Tool risk level and new referral within 3-years of the assessment. All six items on the DIV Tool had statistically significant and positive correlations with a new referral within 3-years, suggesting that as scores on these risk items increased, so did the new referral rate. Specifically, “prior offenses” had correlation of 0.07 ( $p < .001$ ), “current charge” had a correlation of 0.05 ( $p < .01$ ), “1<sup>st</sup> contact with the juvenile justice system” had a correlation of 0.13 ( $p < .001$ ), “prior probation” had a correlation of 0.04 ( $p < .01$ ), “Family member(s) arrested” had a correlation of 0.08 ( $p < .001$ ), and “parents have a difficult time supervising youth” had a correlation of 0.10 ( $p < .001$ ). Further, both the DIV Tool total score ( $r = 0.12$ ;  $p < .001$ ) and DIV Tool risk level ( $r = 0.11$ ;  $p < .001$ ) had statistically significant and positive correlations with new referral.

Table 44. Correlation between Recidivism and the DIV Tool

	New Referral 3-Years (N = 4,954)
	Correlation (r)
Prior Offenses	0.07***
Current Charge	0.05**
First Contact with Juvenile Justice System	0.13***
Prior Probation	0.04*
Family Members Arrested	0.08***
Parents Have Difficult Time Supervising	0.10***
DIV Total Score	0.12***
DIV Risk Level	0.11***

Notes: DIV = Diversion

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Figure 26 shows the distribution of new referral rate by the DIV Tool risk level. The new referral rate varies by risk level as expected. Specifically, youth assessed as low risk had the lowest new referral rate at 7.88%, followed by moderate risk with a new referral rate of 14.97%, and high risk youth which had the highest referral rate of 18.79%. This association was statistically significant ( $\chi^2 = 63.81$ ;  $V = 0.11$ ). Overall, low risk youth had a new referral rate that was 10.91% lower than high risk youth.

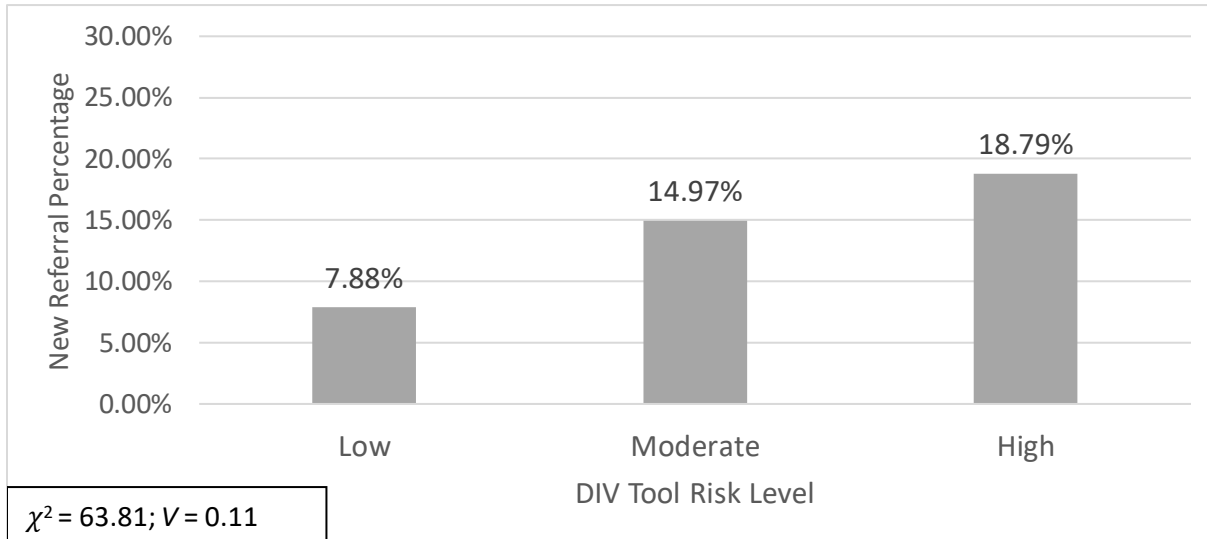


Figure 26. New Referral Percentage within 3-years of Assessment by DIV Tool Risk Level (N = 4,954).

Notes: DIV = Diversion

Table 45 shows the final series of bivariate analyses for the DIV Tool, the AUC analyses. The AUC statistic for the total sample was statistically significant (AUC = 0.58) suggesting that the DIV Tool predicts new referrals within 3-years better than chance. The AUC value was also statistically significant for males (AUC = 0.58), females

(AUC = 0.58), White youth (AUC = 0.61), Black youth (AUC = 0.54), youth categorized as an other racial category (AUC = 0.58), violent offenders (AUC = 0.57), property offenders (AUC = 0.64), substance offenders (AUC = 0.59), and youth charged with other offenses (AUC = 0.55).

Table 45. Area Under the Curve Analyses Between the DIV Tool Risk Level and Recidivism

IYAS DIV	New Referral 3-Years (N = 4,954)	
	AUC	95% CI
Total Sample	0.58*	[0.56 – 0.60]
Sex		
Males	0.58*	[0.56 – 0.61]
Females	0.58*	[0.55 – 0.61]
Race		
White	0.61*	[0.58 – 0.64]
Black	0.54*	[0.50 – 0.57]
Other	0.58*	[0.54 – 0.62]
Offense Type		
Violent	0.57*	[0.53 – 0.61]
Property	0.64*	[0.61 – 0.68]
Substance	0.59*	[0.55 – 0.63]
Other	0.55*	[0.51 – 0.59]

Notes: AUC = Area Under the Curve; DIV = Diversion; IYAS = Indiana Youth Assessment System; CI = Confidence Interval.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### ***DIV – Multivariate Analysis***

Table 46 shows the results of the logistic regression model of the DIV Tool total score predicting a new referral within 3-years of the assessment, while controlling for sex, age, race, and offense types. The findings indicated that the DIV Tool total score was a statistically significant and positive predictor of a new referral while controlling for other factors (OR = 1.23;  $p < .001$ ). The odds ratio suggests that a one score increase in the DIV Tool total score is associated with a 23% increase, on average, in the odds of experiencing a new referral within 3-years of the assessment. The bottom of Table 46 displays the sensitivity, specificity, and correct classification statistic. These three statistics all ranged from 58.66% to 64.09%.

Table 46. Logistic Regression of the DIV Tool Total Score Predicting Recidivism

	Referral 3-Years (N = 4,954)	
	OR	95% CI
DIV Total Score	1.23***	[1.17 – 1.29]
Female	--	--
Male	1.10	[0.93 – 1.30]
White	--	--
Black	0.98	[0.81 – 1.18]
Others	0.95	[0.76 – 1.19]
Violent	--	--
Property	0.88	[0.70 – 1.12]
Substance	1.25	[0.95 – 1.63]
Other	0.90	[0.71 – 1.12]
Age	0.83***	[0.80 – 0.87]
Model $\chi^2$	150.13***	
Sensitivity	58.66%	
Specificity	64.09%	
Correct Classification	63.23%	

Notes: DIV = Diversion; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification are determined based on a threshold level of 0.20.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

### ***DIV – Supplemental Analyses***

Examining the predictive validity of the IYAS DIV Tool across sex, race, and offense groups revealed two significant differences (See Appendix H). First, the predictive ability of the DIV Tool was stronger for White youth (AUC = 0.61) than it was for Black youth (AUC = 0.54). Potentially, the item “Prior Probation” may be partially leading to this difference as the correlation between this item and recidivism for White youth was 0.08 ( $p < .001$ ) in comparison to -0.02 for Black youth ( $p > .05$ ). Second, the predictive power of the DIV Tool was significantly stronger for youth charged with property offenses (AUC = 0.64) than it was for youth charged with offenses categorized as other. Examining the correlations between items, both “prior offenses” and “prior probation” revealed substantial differences between youth charged with property offenses and youth charged with other offenses. For example, the correlation for “prior offenses” for youth charged with property offenses was 0.15 ( $p < .001$ ) in comparison to 0.04 ( $p > .05$ ) for youth charged with other offenses. Importantly, the DIV Tool was still a statistically significant predictor of recidivism for Black youth and youth charged with offenses categorized as other. Consistent with the DET Tool, the two alternative recidivism outcomes for the DIV Tool were a new adjudication within 3-years of the assessment and any new referral post assessment. The findings



revealed no significant or substantive differences when examining these alternate measures of recidivism. Finally, when comparing the overall predictive validity of the DIV Tool by urban and rural counties it was found that the tool had a stronger predictive power for urban counties (AUC = 0.58) in comparison to rural counties (AUC = 0.53).

## **IYAS – Disposition Tool**

### ***DIS – Univariate Analyses***

Table 47 presents the univariate statistic for the DIS Tool sample. Just over 60% of the DIS Tool sample were males and the average age was around 16 and a half years old. Further, just under half of the sample (47.72%) were White youth with 35.93% being Black youth and 16.35% being categorized as an Other racial category. Across the total sample, 35.13% of youth were adjudicated for an offense categorized as other, and around 25% of youth were adjudicated of a violent offense as well as a property offense. Just under 15% of youth were adjudicated for a substance offense and only 1 youth assessed by the DIS Tool was adjudicated with a sexual offense. As such, no analyses will be conducted for youth adjudicated for a sexual offense. Most youth (52.19%) were assessed a low risk on the DIS Tool, with 35.13% being assessed as moderate risk, and 12.68% being assessed as high risk. Further, the average score on the DIS Tool across the total sample was 11.19, which youth as low risk on the tool. Finally, just under 20% of youth were adjudicated for a new offense within 3-years of the assessment.

Table 47. DIS Tool Analytical Sample Descriptive Statistics

	Adjudication Sample	
	%/mean (SD)	Range
Sex		0 – 1
Male	61.51%	--
Female	38.49%	--
Race		1 – 3
White	47.73%	--
Black	35.93%	--
Other	16.34%	--
Age	16.44 (1.50)	8 – 19
Offense Type		1 – 5
Violent	25.19%	--
Property	25.01%	--
Substance	14.67%	--
Other	35.13%	--
Risk Level		0 – 2
Low	52.19%	--
Moderate	35.13%	--
High	12.68%	--
Total Risk Score	11.19 (5.79)	0 – 30
Recidivism		0 – 1
New Adjudication 3-Years	19.05%	--
N		6,996

Notes: DIS = Disposition; SD = Standard Deviation

Table 48 provides the descriptive statistics of each risk and need domain contained within the DIS Tool. Specifically, the seven domains are the (1) Juvenile Justice History domain, (2) Family and Living Arrangements domain, (3) Peers and Social Support Network domain, (4) Education and Employment domain, (5) Pro-social Skills domain, (6) Substance Abuse, Mental Health, and Personality domain, and the (7) Values, Beliefs, and Attitudes domain. The average score on the Juvenile Justice History domain was 0.97, with the scores in this domain ranging from 0 to 3. As for the Family and Living Arrangements, scores ranged between 0 and 6, with the average score being just over 2 (mean = 2.06). Similarly, scores on Peers and Social Support Network domain range between 0 and 6 and the average score on the domain was a 2.25. The average score on Education and Employment domain was 1.86, with scores ranging between 0 and 4. Scores on the Pro-social Skills domain ranged between 0 and 3, with the average score being 1.67. The Substance Abuse, Mental Health, and Personality domain has scores range between 0 and 6, with the average score being 1.41. Finally, the average score on the Values, Beliefs, and Attitudes domain was 0.98, on a scale that ranges from 0 to 5. Average scores on the 33 items included on the DIS Tool can be found in Appendix I.

Table 48. DIS Tool Domain Descriptive Statistics

	Adjudication Sample	
	Mean (SD)	Range
Juvenile Justice History	0.97 (1.00)	0 – 3
Family & Living Arrangements	2.06 (1.64)	0 – 6
Peers & Social Support Network	2.25 (1.60)	0 – 6
Education & Employment	1.86 (1.14)	0 – 4
Pro-Social Skills	1.67 (1.18)	0 – 3
Substance Abuse, Mental Health, & Personality	1.41 (1.25)	0 – 6
Values, Beliefs, & Attitudes	10.98 (1.10)	0 – 5
N		6,996

Notes: DIS = Disposition; SD = Standard Deviation

### **DIS – Bivariate Analyses**

Figure 27 shows the distribution of new adjudication rate by DIS Tool total score. The horizontal axis contains the total DIS Tool score, while the vertical axis contains the percentage of youth that experienced a new adjudication within 3-years of the assessment. The figure shows no discernable pattern between risk score and new adjudication, as the rate of new adjudication rises and falls between about 15% and 30% before dropping to 0% for youth that scored a 27 on the assessment and spiking to 100% for youth that scored a 30 on the assessment. However, it is necessary to point out that only 15 total youth scored above a 25 on the assessment, with 6 youth scoring a 26, 8 youth scoring a 27, and 1 youth scoring a 30. As such, the spikes in adjudication rates seen at the right end of the graph are likely due to small sample sizes.

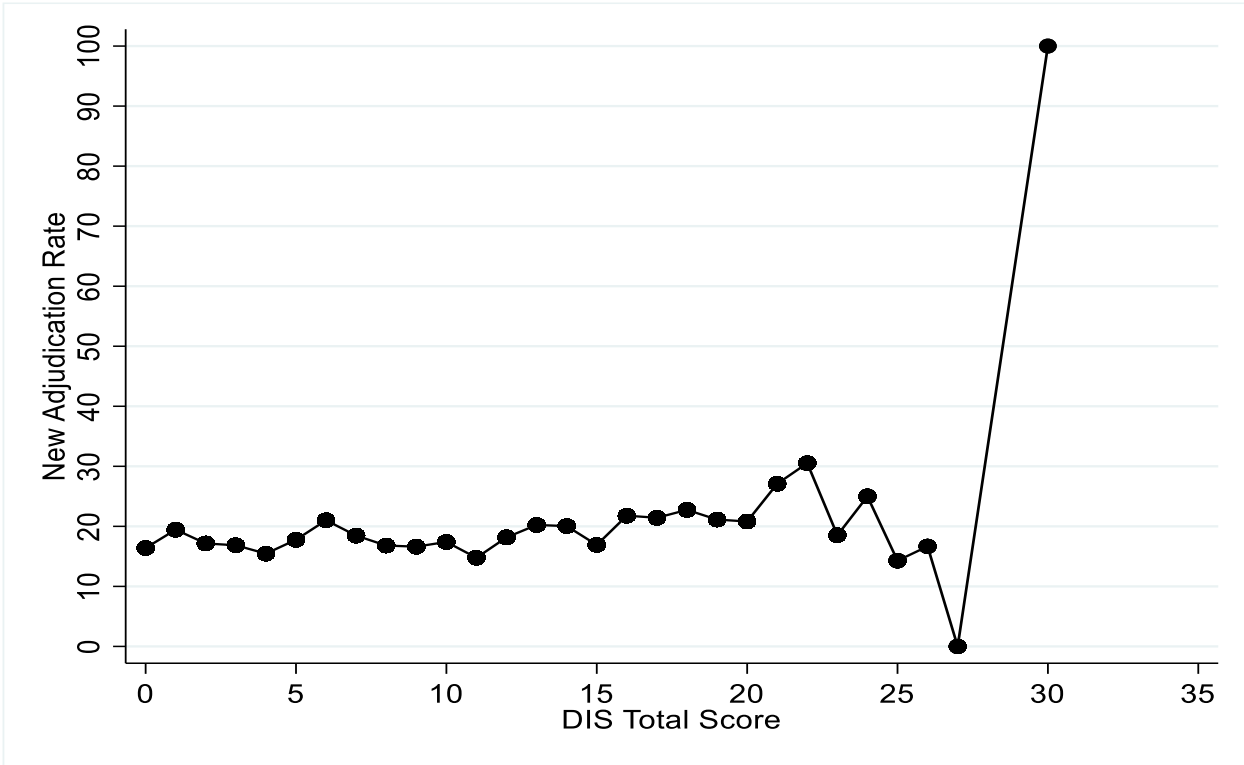


Figure 27. New Adjudication Percentage within 3-Years of Assessment by DIS Tool Total Score (N = 6,996)  
 Notes: DIS = Disposition

Table 49 contains the correlations with each DIS item, DIS risk and need domain, DIS total score, DIS risk level, and new adjudication within 3-years. The results show that only 14 of the 32 items contained on the DIS Tool had a positive and statistically significant correlation with new adjudication, whereas 17 items across the seven domains had a non-significant relationship with new adjudication. One item – “Suspended from School” – had a statistically significant and negative, albeit very small ( $r = -0.03; p < .05$ ), correlation with new adjudication. As for the seven risk and need domains, the Family and Living Arrangements domain ( $r = 0.04; p < .01$ ), the Education and Employment domain ( $r = 0.03; p < .05$ ), the Pro-social Skills domain ( $r = 0.06; p < .001$ ), and the Values, Beliefs, and Attitudes domain ( $r = 0.04; p < .001$ ) had statistically significant and positive correlations with recidivism. As such, the Juvenile Justice History domain, the Peers and Social Support Network domain, and the Substance Abuse, Mental Health, and Personality domain were not significantly correlated with new adjudication. Finally, the DIS Tool total score ( $r = 0.04; p < .001$ ) and risk level ( $r = 0.05; p < .001$ ) had statistically significant, positive, but weak correlations with new referral within 3-years of the assessment

Table 49. Correlations between Recidivism and the DIS Tool

	New Adjudication 3-years (N = 6,996) Correlation ( <i>r</i> )
<i>Juvenile Justice History</i>	0.02
Documented Contact with Juvenile Justice System	0.05***
Previous Adjudications	-0.00
<i>Family &amp; Living Arrangements</i>	0.04**
Family is Important	0.05***
Consistently Applies Consequences	0.01
Follows Caregiver's Rules	0.06***
Follows Through with Consequences	-0.00
Contact with Biological/Adoptive Parent	-0.00
Relationship with Adults	0.03*
<i>Peers &amp; Social Support Network</i>	-0.01
Friends Fight	-0.00
Friends Arrested	-0.01
Friends/Family Associated with Gang Activity	-0.02
Arrested with Friends	0.01
Friends Suspended/Expelled from School	-0.02
Friends are Important	-0.01
<i>Education &amp; Employment</i>	0.03*
Suspended from School-Ever	-0.03*
Suspended from School-Last 6 Months	0.05***
Expelled Ever	-0.00
Relationship with Current School Personnel/Employer	0.03*
<i>Pro-Social Skills</i>	0.06***
Can Identify Triggers/High Risk Situations	0.05***
Weighs Pro/Cons of a Situation	0.06***
Pro-Social Decision Making	0.04**
<i>Substance Abuse, Mental Health, &amp; Personality</i>	0.02
Age of Drug onset	0.03*
Used Drugs Recently	0.00
Used Alcohol Recently	0.03*
Likely to Quit	-0.02
Inflates Self-Esteem	-0.01
Mental Health Issues	0.04**
<i>Values, Beliefs, &amp; Attitudes</i>	0.04***
Pro-Criminal Sentiments	0.04**
Future Criminal Behavior	0.04**
Blames Others	0.02

Attitudes Towards Gang	0.00
Self-Efficacy	0.01
DIS Total Score	0.04***
DIS Risk Level	0.05***

Notes: DIS = Disposition

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Figure 28 displays the results of the chi-square analysis with a level of association. Across risk levels, low risk clients had the lowest rate of new adjudications (17.20%), followed by moderate risk youth (20.33%), and high risk youth (22.72%). This association is statistically significant with a weak measure of association ( $\chi^2 = 18.55$ ;  $V = 0.05$ ). Further, the difference in adjudication rates between low risk and high risk youth is only 5.52%.

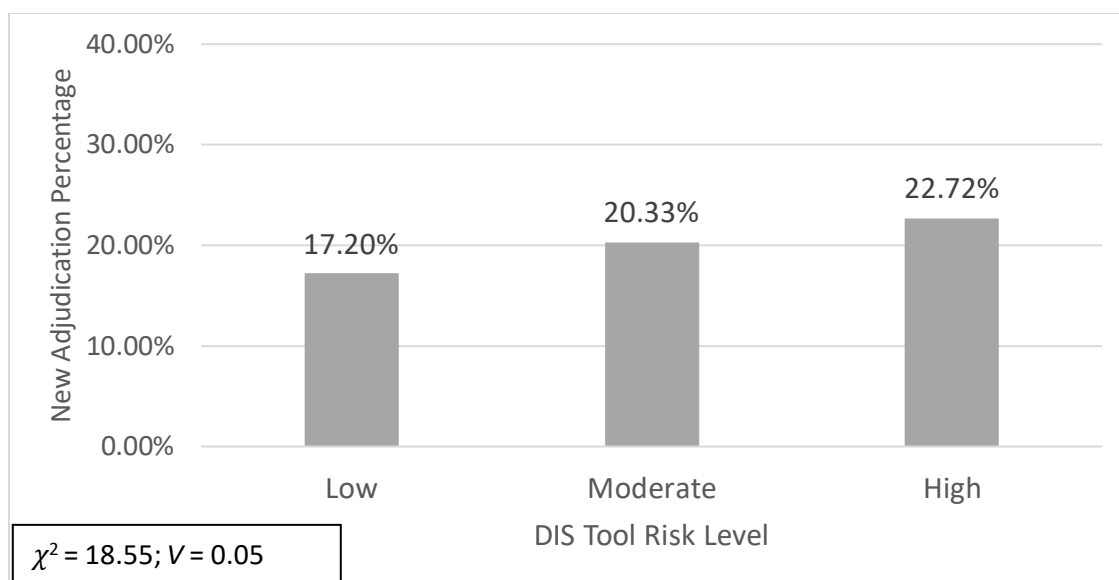


Figure 28. New Adjudication Percentage within 3-years of Assessment by DIS Tool Risk Level (N = 6,996).

Notes: DIS = Disposition

Table 50 shows the results of the AUC analyses of the DIS Tool risk level, and each DIS Tool risk and need domain, predicting new adjudication within 3-years of the assessment. The DIS Tool risk level had a statistically significant but weak AUC value of 0.53. Of the risk and need domains, the Family and Living Arrangements domain (AUC = 0.53), the Education and Employment (AUC = 0.52), Pro-social Skills domain (AUC = 0.55), and Values, Beliefs, and Attitudes domain (AUC = 0.53) had statistically significant AUC values. The Juvenile Justice History domain, the Peers and Social Support Network domain, and the Substance Abuse, Mental Health, and Personality domain did not have statistically significant AUC values.

Table 50. Area Under the Curve Analyses Between DIS Tool Risk Level and Recidivism

IYAS DIS	New Adjudication 3-Years (N = 6,996)	
	AUC	95% CI
DIS Tool Risk Level	0.53*	[0.52 – 0.55]
Juvenile Justice History	0.51	[0.49 – 0.53]
Family & Living Arrangements	0.53*	[0.51 – 0.54]
Peers & Social Support Network	0.49	[0.47 – 0.51]
Education & Employment	0.52*	[0.50 – 0.54]
Pro-Social Skills	0.55*	[0.53 – 0.56]
Substance Abuse, Mental Health, & Personality	0.52*	[0.50 – 0.53]
Values, Beliefs, & Attitudes	0.53*	[0.51 – 0.55]

Notes: AUC = Area Under the Curve; IYAS = Indiana Youth Assessment System; DIS = Disposition; CI = Confidence Intervals

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; two tailed tests.

### **DIS – Multivariate Analyses**

Table 51 provides the results of the logistic regression model of the DIS Tool total score predicting new adjudication, while controlling for sex, race, offense type, and age. The results of this model found that the DIS Tool total score had a statistically significant and positive effect on new adjudication (OR = 1.02;  $p < .001$ ), while controlling for other variables. As such, on average, a one-score increase in the DIS Tool total score was associated with a 2% increase in the odds of experiencing a new adjudication within 3-years of the assessment. Further, the bottom of Table 51 shows the sensitivity, specificity, and correct classification statistics. The sensitivity statistics was 47.76%, while the specificity statistic was 67.24%. Overall, the correct classification rate was 63.72%

Table 51. Logistic Regression of the DIS Tool Total Score Predicting Recidivism

	New Adjudication 3-Years (N = 6,996)	
	OR	95% CI
DIS Total Score	1.02***	[1.01 – 1.03]
Female	--	--
Male	1.01	[0.89 – 1.15]
White	--	--
Black	0.79**	[0.68 – 0.90]
Others	1.01	[0.85 – 1.21]
Violent	--	--
Property	1.04	[0.88 – 1.24]
Substance	1.26*	[1.03 – 1.54]
Other	0.98	[0.83 – 1.15]
Age	0.87***	[0.75 – 0.82]
Model $\chi^2$		180.48***
Sensitivity		48.76%
Specificity		67.24%
Correct Classification		63.72%

Notes: DIS = Disposition; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Table 52 shows the effect of each of the seven DIS Tool risk and need domains on new adjudication while controlling for the other domains, as well as sex, race, offense type, and age. Six of the seven domains had a non-significant effect on new adjudication, while controlling for other factors. Only the Pro-social Skills domain had a statistically significant and positive effect on new adjudication (OR = 1.10;  $p < .01$ ), suggesting that a one-score increase on the Pro-social Skills domain was associated with a 10% increase in the odds of experiencing a new adjudication, on average. Finally, the sensitivity statistic was 50.04%, the specificity statistic was 66.64%, and 63.48% of individuals were correctly classified.



Table 52. Logistic Regression of the DIS Tool Domains Predicting Recidivism

DIS Tool Domain	New Adjudication 3-Years (N = 6,996)	
	OR	95% CI
Juvenile Justice History	1.04	[0.97 – 1.11]
Family & Living Arrangements	1.01	[0.96 – 1.05]
Peers & Social Support Network	0.96	[0.92 – 1.00]
Education & Employment	1.02	[0.96 – 1.08]
Pro-Social Skills	1.10**	[1.03 – 1.17]
Substance Abuse, Mental Health, & Personality	1.02	[0.96 – 1.08]
Values, Beliefs, & Attitudes	1.05	[0.98 – 1.12]
Female	--	--
Male	1.01	[0.89 – 1.15]
White	--	--
Black	0.81**	[0.70 – 0.93]
Others	1.04	[0.87 – 1.24]
Violent	--	--
Property	1.08	[0.91 – 1.28]
Substance	1.28*	[1.05 – 1.57]
Other	1.00	[0.85 – 1.18]
Age	0.79***	[0.76 – 0.82]
Model $\chi^2$		193.55***
Sensitivity		50.04%
Specificity		66.64%
Correct Classification		63.48%

Notes: DIS = Disposition; CI = Confidence Interval; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests

### DIS – Supplemental Analyses

Examining the predictive validity of the IYAS DIS Tool across sex, race, and offense types revealed one significant difference in the overall predictive validity. That is, the tool was found to be a non-significant predictor of recidivism for youth categorized as an Other racial category. Further, the non-significant AUC value for other youth was significantly different from the AUC value for Black youth (AUC = 0.55) and White youth (AUC = 0.54). The alternate measures of recidivism examined for the IYAS DIS Tool were any new adjudication post-assessment and a new referral within 3-years of the assessment. Examining the predictive validity with these outcomes revealed no significant or substantive difference in comparison to when recidivism was measured as a new adjudication within 3-years of the assessment. Finally, no significant or substantive difference was found in the predictive value of the DIS Tool by urban and rural counties.

## IYAS – Residential Tool

### RES – Univariate Analyses

The main outcome of interest for the RES Tool was new adjudication. Table 53 displays the descriptive statistics of youth assessed by the RES Tool. Across the total sample, 70.32% of youth were male and the average age of the youth at the time of their assessment was about 16 and a half years old. Almost two-thirds (65.72%) of the sample are White, with about one-fourth being Black (25.66%). Only 8.63% of youth were categorized as another racial category. Just under half of youth in the sample were adjudicated of offenses categorized as other. About one-fourth (26.54%) of youth in this sample were adjudicated of a violent offense, 20.91% were adjudicated for property offenses, and 6.80% were adjudicated for substance related offenses. No youth in this sample were convicted of a sexual offense. Over half of the youth in this sample (54.46%) were assessed as moderate risk on the RES Tool, with 25.22% being assessed as low risk, and 20.32% being assessed as high risk. The average score on the RES Tool was 15.02, which categorizes youth as moderate risk. Finally, about 20% of youth received a new adjudication within 3-years of their assessment.

Table 53. RES Tool Analytical Sample Descriptive Statistics

	Adjudication Sample	
	%/mean (SD)	Range
Sex		0 – 1
Male	70.32%	--
Female	29.68%	--
Race		1 – 3
White	65.72%	--
Black	25.66%	--
Other	8.63%	--
Age	16.40 (1.32)	10 – 19
Offense Type		1 – 5
Violent	26.54%	--
Property	20.91%	--
Substance	6.80%	--
Other	45.76%	--
Risk Level		0 – 2
Low	25.22%	--
Moderate	54.46%	--
High	20.32%	--
Total Risk Score	15.02 (5.55)	1 – 32
Recidivism		0 – 1
New Adjudication 3-Years	20.03%	--
N		1,368

Notes: RES = Residential; SD = Standard Deviation

Table 54 provides youths’ average score on each of the RES Tool domains. The RES Tool contains the same seven domains as the DIS Tool, although the items within these domains differ across the tools. The average score on the Juvenile Justice history domain was 2.00 out of 4 possible points. The Family and Living Arrangements domain had scores that ranged between 0 and 3, with an average score of 0.82. Scores on the Peers and Social Support Network domain ranged between 0 and 7, with the average score being 2.76 across the total sample. The average score on the Education and Employment domain was 1.04, with scores ranging from 0 to 3. As for the Pro-social Skills domain, the range of possible scores was 0 to 4, with the average score across youth in this sample being 2.84. The Substance Abuse, Mental Health, and Personality domain had an average score of 3.67, with 8 being the highest possible score. Finally, the Values, Beliefs, and Attitudes domain ranged from 0 to 5 and the average score on this domain was 1.89. The average scores of each item contained on the RES Tool can be found in Appendix J.

Table 54. RES Tool Domain Descriptive Statistics

	Adjudication Sample	
	Mean (SD)	Range
Juvenile Justice History Domain	2.00 (1.32)	0 – 4
Family & Living Arrangements Domain	0.82 (1.03)	0 – 3
Peers & Social Support Domain	2.76 (1.71)	0 – 7
Education & Employment Domain	1.04 (0.84)	0 – 3
Pro-Social Skill Set Domain	2.84 (1.17)	0 – 4
Substance Abuse, Personality, & Mental Health Domain	3.67 (2.08)	0 – 8
Values, Beliefs, & Attitudes Domain	1.89 (1.31)	0 – 5
N		1,368

Notes: RES = Residential; SD = Standard Deviation

### **RES – Bivariate Analyses**

Figure 29 visualized the distribution of the new adjudication rate for youth who scored each score on the RES Tool. The figure shows a gradual, although inconsistent, increase in new adjudication rate as the total score on the RES Tool increases. Similar to the DIS Tool, there were a small number of youth who scored over 25 on the tool. Specifically, only 25 youth scored higher than a 25 on the tool, with 14 youth scoring a 26, 8 youth scoring a 27, 2 scoring a 29, and 1 youth scoring a 30 and a 32. As such, the sharp spikes in new adjudication rate, and the 0% adjudication rate for the top end scores, are likely a result of a small sample.

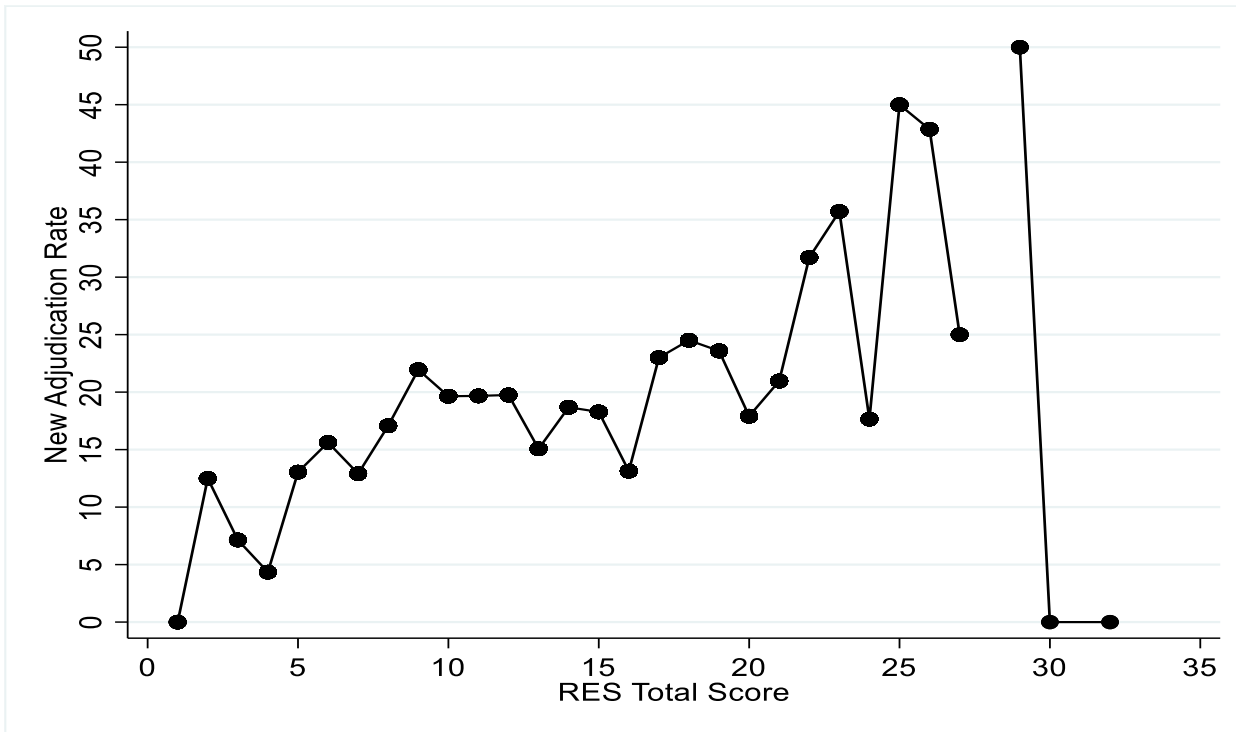


Figure 29. New Adjudication Percentage within 3-Years of Assessment by RES Tool Total Score (N = 1,368)  
 Notes: RES = Residential.

Table 55 displays the correlations between the 33 RES Tool items and new adjudication, as well as the correlations between each risk and need domain, total score, and risk level and new adjudication within 3-years. The results revealed that the majority of the items (23 out of 33) did not have a statistically significant correlation with new adjudication, while the other 10 items had a statistically significant and positive relationship with new adjudication. Across the seven risk and need domains, the Juvenile Justice History domain ( $r = 0.07$ ;  $p < .01$ ), the Family and Living Arrangements domain ( $r = 0.05$ ;  $p < .05$ ), the Peer and Social Support Network domain ( $r = 0.09$ ;  $p < .001$ ), the Education and Employment domain ( $r = 0.07$ ;  $p < .01$ ), the Pro-social Skills domain ( $p = 0.08$ ;  $p < .01$ ), and the Values, Beliefs, and Attitudes domain ( $r = 0.07$ ;  $p < .01$ ) had statistically significant and positive correlations with new adjudication. As such, only the Substance Abuse, Personality, and Mental Health domain had a non-significant correlation with new adjudication. Both the RES Tool total score ( $r = 0.11$ ;  $p < .001$ ) and the RES Tool risk level ( $r = 0.08$ ;  $p < .01$ ) had statistically significant and positive correlations with new adjudication within 3-years of the assessment.

Table 55. Correlations between Recidivism and the RES Tool

	New Adjudication 3-years (N = 1,368) Correlation (r)
<i>Juvenile Justice History Domain</i>	0.07**
Documented Contact with Juvenile Justice System	0.11***
Previous Adjudications	0.02
Probation Violations	0.05
<i>Family &amp; Living Arrangements Domain</i>	0.05*
Family is Important	0.07**
Parental Support	0.05
Effective Communication with Family	0.01
<i>Peers &amp; Social Support Domain</i>	0.09***
Friends Fight	0.07**
Arrested with Friends	0.05
Friends Support Drug Use	0.04
Friends/Family Associated with Gang Activity	0.02
Friends Arrested	0.09**
Fight with Significant Other	-0.00
Relationship with Juvenile Justice Personnel	0.09**
<i>Education &amp; Employment Domain</i>	0.07**
Expelled Ever	0.04
Relationship with Current School Personnel/Employer	0.04
Truant from School	0.04
<i>Pro-Social Skill Set Domain</i>	0.08**
Can Identify Triggers/High Risk Situations	0.04
Weighs Pro/Cons of a Situation	0.06*
Pro-social Decision Making	0.07**
Frustration Tolerance	0.05
<i>Substance Abuse, Personality, &amp; Mental Health Domain</i>	0.03
Age of Drug Onset	0.06*
Most Recent use of Alcohol/Drug	0.01
Others Complained about Drug/Alcohol Use	0.01
Positive Drug Test within Past 6 Months	-0.03
Alcohol/Drugs Have Caused Problem in Major Life Area	0.00
Inflated Self-Esteem	0.01
Major Head Trauma	-0.00
Risk Taking Behavior	0.08**
<i>Values, Beliefs, &amp; Attitudes Domain</i>	0.07**
Pro-Criminal Sentiments	0.04
Negative Attitude Towards Supervision	0.07*

Attitude Support Substance Use	0.04
Demonstrates Empathy Towards Others	0.02
Attitude Towards Gangs	0.03
RES Total Score	0.11***
RES Risk Level	0.08**

Notes: RES = Residential

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests.

Figure 30 shows the percent of youth who experienced a new adjudication within 3-years of the assessment by risk level. It also displays the chi-square analysis with a level of association. The pattern of recidivism rates follows the expected pattern, as low risk youth had the lowest new adjudication rate (15.85%), followed by moderate risk youth (19.73%), and high risk youth (25.90%). This association was statistically significant with a weak association ( $\chi^2 = 9.82$ ;  $V = 0.08$ ). Further, there is a 10.05% difference in the new adjudication rate between low risk and high risk youth.

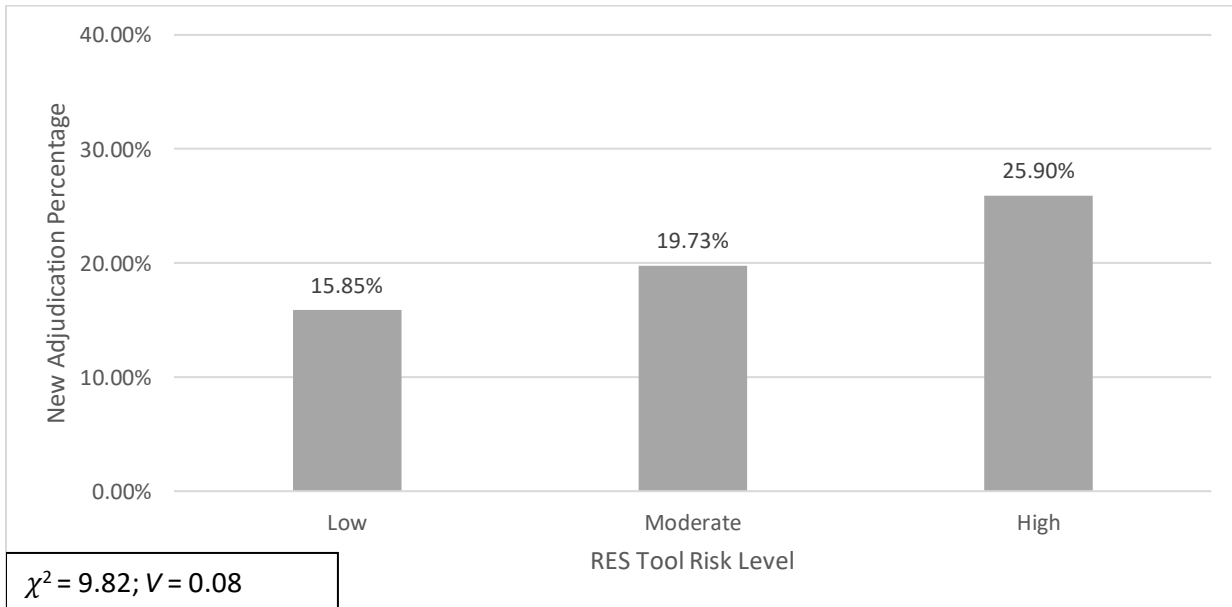


Figure 30. New Adjudication Percentage within 3-years of Assessment by RES Tool Risk Level (N = 1,368).  
Notes: RES = Residential

Table 56 provides the results of the AUC analyses for the RES Tool risk level predicting new adjudication, as well as each of the risk and need domains. The RES Tool risk level had a statistically significant AUC value of 0.55. Further, the Juvenile Justice History domain (AUC = 0.55), the Family and Living Arrangements domain (AUC = 0.54), the Peers and Social Support domain (AUC = 0.56), the Education and Employment domain (AUC = 0.54), the Pro-social Skills domain (AUC = 0.55), and the Values, Beliefs, and Attitudes domain (AUC = 0.55) all

had statistically significant AUC values. As such, the only domain that did not have a statistically significant AUC value was the Substance Abuse, Mental Health, and Personality domain.

Table 56. Area Under the Curve Analyses Between the RES Tool Risk Level and Recidivism

IYAS RES	New Adjudication 3-Years (N = 1,368)	
	AUC	95% CI
RES Tool Risk Level	0.55*	[0.52 – 0.59]
Juvenile Justice History Domain	0.55*	[0.51 – 0.59]
Family & Living Arrangements Domain	0.54*	[0.50 – 0.57]
Peers & Social Support Domain	0.56*	[0.53 – 0.60]
Education & Employment Domain	0.54*	[0.51 – 0.58]
Pro-Social Skill Set Domain	0.55*	[0.52 – 0.59]
Substance Abuse, Personality, & Mental Health Domain	0.52	[0.48 – 0.55]
Values, Beliefs, & Attitudes Domain	0.55*	[0.52 – 0.59]

Notes: AUC = Area Under the Curve; IYAS = Indiana Youth Assessment System; RES = Residential; CI = Confidence Intervals

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two tailed tests.

### **RES – Multivariate Analyses**

Table 57 provides the results of the logistic regression model of the RES Tool total score predicting new adjudication, while controlling for sex, race, offense type, and age. The results of this model found that the RES Tool total score had a statistically significant and positive effect on new adjudication (OR = 1.06;  $p < .001$ ), while controlling for other variables. As such, on average, a one-score increase in the RES Tool total score was associated with a 6% increase in the odds of experiencing a new adjudication within 3-years of the assessment. Further, the bottom of Table 57 shows the sensitivity, specificity, and correct classification statistics. All three statistics were between 62.04% and 64.04%.

Table 57. Logistic Regression of the RES Tool Total Score Predicting Recidivism

	New Adjudication 3-Years (N = 1,368)	
	OR	95% CI
RES Total Score	1.06***	[1.03 – 1.09]
Female	--	--
Male	1.16	[0.85 – 1.58]
White	--	--
Black	1.03	[0.74 – 1.40]
Others	0.98	[0.59 – 1.61]
Violent	--	--
Property	0.77	[0.52 – 1.16]
Substance	0.76	[0.41 – 1.43]
Other	0.92	[0.66 – 1.29]
Age	0.69***	[0.62 – 0.75]
Model $\chi^2$	77.36***	
Sensitivity	62.04%	
Specificity	64.53%	
Correct Classification	64.04%	

Notes: RES = Residential; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20.

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; two tailed tests.

Table 58 shows the effect of each of the seven RES Tool risk and need domains on new adjudication. Six of the seven domains had a non-significant effect on new adjudication, while controlling for other factors. Only the Peers and Social Support Network domain had a statistically significant and positive effect on new adjudication (OR = 1.17;  $p < .01$ ), suggesting that a one-score increase on the Peers and Social Support Network domain was associated with a 17% increase in the odds of experiencing a new adjudication, on average. Finally, the sensitivity, specificity, and correct classification rates were all between 63 and 64%.



Table 58. Logistic Regression of the RES Tool Domains Predicting Recidivism

	New Adjudication 3-Years (N = 1,368)	
	OR	95% CI
RES Tool Domain		
Juvenile Justice History Domain	1.10	[0.98 – 1.23]
Family & Living Arrangements Domain	1.09	[0.94 – 1.24]
Peers & Social Support Domain	1.18**	[1.06 – 1.31]
Education & Employment Domain	1.14	[0.95 – 1.35]
Pro-Social Skill Set Domain	1.12	[0.98 – 1.28]
Substance Abuse, Personality, & Mental Health Domain	0.98	[0.89 – 1.06]
Values, Beliefs, & Attitudes Domain	0.97	[0.85 – 1.10]
Female	--	--
Male	1.24	[0.90 – 1.71]
White	--	--
Black	0.97	[0.70 – 1.35]
Others	0.96	[0.58 – 1.59]
Violent	--	--
Property	0.77	[0.51 – 1.16]
Substance	0.80	[0.42 – 1.52]
Other	0.92	[0.66 – 1.29]
Age	0.68***	[0.66 – 1.29]
Model $\chi^2$		85.65***
Sensitivity		63.14%
Specificity		63.89%
Correct Classification		63.74%

Notes: RES = Residential; CI = Confidence Interval; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.20

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two tailed tests.

### RES – Supplemental Analyses

Examining the overall predictive validity of the RES Tool across sex, race, and offense types (see Appendix J) revealed no significant or substantive differences. However, there was a significant difference in the AUC value of the Pro-social Skills domain across sex, as the AUC value was 0.57 for males and a non-significant predictor for females. Additionally, the item “Most recent use of Alcohol/Drugs” had a noticeably strong correlation ( $r = 0.20$ ) for Black youth in this sample. In comparison, the correlation value was 0.00 for White youth.

The second set of supplemental analyses examined the additional outcomes of new referral within 3-years and any new adjudication post-assessment. No significant differences were identified with these alternative outcomes. Further, data on the IYAS RES Tool did not allow for the examination of the predictive validity across county type.

## IYAS – Reentry Tool

### RT – Univariate Analyses

Table 59 provides information about youths' sex, race, age, offense type, risk level and score, and recidivism for youth assessed by the RT Tool. The majority of youth assessed by the RT Tool were males (75.82%) and had an average age of just over 17 years old. Over half (56.45%) of youth assessed by the RT Tool are White, 34.12% are Black, and 9.42% of youth are categorized another racial category. Just over 40% (41.48%) of youth were adjudicated of offenses in the other category, 27.50% were adjudicated for violent offenses, 24.96% were adjudicated for property offenses, and 6.07% for substance related offenses. No youth in this sample were adjudicated for sexual offenses. Most youth assessed by the RT Tool were low risk (61.02%), with 34.04% being assessed as moderate risk, and only 4.95% being assessed as high risk. The average total score on the RT Tool was 13.66 which categorizes youth as low risk for recidivism. Across the total sample, only 12.01% of youth were adjudicated for a new offense within 3-years of the assessment.

Table 59. RT Tool Analytical Sample Descriptive Statistics

	Adjudication Sample	
	%/mean (SD)	Range
Sex		0 – 1
Male	75.82%	--
Female	24.18%	--
Race		1 – 3
White	56.45%	--
Black	34.12%	--
Other	9.42%	--
Age	17.10 (1.14)	12 – 19
Offense Type		1 – 5
Violent	27.50%	--
Property	24.96%	--
Substance	6.07%	--
Other	41.48%	--
Risk Level		0 – 2
Low	61.02%	--
Moderate	34.04%	--
High	4.95%	--
Total Risk Score	13.66 (6.28)	0 – 35
Recidivism		0 – 1
New Adjudication 3-Years	12.01%	--
N		2,324

Notes: RT = Reentry; SD = Standard Deviation

Table 60 provides the average scores of youth in the RT sample on each risk and need domain contained within the RT Tool. The seven risk and need domains contained within the RT Tool are the same as the domains on the DIS and RES tools, although the items again differ from those tools. The Juvenile Justice History domain has scores that range between 0 and 7, with the average score being 2.77. As for the Family and Living Arrangements domain, the average score was 1.16, with scores ranging from 0 to 4. Scores on the Peer and Social Support Network domain ranged from 0 to 9 and the average score on this domain was 3.00. The fourth domain, Education and Employment, had scores that ranged from 0 to 4, with the average score being 1.17. Scores on the Pro-social Skills domain ranged from 0 to 4 and the average score on this domain was 1.35. The Substance Abuse, Mental Health, and Personality domain had an average score of 2.65, with scores ranging from 0 to 7. The Values, Beliefs, and Attitudes domain had scores that ranged from 0 to 7 with the average score being 1.56. Average scores on each of the 41 items contained on the RT Tool can be found in Appendix K.

Table 60. RT Tool Domain Descriptive Statistics

	Adjudication Sample	
	Mean (SD)	Range
Juvenile Justice History	2.77 (1.51)	0 – 7
Family & Living Arrangements	1.16 (0.78)	0 – 4
Peers & Social Support	3.00 (2.09)	0 – 9
Education & Employment	1.17 (0.94)	0 – 4
Pro-Social Skill Set	1.35 (1.39)	0 – 4
Substance Abuse, Personality, & Mental Health	2.65 (1.68)	0 – 7
Values, Beliefs, & Attitudes	1.56 (1.52)	0 – 7
N		2,324

Notes: RT = Reentry; SD = Standard Deviation

### **RT – Bivariate Analyses**

Figure 31 displays the distribution of new adjudication rates by total risk score on the RT Tool. Although variation exists, the adjudication rate steadily increases between the score of 0 and 25. The adjudication rate then spikes downward and upward as scores get larger than 25. Notably, the sample size of youth who score more than a 25 on the RT Tool is relatively small. Specifically, 20 youth scored a 26 on the assessment, 22 scored a 27, and 17 scored a 28. Less than 10 youth scored a 29 through 35 on the tool, with only 2 youth scoring a 33, 1 scoring a 34, and 1 scoring a 35. Thus, the spikes in adjudication rate among the higher risk scores is likely a result of small sample sizes.

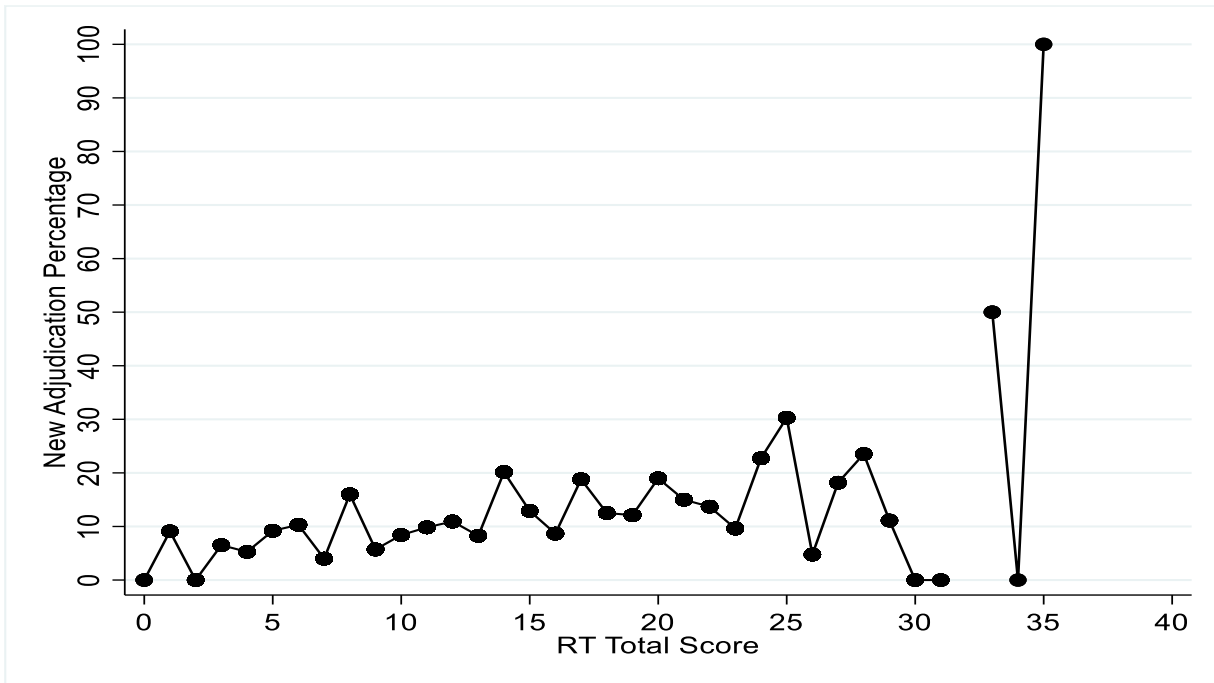


Figure 31. New Adjudication Percentage within 3-Years of Assessment by RES Total Score (N = 2,324)  
 Notes: RT = Reentry.

Table 61 provides the correlations between the RT Tool items, risk and need domains, total risk score, risk level and new adjudication within 3-years of the assessment. Only 13 of the 41 items had a statistically significant and positive correlation with new adjudication, with the other 28 items having a non-significant correlation with new adjudication. Of the risk and need domains, five of the seven were significantly associated with new adjudication. Specifically, the Juvenile Justice History domain ( $r = 0.10; p < .001$ ), the Peers and Social Support Network ( $r = 0.06; p < .01$ ), the Education and Employment domain ( $r = 0.05; p < .05$ ), the Pro-social Skills domain ( $r = 0.05; p < .001$ ), and the Values, Beliefs, and Attitudes domain ( $r = 0.05; p < .01$ ) all had statistically significant and positive correlations with new adjudication. The Family and Living Arrangement and Substance Abuse, Mental Health, and Personality domain had non-significant correlations with new adjudication. Both the RT Tool total score ( $r = 0.10; p < .001$ ) and risk level ( $r = 0.07; p < .001$ ) had statistically significant and positive correlations with new adjudication.

Table 61. Correlation between Recidivism and the RT Tool

	New Adjudication 3-years (N = 2,324) Correlation (r)
<i>Juvenile Justice History Domain</i>	0.10***
Documented Contact w/ Juvenile Justice System	0.11***
Attempted Escape from Residential Facility	0.01
History of Selling Drugs	0.02
Physical Altercation with an Authority Figure	0.08***
Weapon Used During a Crime	0.05*
Victim Physically Harmed During Offense	0.02
Received a Major Sanction while in Residential Care	0.03
<i>Family &amp; Living Arrangements Domain</i>	0.03
Family is Important	0.01
Family Member(s) Arrested	0.04*
Parents use Appropriate Consequences	0.03
Positive Relationship w/ Person at Planned Residence	-0.03
<i>Peers &amp; Social Support Domain</i>	0.06**
Acquaintances Use Drugs	0.01
Friends Fight	0.07***
Friends Use Drugs	0.02
Friends Arrested	0.01
Relationship with Youth on Unit	0.03
Relationship with Staff	0.05*
Friends/Family Associated with Gang Activity	0.03
Arrested with Friends	0.04
Adults in the Community are Supportive	0.02
<i>Education &amp; Employment Domain</i>	0.05*
Trust from School	0.00
Expelled Ever	0.03
Effort in School	0.05*
Relationship w/ Current School Personnel/Employer	0.03
<i>Pro-Social Skills Domain</i>	0.09***
Can Identify Triggers/High Risk Situation	0.05*
Weighs Pros/Cons of a Situation	0.06**
Pro-social Decision Making	0.06**
Frustration Tolerance	0.09***
<i>Substance Abuse, Mental Health, and Personality Domain</i>	0.04
Age of Drug Onset	0.03
Others Complained about Drug/Alcohol Use	0.01
Positive Drug Test within Past 6 Months	-0.02
Alcohol/Drugs Have Caused Problem in Major Life Area	0.01

Used Substances While in Residential Facility	0.03
Inflated Self-Esteem	0.01
Risk Taking Behavior	0.07***
<i>Values, Beliefs, &amp; Attitudes Domain</i>	
Pro-Criminal Sentiments	0.04
Negative Attitudes Towards Supervision	0.04
Attitude Supports Substance Use	0.04
Demonstrates Remorse for Offense	0.04
Demonstrates Empathy Towards Others	0.03
Attitudes Towards Gangs	0.01
RT Total Score	0.10***
RT Risk Level	0.07***

Notes: RT = Reentry

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two tailed tests.

Figure 32 provides the distribution of new adjudication rates by risk level for youth assessed by the RT Tool. As would be expected, the new adjudication rate increases as risk level increases. Specifically, 10.20% of low risk youth assessed by the RT Tool experienced a new adjudication within 3-years of the assessment, while 13.98% of moderate risk and 18.97% of high risk youth experienced a new adjudication within 3-years of the assessment. This association was statistically significant with a weak strength of association ( $\chi^2 = 12.71$ ;  $V = 0.07$ ). There was an 8.77% difference in new adjudication rates between low risk youth and high risk youth.

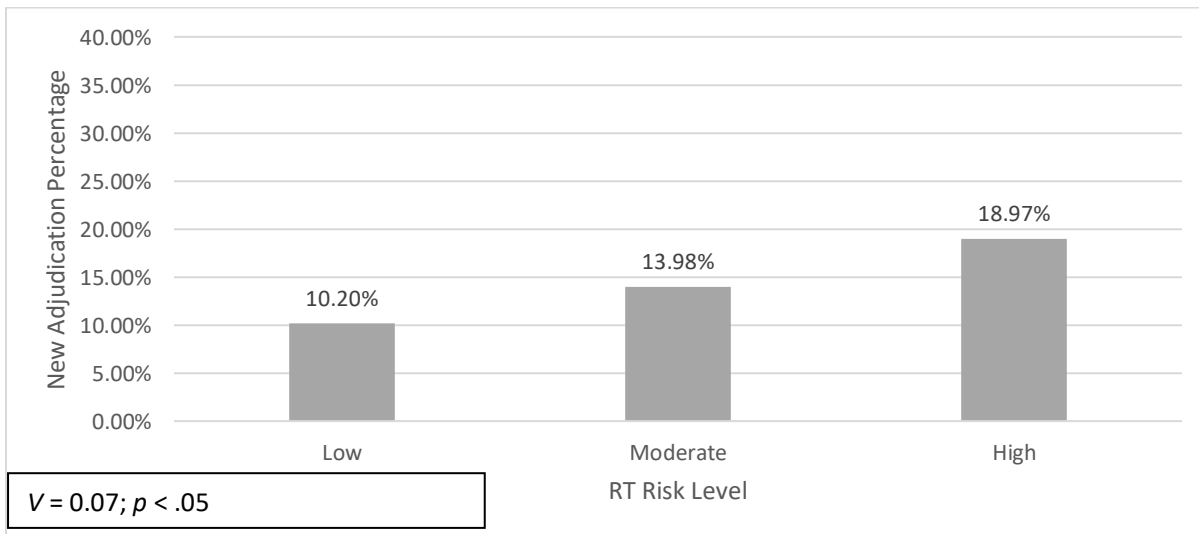


Figure 32. New Adjudication Percentage within 3-years of Assessment by RT Tool Risk Level (N = 2,324).

Notes: RT = Reentry

Table 62 displays the AUC analyses of the RT Tool risk level, as well as the each of the seven risk and need domains, predicting new adjudication within 3-years of the assessment. The AUC value for the RT Tool risk level was statistically significant with an AUC value of 0.55. Of the seven risk and need domains, the Juvenile Justice History domain had a largest AUC value of 0.59, followed closely by the Pro-social Skills domain (AUC = 0.58). The Peer and Social Support Network domain (AUC = 0.55), the Education and Employment domain (AUC = 0.55), and the Values, Beliefs, and Attitudes domain (AUC = 0.54) also had statistically significant AUC values. The Family and Living Arrangements and Substance Abuse, Mental Health, and Personality domain had non-significant AUC values.

Table 62. Area Under the Curve Analyses Between the RT Tool Risk Level and Recidivism

IYAS RT	New Adjudication 3-Years (N = 2,324)	
	AUC	95% CI
RT Tool Risk Level	0.55*	[0.52 – 0.58]
Juvenile Justice History	0.59*	[0.55 – 0.62]
Family & Living Arrangements	0.53*	[0.50 – 0.56]
Peers & Social Support	0.55*	[0.52 – 0.59]
Education & Employment	0.55*	[0.52 – 0.58]
Pro-Social Skill Set	0.58*	[0.55 – 0.61]
Substance Abuse, Personality, & Mental Health	0.53	[0.49 – 0.57]
Values, Beliefs, & Attitudes	0.54*	[0.51 – 0.58]

Notes: AUC = Area Under the Curve; IYAS = Indiana Youth Assessment System; RT = Reentry; CI = Confidence Intervals

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; Two tailed tests.

### **RT – Multivariate Analyses**

Table 63 displays the results of a logistic regression model with the RT Tool total score predicting new adjudication while controlling for other variables. The findings revealed that the RT Tool total score had a statistically significant and positive effect on new adjudication (OR = 1.05;  $p < .001$ ), suggesting that a one-score increase on the RT Tool is associated with a 5% increase in the odds of experiencing a new adjudication within 3-years of the assessment, on average. The bottom of Table 63 shows the sensitivity, specificity, and correct classification statistics. The sensitivity statistic was 75.63% and the specificity statistic was 62.93%, while 64.46% were correctly classified.

Table 63. Logistic Regression of the RT Tool Total Score Predicting Recidivism

	New Adjudication 3-Years (N = 2,324)	
	OR	95% CI
RT Total Score	1.06***	[1.03 – 1.07]
Female	--	--
Male	1.12	[0.81 – 1.54]
White	--	--
Black	0.81	[0.60 – 1.09]
Others	0.80	[0.49 – 1.29]
Violent	--	--
Property	1.01	[0.71 – 1.44]
Substance	0.56	[0.27 – 1.18]
Other	0.85	[0.62 – 1.18]
Age	0.51***	[0.46 – 0.57]
Model $\chi^2$	189.26***	
Sensitivity	75.63%	
Specificity	62.93%	
Correct Classification	64.46%	

Notes: RT = Reentry; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.10.

\* $p < .05$ ;  $p < .01$ ;  $p < .001$

The final main analysis for the RT Tool was a logistic regression model with each RT Tool risk and need domain predicting new adjudication while controlling for sex, race, age, and offense type. Table 64 provides the results of this analysis. The findings revealed that none of the seven risk and need domains included on the RT Tool had a statistically significant relationship with new adjudication while controlling for other factors. Although, while not reaching statistical significance, both the Juvenile Justice History domain (OR = 1.10;  $p = .051$ ) and the Education and Employment domain (OR = 1.15;  $p = .067$ ) closely approached significance. The sensitivity, specificity, and correct classification statistics were very similar to those from the logistic regression model with the RT Tool total score, as the sensitivity statistic was 75.27%, the specificity statistic was 62.40%, and the correct classification rate was 63.94%.



Table 64. Logistic Regression of the RT Tool Domains Predicting Recidivism

RT Tool Domain	New Adjudication 3-Years (N = 2,324)	
	OR	95% CI
Juvenile Justice History	1.10*	1.00 – 1.21
Family & Living Arrangements	0.94	0.79 – 1.13
Peers & Social Support	1.06	0.99 – 1.16
Education & Employment	1.15	0.99 – 1.34
Pro-Social Skill Set	1.07	0.96 – 1.20
Substance Abuse, Personality, & Mental Health	1.05	0.88 – 1.09
Values, Beliefs, & Attitudes	0.98	0.88 – 1.09
Female	--	--
Male	1.12	0.81 – 1.54
White	--	--
Black	0.83	0.62 – 1.12
Others	0.82	0.50 – 1.33
Violent	--	--
Property	0.99	0.69 – 1.44
Substance	0.57	0.26 – 1.21
Other	0.86	0.62 – 1.19
Age	0.51***	0.45 – 0.57
Model $\chi^2$		194.88***
Sensitivity		75.27%
Specificity		62.40%
Correct Classification		63.94%

Notes: RT = Reentry; CI = Confidence Interval; OR = Odds Ratio; CI = Confidence Interval; Sensitivity, Specificity, and Correct Classification based on a threshold of 0.10

\* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ , two tailed tests

### **RT – Supplemental Analysis**

Examining the predictive validity of the RT Tool across sex, race, and offense types, no substantive differences were found in the overall predictive validity of the tool across these groups (see Appendix K). However, the Education and Employment domain had a significantly stronger AUC value for violent offenders (AUC = 0.61) than property offenders (AUC = 0.49). As for the alternate measures of recidivism (i.e., any new adjudication post-assessment and a new referral within 3-years of the assessment) the results revealed no significant or substantive differences. Finally, examining the overall predictive validity of the tool across urban and rural counties revealed no significant differences.

## DISCUSSION

The major aim of the current study was to assess the predictive validity of six IRAS and five IYAS tools. Overall, 10 out of the 11 tools were found to be statistically significant predictors of recidivism. Further, the IRAS PAT, CST, CSST, SRT, and the IYAS DIV Tool, were found to reach levels of predictive validity that are typically accepted within the industry (Brennan et al., 2009; Dellar et al., 2022; Desmarais et al., 2021; Latessa et al., 2018; Orbis Partners, 2023; Wormith et al., 2015). The IRAS PIT, IYAS RES Tool, and IYAS RT Tool had predictive validity levels that were at the lower end of the industry standard. As for the results of the IYAS DET and DIS Tools, these tools were statistically significant predictors of recidivism, but their predictive levels fell below what is generally accepted by the industry. The IRAS Static Tool was the only tool that was not found to be a statistically significant predictor of recidivism, suggesting that it was not a valid tool within the sample under study.

Although the main goal of this study was to examine the overall predictive validity of the IRAS and IYAS tools, there was additional interest in examining the validity of the tools across race, sex, and offense types. Focusing on the overall predictive validity of these tools across these groups, the results revealed relatively consistent levels of predictive validity across tools, but some variation was found. This variation differed depending on the tool, which will be discussed further below. Additionally, as mentioned in the results section, there were instances where item and domain differences were found across groups. These differences should be noted and further explored.

Finally, to further examine the validity of the IRAS and IYAS tools, we also assessed the tools' performance across urban and rural counties. This was done for the IRAS PAT, CST, and CSST, as well as the IYAS DIV, DET, DIS, and RT Tools. No significant or substantive differences were found across county type for the PAT, CST, DET, DIS, or RT. Significant differences were found for the CSST and DIV Tool as these tools predictive validity were stronger for assessments conducted in urban counties in comparison to rural counties. Notably, the significant differences found for the CSST were only identified for one of the two recidivism outcomes examined. As such, the totality of results examining the predictive validity across the IRAS and IYAS tools suggest that there are not substantive differences between urban and rural counties in the predictive validity of IRAS or IYAS tools.

Overall, 10 out of the 11 tools were found to be statistically significant predictors of recidivism; however, specific findings of the validation analyses varied by tool. Therefore, the discussion of each tool will differ due

to the variation in the tools, data used to examine the tools validity, and the results of the reliability analyses associated with the tools. Given this, we will provide an in-depth discussion to provide an interpretation of the results for each IRAS and IYAS tool. After breaking the discussion down by tool, this report will conclude with a series of general recommendations that could be considered to further examine the validity of the tools as well as potentially improve the predictive validity of the tools.

## **Pre-trial Assessment Tool – Conclusions**

The results of the current study suggest that the PATs ability to predict FTAs fell slightly below the industry standard of predictive validity. This is highlighted based on the distribution of FTA rates by risk level, as there is a very small difference in the FTA rates for moderate and high risk clients. However, the PATs ability to predict a new case filed fell within standards that are traditionally accepted by the field (Desmarais et al., 2021; Latessa et al., 2018; Lowder et al., 2022). This is evident as all seven items on the tool were positively and significantly associated with recidivism. Further, the distribution of risk level and new case filed rates suggest that the tool is correctly classifying many clients assessed by the tool. Finally, it is worth noting that the results that the PAT were found to be a stronger predictor of a new case filed for females than males. Although it is recommended that more research should be conducted to examine why the potential differences in predictive validity of the PAT were found across sex, the tool was found to be a valid predictor for both groups.

When interpreting the results of the PATs predictive validity there are several limitations that should be noted. First, for the outcome FTA in particular, a limitation with the current analysis is that the data available to the research team did not allow us to confidently match the start and end date of each client's pre-trial supervision or disposition date for the court case associated with the PAT assessment. Given that a failure to appear can only occur while a court case is open, this serves as a limitation in the analysis examining FTA. With this limitation in mind, it is difficult to draw steadfast conclusions surrounding the predictive validity of the PAT assessment, and the items contained on the assessment, when FTA is the outcome of interest.

Notably, however, a series of local validation studies with the IRAS PAT has recently been completed in the state of Indiana (Lowder et al., 2022). Specifically, Lowder and colleagues (2022) recently published a report examining the validity of the PAT predicting FTA (along with arrest) across 12 counties in Indiana. Working with local counties, the researchers were able to better match the PAT assessments with specific start and end dates of pre-trial supervision and court cases associated with each assessment. Overall, the results of these studies revealed noticeably stronger predictive validity of the IRAS PAT's ability to predict FTA than the results of the

current study, with an overall AUC value of 0.69 across the 12 counties (Lowder et al., 2022). As such, Lowder and colleagues (2022) concluded that the PAT reached acceptable levels of predictive validity in comparison to similar pre-trial assessments for the 12 counties under study. However, it should be noted that there was considerable variation in the AUC values across the 12 counties, as AUC values ranged from non-significant to 0.72.

A second limitation for the PAT was an issue matching assessment data to outcome data. Specifically, when predicting FTA, only 61.40% of assessments were matched, while 66.12% of the PAT assessments were matched with the outcome of a new case filed. Although matching around two-thirds of cases on a large sample is not a significant concern, missing data on over 5,000 cases could influence the validity results.

Overall, when considering the findings of the current study and the limitations discussed above, we conclude that the PAT likely remains a valid predictor of recidivism in Indiana. Although the current study found that the prediction of FTA fell slightly below the industry standard, the tool remained a significant predictor of FTA. This combined with the findings of the recent validation studies conducted by Lowder et al. (2022) lead us to the recommendation that the PAT continue to be used.

## **Community Supervision Tool and Screening Tool – Conclusions**

The IRAS CSST is a screening tool for clients supervised by community corrections agencies in the state of Indiana. Specifically, during the pre-sentence investigation process or at intake to community supervision, IRAS assessors use the CSST to quickly identify clients as either low or high risk. If the client is assessed as high risk they are then assessed by the full CST. Whereas, if the assessment results reveal the client is low risk, the agency does not have to complete the CST (Indiana Risk Assessment System, 2010, Policy and Procedures). This process is in place to save time and resources for community supervision agencies that process a sizeable number of cases.

The results of the current study suggest that the CSST is appropriate for (1) predicting recidivism and (2) continuing to act as a screening tool for the full CST. The results of the CST suggest that it is a valid predictor of recidivism for the sample under study. This is evident by the fact that all items and domains on the CSST and CST were significantly associated with recidivism. Further, the predictive power of the CST and CSST fell within the industry standard of predictive validity when recidivism was measured as both a new case filed and a new conviction. Additionally, some variation was found across race and offense types for the CST, as the tool appeared to be a stronger predictor of new case filed for White clients than Black clients, as well as a stronger

predictor of new conviction for substance use offenders as opposed to violent offenders. Although these differences should be noted, it is worth pointing out that the tools still reached acceptable levels of predictive validity for Black clients and clients convicted of violent offenses. Further, these differences were only identified for one of the two recidivism outcomes.

Similar to the PAT, there are a number of factors that should be considered when interpreting the results of the CST and CSST. First, trouble matching assessment data also existed with the CST and CSST as only 61.25% and 63.96% of CSST cases and 74.65% and 77.16% of CST cases were matched with the new case filed and new conviction outcome, respectively. Second, missing data was found for the outcomes of new case filed and new conviction, leading us to remove some cases from the analyses. This was mainly identified within the disposition information needed to determine whether a client experienced a new conviction when disposition information did not indicate whether a client's case ended in a conviction or not (e.g., the final disposition of case being marked as "unknown"). Third, reliability concerns were identified for assessors using the CST in the 2019 study conducted by Manchak et al. (2019). Specifically, the researchers found that assessors did not reliably score the Substance Use domain, while internal reliability issues were found with the Criminal History and Family and Social Support domains. These issues with the reliability could dampen the validity of the tool as items and overall domains may be mis-scored, which then incorrectly classifies clients,

With the limitations discussed above in mind, the overall results of the CSST and CST validation are still encouraging. The predictive power of the tools fell within industry standards and the distribution of risk level and recidivism rates show a clear distinction between recidivism rates and risk level, suggesting the tools are correctly classifying a large number of clients. Overall, the CST and CSST remain valid tools for predicting recidivism in the State of Indiana and we recommend their continued use.

### **Prison Intake Tool – Conclusions**

The purpose of the IRAS PIT is to assess clients' risk and needs at the time they are admitted to prison. Doing so provides officials within the Department of Correction an idea of the clients' risk of recidivism and treatment needs while confined (Indiana Risk Assessment System, 2010, Policy and Procedures). The results of the validation analyses demonstrated that the validity of the PIT fell at the lowest end of the industry standard for acceptable predictive validity when predicting the outcomes of new conviction and return to the department of correction. Additionally, the majority of items on the PIT and a number of domains on the PIT were not statistically associated with either measure of recidivism. Finally, the fact that the predictive power of the PIT

for Black clients was substantially lower than White clients, falling to the point where it was a non-significant predictor for Black clients, is concerning.

However, there are several salient factors that should be considered prior to drawing any conclusions on the validity of the PIT based on the results of the current study, as several factors may have impacted the results of the validation analyses. Specifically, the data concerns, reliability issues, and racial disproportionalities in imprisonment rates within the state of Indiana – described below – may have contributed to the relatively lackluster results around the PIT.

First, the initial plan for the current study was to examine misbehavior in prison (e.g., misconduct/incidents) as a main measure of recidivism for the PIT. The current study was unable to examine this as an outcome due to data limitations. Explicitly, less than 30% of the 13,015 clients assessed by the PIT were able to be matched to incident/misconduct data within DOC. Further, among the cases that were successfully matched between the assessment file and incident/misconduct file, only a handful were identified as receiving an official misconduct post the date of their assessment. As such, it was not possible to examine incidents/misconduct as an outcome for the PIT. Although, the PIT is designed to predict recidivism post-release, not being able to examine one of the primary measures of recidivism that Indiana aims to have the PIT predict, limits the conclusions that can be made around this tool.

A second issue with the PIT is that the current study did not have access to clients' release date from prison or the sentence length they received while in prison. Given this limitation, it is possible that a substantial portion of the follow up time (i.e., time between assessment and recidivism) for clients occurred during the time they were still housed within a facility. Notably, a person can be convicted of a new crime while in prison; however, most misbehavior will be handled by the prisons rule infraction board as opposed to the court. Third, the prevalence rate of recidivism, both when measured as new conviction (15.69%) and return to department of correction (7%), was noticeably low. The limited prevalence rate of recidivism in the PIT sample may have resulted from (1) general data issues that are prevalent with the other IRAS and IYAS tools and (2) from the possibility that a substantial portion of client follow up time was while they were still housed within a prison facility. With these reasons in mind, the prevalence rate of recidivism was still noticeably lower than other studies examining recidivism rates of former prisoners (Durose & Antenangeli, 2021; IDOC, 2021; ODRC, 2021). For example, a recent report conducted by the Indiana Department of Correction found that return to DOC rate for a new crime for clients released from prison in 2018 was 33.82% within 3-years of release (IDOC, 2021). In

comparison the return to DOC rate in the current study was 7% any time post their PIT assessment. The noticeably lower recidivism rates in the current study could indicate that data issues may be especially prevalent in the PIT sample. The generally low prevalence rates of both recidivism measures for the PIT sample could cause further issues with examining the tools predictive validity because predicting an event that rarely occurs, as recidivism did for the PIT sample (especially when measured as return to DOC), is difficult to do from a statistical standpoint (Maalouf & Siddiqi, 2014). This means, that it could be expected for the validity of a risk assessment to be underwhelming when the prevalence of recidivism is very low.

Third, the reliability study conducted on the PIT also revealed a few concerns that may partly explain why the validity of the tool was low and why some of the items and domains were not found to be statistically correlated with recidivism. Specifically, reliability concerns were discovered with the Family and Social Support and the Substance Use and Mental Health domains (Manchak et al., 2019). These concerns are reflected within the findings of the validity study, as the Family and Social Support domain was not statistically correlated with either measure of recidivism with only two of the five items being positively correlated with a new conviction and zero items being correlated with return to DOC. Further, the Substance Abuse and Mental Health domain was weakly correlated with both measures of recidivism with only three of the five items being positively correlated with new conviction and two of the items being correlated with return to DOC. Overall, while the reliability study examining the PIT did not reveal any major concerns, the issues that were uncovered could potentially lead to inconsistencies in scoring of the tool, which in turn, could explain the lower levels of predictive validity found within the IRAS PIT.

The last issue worth discussing is the fact that the IRAS PIT was a non-significant predictor of new conviction for Black clients and the AUC value was substantially lower for Black clients than for White and Other clients. It is possible that the sentencing practices in Indiana may partially contribute to the non-significant predictive power for Black clients assessed by the PIT. Specifically, Black individuals are disproportionately represented in the incarcerated population within Indiana, as recent estimates suggest that 2,814 per 100,000 Black individuals are incarcerated in the state of Indiana in comparison to a rate of 542 per 100,000 for White individuals (Prison Policy Initiative, 2021). This trend may partially explain the low levels of predictive validity for the PIT for Black clients because Black clients may be sentenced to prison when a similarly situated White clients are not sentenced prison (i.e., the only difference between clients is their race; Steffensmeier et al., 1998). This could mean that the PIT is assessing the risk and needs of Black clients who would not normally be

placed in prison if they were a different race. These potential differences could lead to diminished validity as there may be salient differences in the risk and need factors between White and Black clients because of the disproportionate sentencing practices that the PIT cannot account for. The current study finds some evidence of racial disproportionality as 34.10% of clients assessed by the PIT were Black when only about 10% of the population of Indiana is Black (United States Census Bureau, 2022).

To summarize, the totality of results reveals concerns over the predictive validity of the IRAS PIT within the State of Indiana. However, data concerns, reliability issues, and racial disproportionalities in imprisonment rates within the State of Indiana provide reasons to be cautious about reaching firm conclusions about the validity of the PIT. We recommend examining this tool more closely—perhaps with a prospective study—before any changes are made to the PIT.

### **Supplemental Reentry Tool – Conclusions**

The SRT is designed to assess clients' risk and needs while they are in prison but preparing to reenter society. Within Indiana, clients are supposed to have their risk and needs assessed annually during their prison stay as well as 30 days prior to release from prison (Indiana Risk Assessment System, 2010, Policy and Procedures). The results of the SRT were like those of the CST. Overall, the SRT was found to have modest predictive validity when predicting both new conviction and return to DOC. This is evident based on the size of the AUC value and the fact that most items and domains on the SRT were significantly correlated with both measures of recidivism. Further, given the fact that recidivism rates tended to increase as risk level also increased suggests that the tool is properly identifying the risk level of a large portion of clients. Notably, the predictive validity of the SRT was found to be stronger for clients convicted of other offenses in comparison to client convicted of substance related offenses. The current study could not speak to why these differences exist, but it is possible that clients convicted of substance use related offenses may possess specific need factors that could be further examined. Specifically, substance use related needs assessments could potentially identify additional factors that more sufficiently capture the unique needs of these clients (e.g., Miller & Lazowski, 2001).

Similar to the other tools, there are a few factors that should be kept in mind when interpreting the results of the SRT validation. Matching issues between the assessment file and outcome file were prevalent for the outcome new conviction, as 14.74% of cases were not able to be matched when recidivism was measured as new conviction. Further, it is likely that some of the follow up time for clients assessed by SRT occurred while clients were still in prison. Although the amount of follow up time was likely substantially less for clients assessed



by the SRT in comparison to those assessed by the PIT, any follow up time that occurs while a client was in prison lessens the likelihood that they could have experienced a new conviction or a return to DOC. This is potentially reflected in the lower prevalence rates of new conviction and return to DOC found in the current study in comparison to the rates that have been found in other studies examining recidivism rates for former prisoners (Durose, 2021; IDOC, 2021; ODRC, 2021). Specifically, the new conviction rate was 23.63% and the return to DOC rate was 22.25% within 3-years of the SRT. The recent report by Indiana found a return to DOC rate of 33.82% (IDOC, 2021). Finally, the overall reliability for the SRT was strong, but the Substance Abuse and Mental Health domain had poor interrater reliability. This issue with reliability may explain why this domain had the smallest correlation and AUC value with both measures of recidivism out of the domains included on the SRT.

Overall, the findings of the SRT study suggest that it is a valid predictor of recidivism within the State of Indiana, and we recommend its continued use. The items on the SRT that were found to be non-significant predictors of recidivism and the difference in the tool's validity found across offense types should be noted and further examined (see below for recommendations).

### **Static Tool – Conclusions**

The Static Tool is unlike the other tools in the IRAS suite of tools, as it is the only one that is scored without interviewing the client. The IRAS Static Tool is used as an alternative to the CST, PIT, or SRT when clients are unable to be interviewed because of severe mental health issues, refusal to participate in the interview, being transferred to a new jurisdiction, or because they absconded from supervision (Indiana Risk Assessment System, 2010, Policy and Procedures). As such, the Static Tool is made up of eight items that can be scored based on information gathered from collateral sources (e.g., file reviews). Examining the validity of the Static Tool revealed that it was a non-significant predictor of recidivism and as such, not a valid tool within the sample under study. This was evident as the total score was not significantly correlated with recidivism. Furthermore, none of the eight items included on the Static Tool were correlated with recidivism and the recidivism rate for clients assessed by the Static Tool were lowest for the highest risk offenders.

Although the Static Tool does not appear to be a statistically significant predictor of recidivism within the sample under study, there are some factors to consider when interpreting these results. First, the sample size for the Static Tool (N = 315) was substantially smaller than the other IRAS tools, although power analyses suggest that there was a sufficient sample size to examine the validity of the tool. Second, the Static Tool is designed to assess clients at various stages of the criminal justice system (i.e., community supervision, prison,

reentry). The current study did not have information on what stage of the criminal justice system that clients assessed by the tool were currently being supervised in. Further, there was no data on the reason as to why the client was assessed by the Static Tool (i.e., mental health reason, absconded, refusal, transfer) – as opposed to the CST, PIT, or SRT. Not being able to control for these factors may impact the findings around the tool. Explicitly, some factors included on the Static Tool are naturally more applicable to specific stages of the criminal justice system than others. For example, the item “Number of Prison Misconducts” can only apply to clients who have spent time in prison. To illustrate why this may be an issue, if a first-time offender is sentenced to community supervision, they will likely have their risk and needs assessed by the CST. However, if that client needs to be assessed by the Static Tool for any of the reasons stated above, it would be impossible for this client to score a “1” on the item “Number of Prison Misconducts” and they have never spent any time in prison in the past. This means the item about prison misconducts is not applicable to understanding the risk of this specific client.

One other factor that should be considered when interpreting the results related to the Static Tool is the potential acute need and responsivity factors that the clients assessed by the Static Tool are presenting with. Specifically, one reason clients are assessed by the Static Tool is they are currently dealing with severe mental health issues. Mental health issues are a responsivity factor that can interfere with a client’s supervision and treatment (Andrews & Bonta, 2010). As such, assessing an individual with purely static factors who is currently dealing with severe mental health issues may not reveal an accurate assessment of their risk of recidivism. Other reasons clients are assessed by the Static Tool are refusal to participate or absconding from supervision. Refusing to participate in a risk assessment process and absconding from supervision are possible indications of acute risk (Hanson & Harris, 2000). Acute risks indicate that there could be dynamic risk factors in client’s life that are currently causing them issues. Since the Static Tool is unable to assess dynamic risk factors, it is possible that the tool is not accurately capturing the client’s risk of recidivism.

Overall, the results of the study and these concerns indicate the Static Tool is not a valid predictor of recidivism in the sample under study. We recommend the Static Tool be assessed by key stakeholders in Indiana to determine whether it should remain in use as a tool designed to predict recidivism.

## **Detention Tool – Conclusions**

The DET Tool helps the juvenile justice system determine whether a youth should be detained or released based on their risk of offending. Indiana IYAS policy indicates that youth must be assessed by the DET

Tool if detained (Indiana Youth Assessment System, 2010, Policy for the Indiana Youth Assessment System). Overall, the validation results for the DET Tool indicated that it was a statistically significant predictor of recidivism; however, the predictive power of the tool fell below the industry standard as can be seen with the size of the AUC values and correlations. The low level of predictive validity is highlighted by the fact that only three of the six items on the tool were statistically correlated with recidivism. Further, there was a small difference between the percent of moderate risk (15.64%) and high risk (16.85%) youth who experienced a new referral within 3-years of the assessment.

As will be discussed for each IYAS Tool, there were several data concerns when conducting the validation analyses for the IYAS DET Tool. First, matching of cases was a slight concern within these data as only 76.59% of youth assessed by the DET Tool were successfully matched to a recidivism data file. Second, there was a limited percentage of youth who recidivated within 3-years of the assessment, as only 12.73% of low risk, 15.64% of moderate risk, and 16.85% of high risk youth received a new referral within 3-years of the assessment. These recidivism rates are drastically lower than the recidivism rates found in the initial OYAS validation analysis (Latessa et al., 2009). Specifically, within the original validation, about 23% of low risk (23% for males, 2.2% for females), 38% of moderate risk (39% for males, 37% for females), and 61% of high risk (59% for males, 63% for females) youth were rearrested within 6 to 15 months of their DET assessment. Although referral rates will likely be lower than arrest rates, as not every youth who is arrested will be referred to the court, the differences are concerning given the significantly longer follow up period in the current study (i.e., 3 years against 6 to 15 months). The drastic difference in recidivism rates could suggest that data issues, such as missing or incorrect recidivism data, exist. Through the data management process, evidence for this was found, as one issue that was identified within the juvenile data was that youth's adjudication date was often earlier than their referral date for a given case. Because the referral decision occurs before the adjudication decision in the juvenile justice process, this could be evidence that data entry errors exist. In an attempt to overcome this specific data concern, both new referral and new adjudication were examined for the IYAS DET Tool; however, no significant differences were identified in the validity of the IYAS DET Tool. Another data limitation in the current study was that no data was available to identify whether a youth was detained as part of the court process. As such, part of youths' follow up time in the DET Tool sample may have occurred while they were in detention, potentially reducing the odds of them experiencing recidivism.

Beyond data limitations, reliability concerns may also explain the generally low predictive validity found within the IYAS DET Tool. Notably, the overall reliability of the DET Tool was strong (Manchak et al., 2019). However, one concern noted by the reliability study was that a handful of users were scoring the tool poorly. Even if only a handful of users are scoring the tool incorrectly, it is possible that these issues weaken the validity of the tool if the users scored a substantial number of youth on the DET Tool. Small issues with specific users may have lowered the predictive power of the tool. In total, the DET Tool, while a significant predictor of recidivism, was not found to reach the industry standard of predictive validity. However, the data and reliability issues noted above should be considered when interpreting the validation results for the DET Tool, cautioning us of any strong conclusions regarding its validity. We recommend examining this tool more closely—perhaps with a prospective study—before any changes are made to the DET Tool.

### **Diversion Tool – Conclusions**

The purpose of the DIV Tool is to assess youths' risk of recidivism after their initial contact with the justice system. Indiana policy dictates that youth being considered for informal adjudication should be assessed with the IYAS DIV Tool (Indiana Youth Assessment System, 2010, Policy for the Indiana Youth Assessment System). The results of the validation revealed that the predictive power of the DIV Tool fell within the industry standard for predictive validity (e.g., Latessa et al., 2009; Takahashi et al., 2013). This can be seen with the AUC value of 0.58 and correlation of 0.12. Further, all six items on the tool were statistically correlated with a new referral and the recidivism rate increased as risk level increased, suggesting it was classifying a large portion of youth correctly. However, significant differences were found in the predictive validity of the DIV Tool across race and across offense types. Explicitly, while the tool was a statistically significant predictor of recidivism for both Black and White youth, the tool was a stronger predictor for White compared to Black youth.

Although the predictive validity of the IYAS DIV Tool fell within acceptable ranges of predictive validity, data limitations are still a factor that should be considered when interpreting these results. Matching assessment data with recidivism data was a particular challenge for this tool as only 58.49% of cases could be matched. Further, general data concerns, such as potential issues with adjudication dates and referral dates, were also existent within the DIV Tool data. Moreover, the recidivism rates of youth assessed by the DIV Tool were lower than expected. To illustrate, the new referral rate within 3-years of the assessment for youth in the current study was 7.88% for low risk youth, 14.97% for moderate risk youth, and 18.79% for high risk youth. In comparison, the new arrest rate within 6 to 15 months of the assessment in the 2009 validation of the OYAS

DIV Tool was about 17% for low risk (20% for males, 14% for females), 33% for moderate (34% for males, 32% for females), and about 46% for high risk youth (48% for males, 44% for females). Again, while there are flaws in comparing arrest rates against referral rates (as they are different stages of the juvenile justice process), the considerable difference in recidivism rates given the variation in follow up times (about 1-year against 3-years) suggests that there may be missing data, or other data issues, within the recidivism databases.

Turning towards the differences in validity across race and offense types, one potential explanation for the racial differences could be based on the percent of youth who are diverted from the juvenile court in comparison to those that are formally processed. While the current study does not have evidence of racial differences in diversion, a recent report conducted by Indiana Criminal Justice Institute, titled *Indiana Juvenile Justice Racial and Ethnic Disparities Plan*, examined racial and ethnic differences within the Indiana juvenile justice system and observed evidence of racial disparity at the diversion stage. Explicitly, in the fiscal years of 2020 and 2021, 62.6% of White Youth were diverted from court in comparison to 45.8% of Black youth (Indiana Criminal Justice Institute, 2022). This suggests that a higher percentage of Black youth, in comparison to White youth, are being processed further into the juvenile justice system. As such, it is possible that Black youth are being exposed to iatrogenic effects (e.g., experiencing the juvenile justice system is leading to a higher risk of recidivism) of the juvenile justice system (Gatti et al., 2009). Youth formally processed in the system could experience iatrogenic effects by being removed from some prosocial sources (e.g., time with family or after school activities) and by being exposed to more antisocial sources (e.g., pro-criminal peers; Lowenkamp & Latessa, 2004). This may be the case with Black youth in Indiana, and in turn, harming the validity of the DIV Tool for Black youth.

Regarding offense type, the predictive validity of the DIV Tool for youth referred to the juvenile court for other offenses was significantly lower than youth referred to the court for property offenses. One potential explanation for these differences could be that other offenses incorporate youth referred to the court for status offenses (i.e., non-criminal behavior such as truancy) or as dual-status youth (i.e., youth presented to the court as part of the juvenile justice system and child welfare system). Youth referred to the court for status offenses or as a dual-status youth may possess unique risk factors that are not captured by the IYAS DIV Tool. There is some evidence of this in risk assessment research, as a study conducted by Onifade and colleagues (2014) on the validity of the Youth Level of Service Case Management Inventory found that the tool differentially predicted

recidivism for dual-status youth in comparison to youth referred only to the juvenile justice system (Onifade et al., 2014).

Notably, there are limited concerns with the reliability of the DIV Tool. The reliability study conducted in 2019 by Manchak and colleagues found that the reliability of the DIV Tool was strong and more consistent than the reliability found in the other IYAS tools. Specifically, they found that the criterion validity of the DIV Tool was high and that the interrater reliability was good. Given the levels of reliability identified for the DIV Tool by Manchak and colleagues (2019), it is possible that the strong reliability of the tool explains why the predictive validity of the DIV Tool was stronger than the other IYAS Tools in the current study. Overall, the validity of the DIV Tool fell within acceptable standards of predictive validity and appears to be a valid predictor of recidivism for youth in Indiana. We recommend continued use of the DIV Tool.

### **Disposition Tool – Conclusions**

The DIS Tool is used to assess youths' risk and needs after they are adjudicated within the juvenile court. It helps determine the level of post-adjudication supervision for youth (Indiana Youth Assessment System, 2010, Policy for the Indiana Youth Assessment System). The overall validation results for the DIS Tool revealed that it was a statistically significant predictor of recidivism, but the validity – reflected in the AUC value and correlation – of the tool fell below industry standards. Specifically, less than half of the items, and only four of the seven domains, on the DIS Tool were found to be statistically correlated with recidivism. Additionally, the new adjudication rates were relatively similar across risk level as 17.20% of low risk, 20.33% of moderate, and 22.72% of high risk youth received a new adjudication within 3-years of the assessment.

The overall results of the DIS Tool draws concerns over its predictive validity. However, data limitations and reliability concerns should be considered when interpreting the results. The general issues with data remained for the DIS Tool, as inconsistencies in the data, such as inconsistencies in adjudication and referral dates, were identified. Similar to the other IYAS Tools, there were also low prevalence rates of recidivism. Importantly, the outcome of new arrest was used in the initial validation of the IYAS DIS (Latessa et al., 2012) and it is difficult to compare the arrest rates against adjudication rates. However, the current study did examine the new referral rates of youth assessed by the DIS Tool. While not a perfect comparison, the new referral rates in the current study were considerably lower than the new arrest rates in the original IYAS DIS study. In the original IYAS DIS validation, an average follow up time of about two years was used, while a 3 year follow up time was used in the current study. In the current study, the new referral rate for youth assessed by the DIS

Tool was 14.57% for low risk, 17.45% for moderate risk, and 19.50% for high risk youth. In comparison, the new arrest rate in the original IYAS DIS Tool validation was about 14% for low risk (13% for males, 15% for females), 30% for moderate risk (31% for males, 28% for females), and 48% for both male and female high risk youth. These large differences in recidivism rates between validation studies are concerning and could signal data issues with missing or invalid recidivism data.

While the overall results of the reliability findings of the DIS Tool from the 2019 were encouraging, a handful of issues did exist. Specifically, criterion and interrater reliability issues were found within the Family and Living Arrangements and Substance Abuse, Mental Health, and Personality domains. These issues could lead to misidentification of risk scores and ultimately risk level, which can harm the validity of the tool (Duwe & Rocque, 2019). The Substance Abuse, Mental Health, and Personality domain had the most consistent reliability issues which may explain why the domain was not significantly correlated with recidivism and why 4 out of 6 items included on this tool were not statistically correlated with recidivism. As such, while the overall validity of the DIS Tool fell below industry standards, the data limitations and reliability issues should be considered when interpreting the results of the current study. We recommend examining this tool more closely—perhaps with a prospective study—before any changes are made to the DIS Tool.

## **Residential Tool – Conclusions**

The goal of the RES Tool is to assess the risk and needs for youth placed in residential facilities. Beyond assessing risk and needs of youth, the tool also helps justice actors determine the level of placement, case management needs, and length of stay for youth (Indiana Youth Assessment System, 2010, Policy for the Indiana Youth Assessment System). The results of the validation analyses for the RES Tool identified that the tool was a significant predictor of recidivism and reached the industry standard for predictive power, though notably on the lowest end of this standard. The AUC values and correlation between risk level and score and new adjudication were within ranges normally seen within validation studies and 6 out of the 7 risk and need domains were statistically associated with recidivism. However, it is noteworthy that only 10 of the 33 items were found to be statistically correlated with recidivism.

When interpreting these results a few things should be kept in mind related to the data used for validation. First, like the IRAS PIT where clients are assessed upon entry into a facility, the IYAS RES is conducted when a youth is admitted to a residential facility. Initially, the intention of the current study was to understand whether the RES Tool could predict youth misbehavior (e.g., misconduct/incidents) during confinement.

However, we were unable to match a sufficient sample of RES Tool cases with the outcome file containing incidents/misconduct. Although the RES Tool is also designed to predict recidivism post-release from a residential facility, not being able to examine its ability to predict misconducts is a limitation of the current study. In a similar vein, data on youths' release date from the residential facility was not available. Given, a portion of youths' follow up time (i.e., the length of time between the assessment and recidivism) occurred while youth were still housed within the residential facility, this likely limits the odds of a youth experiencing a new adjudication during the study's follow up time. Though it is possible for youth to pick up new charges or be adjudicated for a new offense while living in a residential facility, the likelihood of this is less than if a youth was living in the community. Being unable to control for the length of time youth spent in a residential facility likely decreases the ability of the RES Tool to accurately predict recidivism.

The RES Tool also had data concerns similar to the other IYAS Tools, as 10.57% of cases could not be matched to data files containing adjudication information and inconsistencies. For example, issues around adjudication information (e.g., unclear dispositions) resulted in missing data as it could not be determined whether some youth were adjudicated for a new offense or not. Further, the prevalence of recidivism identified for the RES Tool was considerably lower than what one may expect. Once again, the original validation of the OYAS RES Tool examined new arrest as the main measure of recidivism. To better compare the recidivism rates in the current study against those in the initial study, we examined the new referral rates within three years of the assessment. In the current study, 11.01% of low risk, 15.03% of moderate risk, and 17.27% of high risk youth experienced a new referral within 3-years of their RES Tool assessment. In comparison, 17% of low risk, 33% of moderate risk, and 55% high risk youth experienced a new arrest within 9 to 19 months of their assessment (Latessa et al., 2009). These stark differences again highlight potential data concerns in the current study.

There were also slight reliability concerns with the IYAS RES Tool. Specifically, the reliability study identified poor or moderate interrater reliability with the Peers and Social Support Network and Family and Living Arrangements domains. Slight issues with reliability could have an impact on the validity of the tool. Overall, the results of the current study draw concerns over the predictive validity of the RES Tool in Indiana, as the tool did reach industry standards of predictive validity but was on the low end of this standard. However, the inability to examine misconduct/incidents as an outcome, data limitations, and reliability concerns should be considered when interpreting the results of the current study. With these points in mind, we recommend continued use of the RES Tool.



## Reentry Tool – Conclusions

The final tool analyzed in the current study was the RT Tool. The RT Tool is used to assess youths' risks and needs during their stay in a residential facility as well as when they prepare to reenter the community. In Indiana, youth housed in residential facilities should have their risk and needs assessed by the RT Tool every six months (Indiana Youth Assessment System, 2010, Policy for the Indiana Youth Assessment System). This ensures staff are aware of the youths' on-going risks and treatment needs while they are housed within a facility as well as at the time of release. The results of the current validations study on the RT Tool identified that it reached the lowest end of the industry standard for predictive validity. This is evident by the AUC values and correlations, as well as the distribution of new adjudication rate across risk level. However, there were concerns within the results, as only 13 of the 41 items, as well as 5 out of the 7 risk and need domains, were found to be statistically correlated with recidivism.

Consistent with the other tools, there are several factors that should be considered when interpreting the results. First, while not as large of a concern as with the RES Tool, given that the RT Tool can be administered before youth are released into the community, it is likely that some portion of youths' follow up time was during their stay in a residential facility. As with the RES Tool, data on the release date of youth from residential facilities was not available in the current study. Second, data concerns remained within the RT Tool, as data inconsistencies, matching issues, and missing data regarding adjudication were prevalent. For example, 16.33% of cases assessed by the RT Tool could not be matched to the data files containing recidivism data. Third, the prevalence rate of recidivism in the current study was substantially lower than the recidivism rate of youth identified in the original IYAS RT validation. In the 2012 validation of the IYAS RT Tool, youth were followed for an average of 20 months after their assessment. In the original study, 19.4% of low risk youth, 37.10% for moderate risk, and 45.00% for high risk youth experienced a new arrest. In comparison, the new referral rate within 3-years of the RT Tool assessment in the current study was 8.25% for low risk, 14.54% for moderate risk, and 17.39% for high risk youth risk.

Fourth, reliability concerns existed within the results of the reliability study, as poor and moderate reliability was found for the Family and Living Arrangements and the Prosocial Skills domains. In particular, the Family and Living Arrangements had reliability concerns which may explain why it was found to be a non-significant predictor of recidivism and why three of the four items within this domain were not statistically correlated with recidivism.

Finally, it is worth noting that most of the youth assessed by the RT Tool in the current study were low risk (61.02%) while a small portion were high risk (4.95%). The fact that such a large portion of low risk youth are being assessed by the RT Tool could be explained in two different ways. On one hand, it could suggest that a large portion youth are being inappropriately placed into residential care, as residential care is generally intended for youth who are at higher risk of recidivating. On the other hand, it could suggest that residential facilities are helping reduce youth's risk in residential treatment by targeting their risks and needs. The current study used the youth's most recent RT assessment. As such, it is possible that youth's risks are being targeted throughout their stay in residential treatment and when they are assessed by the RT Tool towards the end of their placement, they've experienced a decrease in their risk level. The current study was not able to examine this possibility; however, future work with the IYAS RT should examine whether youth's risk levels are being consistently reduced throughout their stay in residential care.

Overall, the RT Tool reached the low end of the industry standard for predictive validity with multiple concerns noted. Data limitations and reliability concerns may partially explain these results and should be considered when interpreting the results. With these points in mind, we recommend continued use of the RT Tool.

## **Summary of Conclusions**

- The IRAS PAT, CST, CSST, and SRT reached acceptable levels of predictive validity and were shown to be statistically significant predictors of recidivism.
- The IRAS PIT fell on the low end of acceptable levels of predictive validity but was a statistically significant predictor of recidivism.
- The IRAS Static Tool was not a significant predictor of recidivism.
- The IYAS DIV Tool reached acceptable levels of predictive validity and was a statistically significant predictor of recidivism.
- The IYAS RES and RT Tools fell on the low end of predictive power but were statistically significant predictors of recidivism.
- The predictive validity of the IYAS DET and DIS Tools fell below the industry standard; though, the tools were statistically significant predictors of recidivism.
- Overall, the reliability study conducted by Manchak and colleagues (2019) identified that the reliability of the IRAS and IYAS tools were relatively strong. However, each tool contained a handful of reliability

concerns that may lead to inaccurate scoring of the tools, which in turn may explain why certain tools had lower validity than others.

- Data limitations were prevalent throughout both the IRAS and IYAS analyses. These concerns included, but were not limited to, difficulties in matching cases across data files, missing data, low prevalence rates of recidivism, data errors (e.g., invalid dates), and data inconsistencies (e.g., missing information about adjudication/conviction outcomes). Generally, data issues lead to more errors within a statistical model which increases the chances of random errors (e.g., marking a client as not recidivating when in reality they did recidivate). The cumulative effect of these errors is that statistical relationships (i.e., predictive validity) will be weakened. Data limitations were especially prevalent for the tools that had the weakest validity (IRAS PIT and the IYAS Tools). This suggests our analyses underestimated the actual predictive power of these tools.
- Some differences in the predictive validity were identified across sex, race, and offense types. The current study could not directly identify why these differences existed in the current study; however, evidence on racial differences within the Indiana criminal justice and juvenile justice system could partially explain racial differences found in the predictive validity across race (Holcomb et al., 2022; Prison Policy Initiative, 2021). Further, specialized needs of various offender types (e.g., substance use offenders or youth referred to the court as part of the child welfare system) may not be fully assessed by the current IRAS and IYAS tools.

## Recommendations

### ***Recommendation 1: Continue to use the IRAS and IYAS Instruments as designed.***

- All tools (except for the Static Tool) were found to be significant predictors of recidivism. Further, as can be seen in most of the included figures, the pattern of recidivism trends as expected (i.e., low risk clients have the lowest rates of recidivism, followed by moderate, and then high (and very high for some tools) risk clients), suggesting that the tools are correctly classifying a large proportion of clients supervised within the State of Indiana. Given this, we recommend that Indiana continues to use each of the IRAS and IYAS tools (except for the Static Tool) as they are currently designed.
- Although it would be preferred for the predictive power of the IRAS and IYAS instruments to be stronger than what were found in the current study, we are not making recommendations to adjust the manner

in which the tool was used; nor will recommendations be made around adjusting the scoring, items, domains, or risk levels on the tool. The data limitations and concerns discovered (those outlined throughout the Conclusion section) limit our ability to make concrete suggestions on adjustments to the use of the tool or the current construction of the tool. As mentioned above, the more prevalent data limitations (e.g., missing information on release dates for clients in prison) and concerns (e.g., matching issues, missing disposition outcomes) present within a statistical model creates more statistical noise (Shugan, 2006). Within validation studies, noise will weaken the observed validity of the tool.

- Overall, it is encouraging that all tools (besides the Static Tool) were found to be statistically significant predictors of recidivism and were able to correctly classify a large portion of clients assessed by the tools. As such, there should be confidence moving forward in the ability of the IRAS and IYAS Tools to help the state of Indiana identify client's risk and need levels. Further recommendations will be made around potential next steps in examining the validity of the IRAS and IYAS tools.

***Recommendation 2: Review the purpose and/or goal of the IRAS Static Tool.***

- The overall recommendation around the use of the IRAS and IYAS tools is to continue to use them as designed. However, given that the IRAS Static Tool was the only instrument among the 11 examined that failed to be a statistically significant predictor of recidivism, Indiana may benefit from reviewing the purpose and/or goal of the Static Tool. Specifically, the Static Tool is designed to only assess static risk factors. However, the clients assessed by the Static Tool are individuals' presenting with acute dynamic risk (e.g., absconding from supervision) or responsivity factors (e.g., severe mental illness). As such, it is possible that the static only nature of the tool fails to capture key factors (i.e., dynamic factors) that would provide better insight into these clients' risk of recidivism.
- Given that the tool is used when clients are unable to participate in the assessment process, it may not be possible to gather information on dynamic risk factors. However, it may be beneficial for Indiana to reconsider the goal/purpose of the tool as it may not be able to consistently predict recidivism. One potential option is that the Static Tool could be used as a criminal history gathering tool to provide criminal justice actors with detailed information on the clients' history, as opposed to a tool specifically designed to predict recidivism. However, like the other IRAS and IYAS tools, the Static Tool could benefit from further examination of its validity (see Recommendation 5).

***Recommendation 3: Continue to invest in continuous quality improvement (CQI) related to the IRAS and IYAS.***

This includes the following:

- Continue to obtain buy-in from key stakeholders around the use of the IRAS and IYAS tools. Stakeholders include, but are not limited to, criminal and juvenile justice actors throughout the system (e.g., court actors, institution staff, probation officers, detention center staff), internal and external service providers, and community partners. Obtaining buy-in can be accomplished in several ways, including:
  - Continuing to train newly hired staff in the use of the tool and providing booster/coaching sessions to staff who currently use the tool.
  - Prioritize resources for staff buy-in. This includes ensuring there are enough resources available surrounding technology, quality assurance, and research/evaluation for the IRAS and IYAS tools.
  - When discussing the IRAS and IYAS with staff and key stakeholders, there should be a focus on the potential *positive* consequences of using the IRAS and IYAS tools, such as allowing staff to build rapport with clients and establishing treatment and supervision risks and needs early in the criminal and juvenile justice processes. It should also be made clear that the use of the tools can lead to positive outcomes for both clients and the agency itself. This message could be delivered during trainings, webinars, pre-recorded videos on state or county websites, written communications through emails, and when visiting agencies.
  - Ensure that staff are aware that risk and need assessments have their limitations and not the “end-all-be-all” solution to predicting recidivism and matching treatment needs. Instead, staff should be aware that these tools are designed to help guide decision making and resource management while allowing staff to use their expertise within these decisions.
  - When staff members are enthusiastic about the tool, agencies could consider using these staff members as advocates of the tools. These advocates could then be encouraged to become trainers and coaches for the use of the tool. This in turn could help obtain buy-in from new staff/staff who have not yet bought into the tool.
  - Develop a method to receive staff feedback on the assessment process. Staff conducting assessments will have valuable insight into the assessment process, which could provide potential suggestions on how to improve the assessment process over time.
- Ensure that current policies and practices are logical and tailored to the environment in which they are implemented. This includes a review of policies and practices on when tools are used, when clients are

reassessed, override decisions, the connection between assessment results and case planning and service referrals, and expectations and suggestions for sharing assessment information with outside stakeholders (e.g., external service providers) effectively.

- Continue with the current training protocol that aims to train and certify newly hired staff in the IRAS or IYAS assessment process. It is important to ensure that the protocol is being consistently used and followed in jurisdictions across the State.
- Continue to provide ongoing training/coaching on the IRAS and IYAS for staff certified in the use of the tools. This can include requiring staff to participate in booster/coaching sessions around certain aspects of the tool including, but not limited to, coaching around difficult to score items/domains, staff interview skills, practicing the scoring of tools during staff meetings, or having supervisors review the scoring of assessments. Indiana should also continue to use its current recertification policy which requires users to recertify every three years.
- During training/coaching sessions, there should be an emphasis on translating the results of the assessment into practice. For example, the results of the assessments can help inform supervision level decisions (e.g., frequency of contact), expectations for treatment referrals, and how to conduct effective case planning.
- Establish quality assurance policies that can help maintain the fidelity of the tools. This can include regular reviews of assessments by master IRAS/IYAS trainers, observations of the assessment process by master IRAS/IYAS trainers, regular coaching or booster sessions, and reliability checks through the use of vignettes.
- Ensure that jurisdictions using an IRAS or IYAS tool(s) have services in place that address the need areas identified on the IRAS and IYAS assessments.

***Recommendation 4: Review and adjust data collection efforts related to risk assessment information.***

This can include, but is not limited to:

- Review and adjust how recidivism measures (e.g., misconduct/incident, arrest, referral, conviction, adjudication, return to DOC) are tracked. One possibility is to develop systems that track clients assessed by specific IRAS and IYAS tools with recidivism measures. For example, for clients assessed by the IRAS PAT, when their court case is concluded, a system should be in place that ensures failure to appear warrants are properly entered on the court case record. Further, these systems could be developed to

hold client, assessment, and recidivism data within one system. A second possibility is to develop a system that continuously matches clients assessed by the IRAS and IYAS tools with databases that contain recidivism information. For example, developing a unique identifier for each client that is consistent in the assessment database and the databases containing recidivism information would ease the process of matching assessment data with recidivism data.

- Ensure that recidivism measures are clearly defined and tracked consistently across the state. Specifically, the State of Indiana should work to develop and define specific measures of recidivism that can be used to examine the validity of the IRAS and IYAS tools, other risk and/or need assessments, or other criminal justice related functions (e.g., program evaluation). To illustrate, one manner in which recidivism is commonly defined is a new arrest. However, there are many factors to consider when using new arrest as a measure of recidivism. For example, does new arrest include arrests for minor offenses (e.g., loitering) or violations of supervision (e.g., parole or probation)? Further, does the measure of new arrest consider any new arrest or only new arrests in which charges are formally made? Regardless of the measure(s) of recidivism chosen, there are numerous factors to consider that should be clearly defined. Additionally, measures of recidivism should be consistently defined and tracked across jurisdictions. If one correctional agency defines new arrest as a new arrest for a criminal offense that ends with an official charge, it would be ideal if this definition is used by other correctional agencies within the state.
- Develop quality assurance measures to review data related to clients, IRAS and IYAS assessments, and recidivism. This can include reviewing databases to ensure they are consistent with data needs, adjusting data systems to simplify the data entry process, hiring or assigning staff to regularly review data, and developing systems to identify and correct inconsistencies in data. Notably, Indiana currently has a system in place that requires all completed risk assessments to be inputted into the Risk Assessment Application System within 30 days. Further, this system is standardized to allow for consistent data entry. This policy should be continued. Ensuring quality assurance measures are in place and/or followed for the Risk Assessment Application system can only enhance the strength of this policy.

***Recommendation 5: Conduct a prospective study to re-examine the validity of the IRAS and IYAS tools.***

- The current study conducted a validation assessment of the IRAS and IYAS instruments through a retrospective design (i.e., data that had been gathered prior to the beginning of the study). Given the

data limitations and other concerns discussed above, it is recommended that engaging in a prospective study would provide key information to better understand the validity of the IRAS and IYAS instruments. A prospective study would consist of a study where IRAS and IYAS assessments are conducted on a sample of Indiana clients, those same clients would be assessed by the tools and followed for a period of time to collect recidivism data. Conducting a prospective study to re-examine the validity of the IRAS and IYAS Tools would be beneficial for several reasons. First, a prospective study would allow a research team to better control the information gathered around client data, assessment data, and recidivism data. This would increase confidence in the quality of data. With increased confidence in the data, a research team could better explore the validity of the IRAS and IYAS tools. Second, it would allow for a more specific examination and consideration of factors such as the weighting of items, the removal or adjustment of items, the construction of risk and need domains, and adjustment to risk/need levels. Third, it would allow a research team conducting the prospective study to compare the results against those of the current study – as well as other past studies examining the validity of the IRAS and IYAS Tools (e.g., Latessa & Lovins, 2012; Latessa et al., 2013; Lowder et al., 2022). If the results of a prospective study remain consistent with the results of the current study (or past studies), then this would increase confidence in decisions made around potential adjustments to the tools themselves or the application of the tools.

***Recommendation 6: Further examine sources of variation in predictive accuracy across racial, sex, offense types, and county groups.***

- Although the IRAS and IYAS tools predictive validity was relatively consistent across sex, race, offense types, and county types, some variation did exist. The current study could not identify why variation existed across these sex, race, and offense type groups. As such, those differences should be noted and monitored. Future studies surrounding the IRAS and IYAS (e.g., such as the prospective study suggested above) should examine these differences further. This could include differential weighting of items by specific groups or developing policies/practices that take these differences into account as decisions are made.
- Consistent with current IRAS and IYAS policies, consider implementing specialized risk and need assessment tools alongside the IRAS and IYAS to help account for differences in the validity of the assessments across groups. While specialized risk and need assessments would not explain the variation



in the IRAS/IYAS tools found across certain groups in the current study, they could help further assess specialized risk and need areas of clients. These specialized risk and need assessments include those designed to assess justice-involved females, such as the Women's Risk and Need Assessment (WRNA, Van Voorhis et al., 2009), specialized needs, such as substance abuse using the Substance Abuse Subtle Screening Inventory (SASSI; Miller & Lazowski, 2001), or specific risks, such as risk of violence using the Violence Risk Appraisal Guide-Revised (VRAG-R) for adults (Rice et al., 2013) or the Structured Assessment of Violence in Youth (SAVRY) for juveniles (Lodewijks et al., 2008). These assessments could be used in combination with the IRAS and IYAS tools to gain a more complete understanding of a client's risk and need profile.

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