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Development of the California Static Risk Assessment (CSRA): Recidivism Risk Prediction in the California Department of Corrections and Rehabilitation

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ABSTRACT

The California Department of Corrections and Rehabilitation (CDCR) has recently made a commitment to incorporate information about offenders' risks and needs into placement decisions and programming. As part of this overall effort, in 2007 CDCR collaborated with the University of California, Irvine Center for Evidence-Based Corrections to develop a risk assessment instrument modeled on one developed by Washington State, which incorporated primarily static risk factors based on an offender's criminal history. This article presents a background of risk assessment tool development and describes the development and validation of the California Static Risk Assessment (CSRA). We present information on predictive validity using Area Under the Curve (AUC) statistics as well as descriptive recidivism outcomes for offenders assigned to one of five risk groups. We also present information on the tool's accuracy for subgroups defined by offender gender, race/ethnicity, offense, and release status.

INTRODUCTION

The population of adults under some form of correctional supervision, including jail, prison, pretrial supervision, probation, and parole, in the United States has increased by 270% in the past two decades (Austin 2004). This increase has been incredibly taxing and costly for prison systems and for community corrections. Overcrowding is particularly prominent in California. By March 2007, the California prison population had reached 171,800; in August 2009, a Three-Judge panel ordered California to develop a plan to reduce the prison population by tens of thousands of prisoners (Coleman v. Schwarzenegger, 2009) and in May 2011, the U.S. Supreme Court concurred. In addition, California has had extremely high rates of parolees returning to custody: 66% of parolees return to custody within three years of release, for either technical violations or new criminal offenses (Petersilia 2008). These high incarceration figures and failure rates have alerted researchers and policymakers to the importance of developing and identifying efficient and effective interventions that hold the promise of reducing imprisonment and improving offender reentry.

Research in evidence-based practices identifies the use of validated risk assessment instruments as valuable in classifying criminal justice clients by risk levels and identifying needs in custodial and non-custodial settings. Such instruments help corrections professionals make decisions regarding levels of supervision, staffing, and programming for offenders. In this article, we provide an overview of how risk assessment philosophy and practice have evolved over time, present key issues regarding the effectiveness of different types of assessment instruments, and discuss the development and validation of the California Static Risk Assessment (CSRA) instrument for the California Department of Corrections and Rehabilitation (CDCR).

Generations of Assessment

The practice of risk assessment has changed over time. In the criminal justice system, the broader stages of risk assessment have been categorized as first, second, third, and, according to some literature, fourth generations of offender assessment. The first generation of risk assessment primarily consisted of clinical judgment, the least formal assessment method. Initially, offender risk assessment was a fairly subjective process in which clinicians informally gathered and analyzed data, and then made professional judgments regarding offender risk. Due to the autonomy in this process, as well as variation in the elements included in the assessment by different clinicians, any beneficial comparison and standardization was impossible. Meta-analyses of such methods have revealed that the predictive validity (the degree to which the method predicts recidivism) of unstructured clinical judgment is inferior to more structured approaches overall as well as for many sub-groups of offender populations (Grove, Zald et al. 2000; Bonta 2002). Second generation assessment began in the early 1970s with the development of the Salient Factor Score (SFS) and shifted the focus from subjective measurement to more actuarial or mechanical measures that were designed to roughly predict the likelihood of offender recidivism. Actuarial measures are those measures that extend beyond individual clinicians' assessments and are "structured, quantitative, and empirically linked to a relevant criterion" (Bonta 2002; Andrews, Bonta et al. 2006). Actuarial measures can include static factors, that is, factors that cannot be changed, such as criminal history, and/or dynamic factors, that is, factors that change over time, such as offender attitude or choice of companions (Simourd 2004). The SFS was first utilized in the early 1970s to predict recidivism of parolees, and was essentially the first tool for recidivism prediction that was used "in a way that had a visible and measurable" effect on parole (Hoffman, 1994). In general, second generation instruments focus on static rather than dynamic risk factors; however, this distinction is not always clear in the literature, and though most instruments target static risk factors, some do include measures of dynamic factors.

The SFS includes items that capture prior convictions and commitments, age at the current offense, commitment-free period prior to offense, commitment or supervision status at the time of the offense, and heroin or opiate dependence (Hoffman 1994). Research has shown that the SFS is a valid assessment tool with a mean predictive criterion validity estimate (effect size or *r*) of .30 for general recidivism, and the predictive validity estimates of the SFS remain fairly consistent over time (Galvin and Polk 1981; Andrews, Bonta et al. 2006).

Other examples of second-generation assessment instruments include the Wisconsin Tool, the Psychopathology Checklist-Revised (PCL-R), and the Violence Risk Appraisal guide (VRAG). The Wisconsin tool[1] was developed in the 1980s to facilitate community supervision of offenders. This instrument shifted "the focus of risk factors from a prediction of likelihood of success to a prediction of the need for control in the community" and can be used to determine appropriate levels of treatment and supervision for offenders (Taxman and Thanner 2006). The PCL-R, by contrast, is considered a "diagnostic instrument" and is not specifically a risk or needs assessment scale (Hemphill and Hare 2004; Andrews, Bonta et al. 2006). Researchers have determined that the PCL-R is both a reliable and valid instrument for assessing offender psychopathy including antisocial, criminal, and psychiatric behavioral issues, and it is known to have "impressive predictive validity" specifically for offenders with mean effect sizes ranging between .20 and .30 (Bonta 2002; Gendreau, Goggin et al. 2002; Hemphill and Hare 2004).

The VRAG is an instrument that has shown a strong degree of accuracy in predicting violence: it has predictive validity estimates of up to .39 for violent reoffending (Grann, Belfrage et al. 2000; Andrews, Bonta et al. 2006). The VRAG is a useful tool for assessing various types of violent recidivism including sexual reoffending. It is designed to predict recidivism of offenses that include "assault, armed robbery, sexual offenses that involve physical contact with the victim, homicide, and attempted homicide" (Barbaree, Seto et al. 2001).

The third generation of risk assessment emerged when researchers began to determine that the level of prediction could increase by focusing more on dynamic risk factors. Research had shown that offender likelihood to recidivate was based on both historical and current factors. Essentially, an offender's risk level is based on his or her past experiences, and offender needs are determined by identifying various deficits in his or her life. Researchers asserted that, by targeting the current domains of risk and incorporating change strategies in the offender supervision process, practitioners and offenders could work toward reducing the likelihood of recidivism (Andrews, Bonta et al. 2006; Taxman and Marlowe 2006; Taxman and Thanner 2006; Bonta 2007).

The Level of Service Inventory-Revised (LSI-R) is a third generation instrument that was designed to aid practitioners in determining appropriate levels of service for offenders (Fass, Heilbrun et al. 2008). Studies have shown that the LSI-R is a valid predictor of recidivism, with mean predictive estimates ranging between .22 and .43. The effectiveness of this tool is closely linked with implementation integrity; it is imperative that those administering the tool undergo thorough orientation and training, as low fidelity can lead to less predictive validity (Andrews, Bonta et al. 2006; Flores, Lowenkamp et al. 2006).

Researchers have determined that there is a strong relationship between competent assessment of offender risk and needs and the effectiveness of treatment: the former directly impacts the reduction of recidivism in the corrections system (Gendreau 1996). This relationship forms the foundation of the current risk, needs, and responsivity (RNR) model of treatment, which bases the intensity and type of services provided on a thorough assessment of offenders' criminogenic needs and level of risk (Andrews, Bonta et al. 1990). According to Taxman and Thanner (2006), this treatment model "requires that correctional agencies use a valid risk tool, have the ability to identify dynamic factors to address in treatment, and have suitable treatment programs that include clinical and control programmatic components."

Fourth generation risk assessment instruments guide case management of offenders from intake through the completion of supervision (Andrews, et al., 2006). These instruments assess offenders' risk, strengths, needs, and responsivity to link them with appropriate services and levels of supervisions. They differ from previous generations in that they encompass a broader range of risk/need factors and take offenders' strengths and degree of resilience into consideration. They offer the advantage of "seamless integration of the need or risk domain with the agency management information system" (Brennan, 2009). The best known fourth generation instruments include the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS), the District of Columbia's Supervision and Management Automated Record Tracking (SMART) system, and the Level of Service/Case Management (LS/CMI), which is a variation of the LSI-R (Andrews, Bonta et al. 2006; Pattavina and Taxman 2007).

The underlying philosophy of the fourth generation tools is that assessment instruments have the highest level of utility when they are designed to go beyond risk factors and take other offender characteristics into account, to streamline case management practices and responsibilities, and to assess changes in risk and needs over time (Pattavina and Taxman 2007; Skeem and Louden 2007). Research has yielded mixed results regarding the predictive strength of fourth generation instruments. For example, some studies conclude that the LS/CMI has moderate predictive validity with mean estimates ranging between .29 and .41, while others find that the predictive value of second generation assessment tools is at least equivalent to, if not superior to, that of third and fourth generation tools (Andrews, Bonta et al. 2006; Pattavina and Taxman 2007). Additionally, researchers debate whether the fourth generation tools improve upon the second and third generation instruments or whether they merely create additional complications and unnecessary challenges (Latessa and Lovins, 2010).

Table 1: Risk Assessment Instruments – Mean Predictive Validity Estimates (r)

Generation of Assessment	Scale	Predictive Validity Mean (Recidivism)	
		General	Violent
First Generation	Unstructured Clinical Judgment	.10	.13
Second Generation	SFS (Salient Factor Score) Wisconsin Tool PCL-R (Psychopathology Checklist-Revised) VRAG (Violence Risk Appraisal Guide)	.26 .31 .27 -	- - .27 .39
Third Generation	LSI-R (Level of Service Inventory-Revised)	.36	.25
Fourth Generation	LS/CMI (Level of Service/Case Management Inventory)	.41	.29

Source: Andrews, Bonta, & Wormith, 2006.

Offender-Based Risk Assessment: Issues in Development and Selection

There are several key issues to consider regarding the development, selection, and implementation of risk assessment tools and practices in the criminal justice system. A prominent ongoing debate in risk assessment literature is whether static or dynamic assessment is more valuable. Proponents of second-generation instruments highlight the effectiveness of measuring static, unchanging factors to determine an offender's likelihood to recidivate. These individuals assert that a combination of scores on age, criminal history factors such as conviction and incarceration records, and drug and alcohol dependence results in an overall risk score that has moderate predictability for future re-offending (Pattavina and Taxman 2007).

The opposing viewpoint is that the measurement of dynamic factors or a combination of static and dynamic factors is essential not only for risk assessment but also for the case management process. Proponents of using dynamic measures in risk and needs assessment suggest that these measures are essential because they can be used to target interventions during the community reintegration process (Austin 2004). Third and fourth generation assessment instruments utilize these measures, but studies have begun to show that the predictive value of the more concise, purely static instruments is at least as high as the more complex, dynamic tools (Gottfredson and Moriarty 2006; Barnoski and Drake 2007; Pattavina and Taxman 2007; Baird 2009). These findings could mean that, though the measurement of dynamic factors can be useful for needs assessment and case management practices, they may not be necessary in the development of risk prediction instruments.

Another important matter in the creation of assessment instruments involves identifying ideal characteristics of such instruments. These characteristics can include objective measurement, predictability, practicality, and efficiency. The best assessment instruments are those that are mechanical, objective, and comprised of valid and reliable measures, capturing the specific behaviors that predict reoffending. Instrument outcomes should be consistent across offender populations regardless of which practitioners administer the tool. Ongoing validation studies are vital for ensuring that the given instrument remains effective for the population in question regarding both demographic and behavioral changes (Meredith, Spier and Johnson, 2007).

Offender-Based Risk Assessment: The Washington State Model

One recent example of a systematic shift between the use of static and dynamic assessment methods is of the creation and implementation of a recent tool in Washington State. In the late 1990s, Washington State legislature passed the Offender Accountability Act, which directs the supervision of adult felony offenders who are under community supervision. As part of the reforms, the Washington State Department of Corrections (DOC) implemented several strategies to reduce recidivism among the population of adults on community supervision. These strategies included utilizing the LSI-R to classify felony offenders based on (1) their risk of reoffending and (2) previous harm they caused to individual victims as well as society as a whole, in order to provide more services for those classified as higher risk individuals (Barnoski and Aos 2003). The Washington Institute for Public Policy, in a study of the effectiveness of these procedures, found that, although the LSI-R was a moderately good predictor of recidivism, the inclusion of some additional static measures of criminal history could increase the level of prediction and would be especially useful regarding violent felony recidivism (Barnoski & Aos, 2003). They also concluded that the calculation of particular risk categories was somewhat problematic, as risk scores did not systematically align with changes in recidivism rates. There were no specific risk scores at which rates of recidivism methodically changed, which made the creation of risk categories somewhat challenging (Barnoski & Aos, 2003).

Based on these findings, the Washington State Institute for Public Policy developed a risk assessment instrument that included only static measures of demographics and criminal history as a recidivism prediction tool for use with offenders released from

either jail or prison and placed on community supervision (Barnoski and Drake 2007). The tool was designed to predict recidivism – specifically, conviction for a felony offense anytime within three years of an offender being placed on community supervision – for offenders in the Washington DOC. The tool was developed using a sample of 308,423 offenders placed on community supervision between 1986 and 2000 and validated on a separate sample of 51,648 (Barnoski and Drake 2007).

The area under the receiver operation characteristic (AUC) statistic was used to measure the tool's ability to predict recidivism. An AUC value of .50 indicates that an assessment tool's ability to predict is no greater than chance, and a value of 1.0 indicates perfect prediction. AUCs in the .60s show weak predictive strength, AUCs in the .70s show moderate predictive strength, and those in the .80s show strong predictive strength (Barnoski and Drake 2007; Daffern 2007; Craig, Browne et al. 2008). The AUC showed that the Washington tool had moderately good predictive accuracy for each of the analyzed risk categories, including the Any Felony, Property/Violent Felony, and Violent Felony groups (Mossman 1994; Barnoski and Drake 2007). As Table 2 depicts, the AUCs for the analysis of the Washington tool were in the .73 to .76 range for each of the risk categories. Further, the tool had predictive utility with three categories of high-risk offenders, including High Drug, High Property, and High Violent offenders.

Table 2: AUCs of Predicted Recidivism Equations (Washington State Tool & LSI-R)

Tool	Risk Prediction Category		
	Any Felony	Property/Violent Felony	Violent Felony
Washington Tool Construction Sample (n=308,423)	.76	.76	.75
Washington Tool Validation Sample (n=51,648)	.74	.73	.73
LSI-R (n=22,533)	.66	-	.64

Source: Barnoski & Aos, 2003; Barnoski & Drake, 2007.

The California Static Risk Assessment Instrument (CSRA): Development And Validation

Historically, CDCR has made decisions about placement and supervision of offenders within the framework of an offense-based model; it is currently moving toward incorporating data about offender risk and needs into decisions and programming (California Department of Corrections 2007; California Department of Corrections 2007; California Department of Corrections 2009). In 2007, the California Expert Panel on Adult Offender Reentry and Recidivism Reduction Programs developed the California Logic Model to guide decision-making and promote system-wide reforms. Risk and needs drive decision-making in the Logic Model. According to the evidence-based principles behind the Logic Model, risk and needs assessment are vital components of rehabilitative programming, supervision, and case management (California Department of Corrections 2009). The current primary risk and needs assessment system utilized by CDCR is the fourth generation COMPAS system, which is designed to assess offender risk and needs as well as guide case management techniques. The COMPAS system combines static and dynamic factors and includes such measures as education and employment status, financial matters, criminal history, and social, emotional, and familial factors (Brennan, Dieterich et al. 2009). This system is not yet used for all offenders in the CDCR system. Analyses of the effectiveness and predictive validity of the COMPAS system have shown mixed results. Some studies indicate that it is a valid and reliable system for risk and needs assessment while others do not support this assertion; additional independent evaluations are needed (Pattavina and Taxman 2007; Skeem and Louden 2007; Brennan, Dieterich et al. 2009). A recent validation of the COMPAS for the CDCR population revealed that the general recidivism risk scale achieved an AUC of .70, however, the AUC for the violence subscale was .65 (Farabee et al. 2010).

While the COMPAS tool was under refinement and being tested, CDCR's Office of Research collaborated with the University of California at Irvine's Center for Evidence-Based Corrections (CEBC) to develop a risk assessment tool. The resulting tool, the California Static Risk Assessment (CSRA) instrument, is a structured decision-making instrument based solely on static risk factors and serves as a substitute for the COMPAS recidivism risk subscale.

CDCR is currently utilizing the CSRA in several key programs and policies, including the Parole Violation Decision Making Instrument (PVDMI), a tool that utilizes offender risk and violation severity to make recommendations to parole agents regarding sanctions, and in a plan that places low-risk offenders, as determined by the CSRA score, into alternative custody programs. CDCR also used the CSRA in the selection of parolees for a non-revocable parole program, where low-risk/low stakes parolees were subject to standard parole search and seizure conditions but were not under active supervision in the community.[2]

METHODS

The CSRA was modeled on the Washington State Institute for Public Policy's (WSIPP) static risk tool. This tool was selected for several reasons. First, it contains only static measures. Data systems currently utilized in CRCR do not record dynamic factors for all offenders. It was not possible for CDCR to include such factors as educational attainment or substance abuse in the development of the instrument because these data were not available within the designated timeframe. In addition, CDCR officials determined that the California offender population was similar to the Washington Department of Corrections offender population and that a tool developed on Washington offenders should result in a valid instrument for the California system.

Sample

The sample for the development of the CSRA included all 103,603 offenders who were released from CDCR institutions in fiscal year 2002-2003. This time frame was selected to allow for a three-year follow-up period, which is frequently used to model outcomes of this type of recidivism analysis (Langan 2002). CEBC used deidentified data from both CDCR and the California Department of Justice (DOJ) in this analysis. CDCR supplied data from its automated systems regarding the offender gender, age, and release date. DOJ provided automated criminal history records, or "rap sheets," which were similar to the prior record variables included on the Washington instrument. Of the 103,603 offenders, 102,457 had "matches" in both systems; this sample was used to develop and test the CSRA. These records were randomly assigned to either the construction (N=51,395) or validation (N=51,062) sample groups. All unmatched records were excluded.

Items and Development

The items included in the CSRA instrument are nearly identical to those in the Washington tool; the main difference is that no juvenile record items are included on the CSRA because no reliable juvenile record information is available in either CDCR or DOJ files. The CSRA includes two demographic items, one total felony convictions item, nine adult felony record items, nine adult misdemeanor record items, and one adult sentence violation item. Table 3 presents the items and categories included on the CSRA.

Table 3: CSRA Items and Categories

Demographics				
Age at release	60 or older 50 to 59 40 to 49 30 to 39	(0) (1) (2) (3)	20 to 29 19 to 19 13 to 17	(4) (5) (6)
Gender	Female	(0)	Male	(1)
Total Felony Convictions				
Felony convictions	First (1) Second Third	 (2) (3)	Fourth Fifth or more	(4) (5)
Total Adult Felony Record (All prior and current sentences, each defined by its unique date)				
Felony homicide offense: murder/manslaughter	None	(0)	One or more	(1)
Felony sex offense	None One	(0) (1)	Two or more	(2)
Felony violent property conviction for a felony robbery/kidnapping/ extortion/unlawful imprisonment/custodial interference/harassment/ malicious mischief	None One	(0) (1)	Two or more	(3)
Felony weapon offense	None One	(0) (1)	Two or more	(2)
Felony property offense	None One Two	(0) (1) (2)	Three Four Five or more	(3) (4) (5)
Felony drug offense	None One	(0) (1)	Two Three or more	(2) (3)
Felony escape offense	None	(0)	One or more	(1)

(continued on next page)

Table 3 (cont'd): CSRA Items and Categories

Total Adult Misdemeanor Record Total past and current sentences involving a misdemeanor conviction for:				
Misdemeanor assault offense – not domestic violence related	None One Two	(0) (1) (2)	Three Four Five or more	(3) (4) (5)
Misdemeanor domestic violence assault or violation of a domestic violence related protection order, restraining order, or no-contact order	None One	(0) (1)	Two or more	(2)
Misdemeanor sex offense	None One	(0) (1)	Two or more	(2)
Misdemeanor other domestic violence: any non-violent misdemeanor convictions such as trespass, property destruction, malicious mischief, theft, etc., that are connected to domestic violence	None	(0)	One or more	(1)
Misdemeanor weapon offense	None	(0)	One or more	(1)
Misdemeanor property offense	None One	(0) (1)	Two Three or more	(2) (3)
Misdemeanor drug offense	None One	(0) (1)	Two or more	(2)
Misdemeanor escape offense	None	(0)	One or more	(1)
Misdemeanor alcohol offense	None	(0)	One or more	(1)
Total Sentence/Supervision Violations				
Total sentence/supervision violations (three or more scored as 3 for violence subscale)	None One Two	(0) (1) (2)	Three Four Five or more	(3) (4) (5)

Source: (Turner, Hess et al. 2009)

The development of the CSRA consisted of four main steps (Turner, Hess et al. 2009). The construction sample was used in the first three steps, and the validation sample was used in the fourth step. The first stage involved processing the DOJ automated felony and misdemeanor criminal history record data[3]. This process involved counting court convictions based on the adjudication (or sentencing date), treating each unique date as a separate event (Turner, Hess et al. 2009).

In the second step, CEBC used the criminal history counts, age at release, and gender to run ordinary least squares (OLS) regression models on arrest after release during the three-year time period for each of the following: 1) any felony; 2) any violent felony; 3) any property/violent felony (e.g., robbery).[4] CEBC calculated weights for each scale item utilizing a process similar to that used by WSIPP in the development of the Washington tool. The OLS regressions were used with the scale items as independent factors to predict the subscale outcomes for arrest, and weights for the scale scores were calculated by multiplying the regression estimates by 200 and rounding to obtain integers; these integers were used as the weights for the scale scores (Turner, Hess et al. 2009).[5]

In the third step, the weights from these regression equations were then multiplied by the corresponding prior conviction counts and added to create recidivism subscale scores for any felony, any violent felony, or any property/violent felony. Based on these subscale scores, each offender in the construction sample was assigned to one of five risk group categories, including Low Risk, Moderate Risk, High Drug Risk, High Property Risk, and High Violent Risk, mirroring the risk group percentages in the Washington tool.[6] Offenders in the High Violent group, comprising 17% of the sample, are those who have the highest scores on the subscale that predicts violent felony recidivism. Those in the High Property category, 19% of the overall sample, are offenders who are not in the High Violent group but who have the highest scores on the subscale that predicts property/violent felony recidivism. The High Drug category, only nine percent (9%) of the sample, is comprised of offenders who have the highest scores for committing any felony but do not fit in the other high-risk categories. The Moderate Risk group, 33% of the sample, consists of those who are not considered high risk but who have higher property/violent subscale scores. Lastly, the Low Risk category encompasses the remaining 22% of the sample and includes the offenders who do not belong to any of the other risk groups. These groups are all mutually exclusive.

In the final stage of the instrument development, CEBC computed measures of predictive accuracy for the validation sample using the AUC statistic. Table 4 presents the AUCs for the three subgroup outcomes for both the construction and validation samples as well as AUCs for other risk assessment instruments. The results are robust and change little between samples, demonstrating that the CSRA is a reliable predictor of risk and that these results would be replicated if this scale was used for other

samples. According to these results, the AUCs for the CSRA are slightly lower than those obtained with the Washington tool but are generally comparable to those obtained by other risk assessment instruments.

Table 4: AUCs of CSRA and Other Risk Assessment Instruments

Instrument	AUC	Sample	Recidivism Measure	Source
CSRA (Construction Sample)	.70 (Felony) .68 (Property/Violent) .68 (Violent)	51,395 California offenders released from institutions in FY2002-2003	Arrest	Center for Evidence-Based Corrections, 2009
CSRA (Validation Sample)	.70 (Felony) .67 (Property/Violent) .67 (Violent)	51,062 California offenders released from institutions in FY2002-2003	Arrest	Center for Evidence-Based Corrections, 2009
COMPAS	.67	515 California parolees	Return to prison	Zhang, Farabee, & Roberts, 2007
COMPAS	.70	25,009 California parolees	Any arrest	Farabee et al. (2010)
Criminal History Computation	.68	28,519 Federal offenders	Re-conviction, re-arrests without disposition available, supervision revocation	U.S. Sentencing Commission (2004)
LSI-R	.66	22,533 Washington State offenders	Any conviction	Barnoski and Aos, 2003
Washington State	.74	51,648 Washington State offenders	Felony conviction	Barnoski and Drake, 2007

RESULTS

In this section, we present the percentage distribution of the CSRA items along with the three-year felony arrest rates of the full sample (Table 5). We follow this with a discussion of recidivism by the five risk groups, using the validation sample only (Figures 1 and 2). We then present more detailed information on both violent felony and misdemeanor arrest recidivism (Tables 6 and 7). Finally, we discuss analyses conducted on specific subgroups defined by gender, ethnicity, offense, and release status using the validation sample (Table 8).

Percentage Distribution of CSRA Items and Follow-Up Recidivism Rates – Full Sample

The percentage distribution of the felony items in the CSRA for the full sample is presented in Table 5, along with the percent of offenders with an arrest for a felony, a drug felony, a property felony, and a violent felony, for each level of each item[7]. According to these results, the majority of offenders in the sample were males (90.4%). Of these males, 70.6% had a felony arrest in three years: 29.3% had a drug felony arrest; 40.1% had a property felony arrest; and 23.9% had a violent felony arrest. Of the females in the sample, 63.4% were arrested for a felony in three years: 27.7% were arrested for a drug felony conviction; 31.3% were arrested for a property felony; and 11.4% were arrested for a violent felony.

The results show that women comprised only 9.7% of the sample and they were 7.2% less likely to have a felony arrest, 1.6% less likely to have a felony drug arrest, 8.8% less likely to have a felony property arrest, and 12.5% less likely to have a violent felony arrest. The percentage of offenders with any felony, a drug felony, or property felony arrest was lower for offenders with prior felony sex offenses than those without such priors. The percent of offenders with arrests for any felony, a property felony or a violent felony increased as the number of prior felony assault convictions increased. As Table 5 shows, offender age and total number of supervision violations show the greatest influence on recidivism outcomes. Younger offenders have much higher recidivism rates than older offenders. Felony recidivism rates are at least 50 percent higher for those offenders with five or more prior supervision violations, compared to those with none.

Table 5: Percentage Distribution of CSRA Items and 3-Year Felony Arrest Recidivism Rates, Full Sample

	Value	Percentage Distribution of Sample	Felony	Drug Felony	Property Felony	Violent Felony
Demographics						
1. Age at time of release						
60+	0	1.0%	40.7%	12.7%	15.9%	7.3%
50-59	1	6.6%	57.9%	21.6%	23.8%	11.6%
40-49	2	27.0%	68.0%	29.5%	32.6%	16.6%
30-39	3	36.4%	71.2%	31.5%	40.2%	22.7%
20-29	4	28.9%	73.7%	28.3%	48.4%	31.2%
18-19	5	0.1%	73.5%	17.7%	45.6%	29.4%
2. Gender						
Female	0	9.7%	63.4%	27.7%	31.3%	11.4%
Male	1	90.4%	70.6%	29.3%	40.1%	23.9%
Total Felony Convictions						
3. Felony Convictions						
None	0	2.4%	63.5%	18.5%	36.9%	24.3%
First	1	20.5%	57.7%	19.5%	31.7%	21.0%
Second	2	21.2%	66.0%	26.0%	36.5%	22.9%
Third	3	17.4%	70.9%	29.1%	39.7%	23.3%
Fourth	4	12.9%	74.1%	33.3%	41.3%	23.4%
Fifth +	5	25.7%	80.6%	38.5%	46.3%	22.9%
Total Adult Felony Record						
4. Felony homicide offense: murder/manslaughter						
None	0	98.1%	70.2%	29.4%	39.4%	22.7%
One +	1	1.9%	55.6%	19.5%	29.5%	22.1%
5. Felony sex offense						
None	0	93.6%	70.4%	30.1%	40.0%	22.9%
One	1	5.6%	61.9%	16.1%	28.2%	18.4%
Two +	2	0.7%	60.6%	11.1%	29.9%	20.9%
6. Felony violent property conviction						
None	0	78.7%	69.1%	29.3%	38.9%	22.3%
One	1	17.8%	72.3%	28.9%	40.6%	24.2%
Two +	2	3.5%	75.2%	28.3%	40.5%	22.9%
7. Felony assault – not domestic violence						
None	0	83.7%	69.6%	29.9%	38.7%	21.3%
One	1	13.9%	70.9%	26.0%	41.6%	28.6%
Two	2	2.0%	73.5%	22.2%	44.3%	34.0%
Three +	3	0.4%	74.0%	22.5%	49.0%	41.3%
8. Felony domestic violence assault						
None	0	89.5%	69.9%	29.7%	39.2%	22.1%
One	1	8.3%	69.3%	25.4%	39.3%	26.5%
Two +	2	2.3%	72.7%	20.8%	41.5%	31.7%

(continued on next page)

Table 5 (Cont'd): Percentage Distribution of CSRA Items and 3-Year Felony Arrest Recidivism Rates, Full Sample

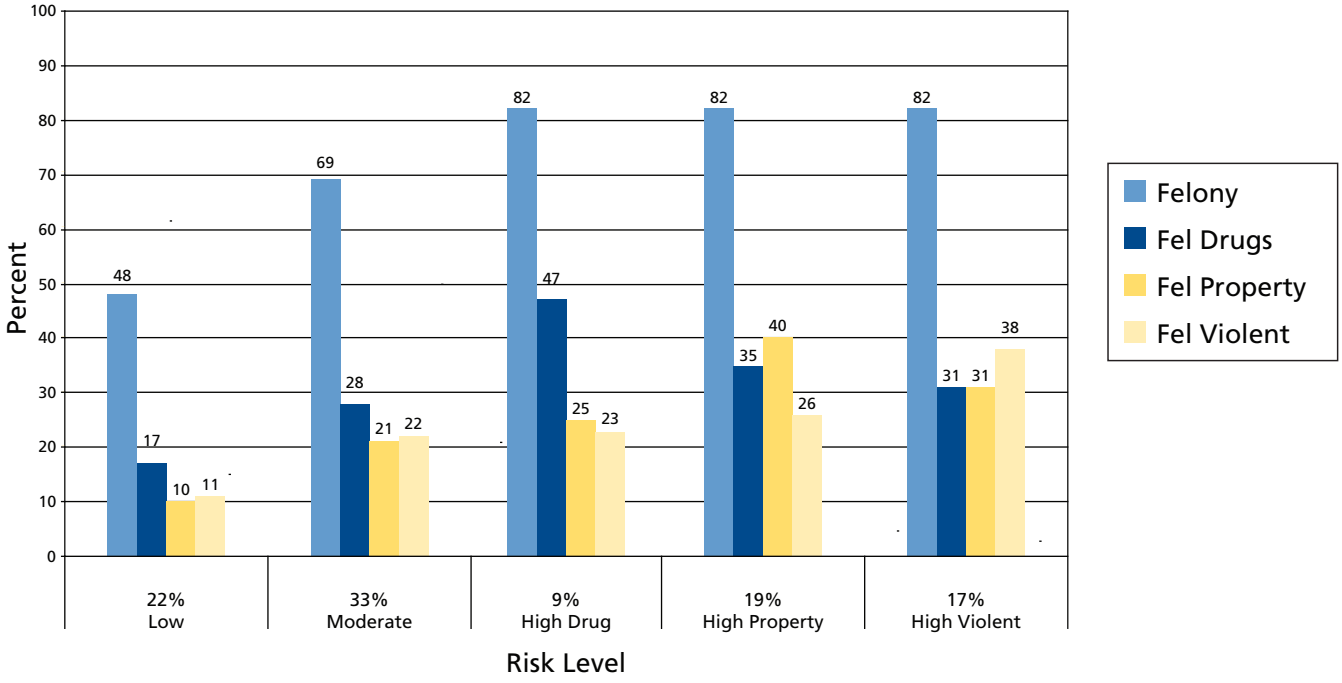
	Value	Percentage Distribution of Sample	Felony	Drug Felony	Property Felony	Violent Felony
Total Adult Felony Record (Cont'd)						
9. Felony weapon offense						
None	0	86.5%	69.0%	28.4%	38.5%	21.6%
One	1	11.4%	75.1%	33.6%	43.0%	28.5%
Two +	2	2.1%	77.0%	36.6%	46.1%	33.4%
10. Felony property offense						
None	0	44.3%	62.7%	26.2%	31.3%	22.1%
One	1	23.4%	72.3%	30.3%	40.3%	23.9%
Two	2	13.4%	75.9%	31.5%	46.4%	23.7%
Three	3	7.8%	78.3%	33.5%	47.8%	22.4%
Four	4	4.4%	79.1%	32.7%	52.5%	22.6%
Five +	5	6.8%	81.2%	32.6%	54.0%	20.3%
11. Felony drug offense						
None	0	46.3%	66.1%	19.3%	41.0%	24.5%
One	1	26.2%	70.6%	31.3%	38.8%	22.2%
Two	2	14.7%	72.9%	37.9%	36.7%	20.2%
Three +	3	12.8%	78.6%	50.2%	36.4%	19.8%
12. Felony escape						
None	0	97.5%	69.7%	29.0%	39.1%	22.7%
One +	1	2.5%	77.9%	35.3%	45.3%	22.9%
Total Sentence/Supervision Violations						
13. Total Sentence/supervision violations						
None	0	33.1%	55.6%	20.4%	30.4%	17.6%
One	1	17.1%	69.1%	26.5%	38.2%	22.9%
Two	2	12.9%	74.1%	31.2%	42.2%	25.1%
Three	3	10.2%	77.7%	33.5%	44.9%	26.3%
Four	4	7.5%	79.3%	35.2%	44.7%	25.3%
Five +	5	19.1%	84.6%	40.7%	48.2%	26.6%

Recidivism by Risk Groups – Validation Sample

The accuracy of the CSRA scale and its utility for predicting recidivism rates by each of the five risk groups are displayed in Figure 1, which presents the three-year "any" felony arrest recidivism rates for each of the risk groups, and in Figure 2, which displays the "most serious" felony arrest recidivism during the three-year follow-up timeframe. If the tool were 100% accurate in prediction, there would be no arrest recidivism for offenders in the low risk group, but this was not the case. We present the percentage of offenders in each of the five risk groups with any felony arrest during the three-year follow-up period, along with subgroups with any felony arrest for a violent, property, or drug offense.

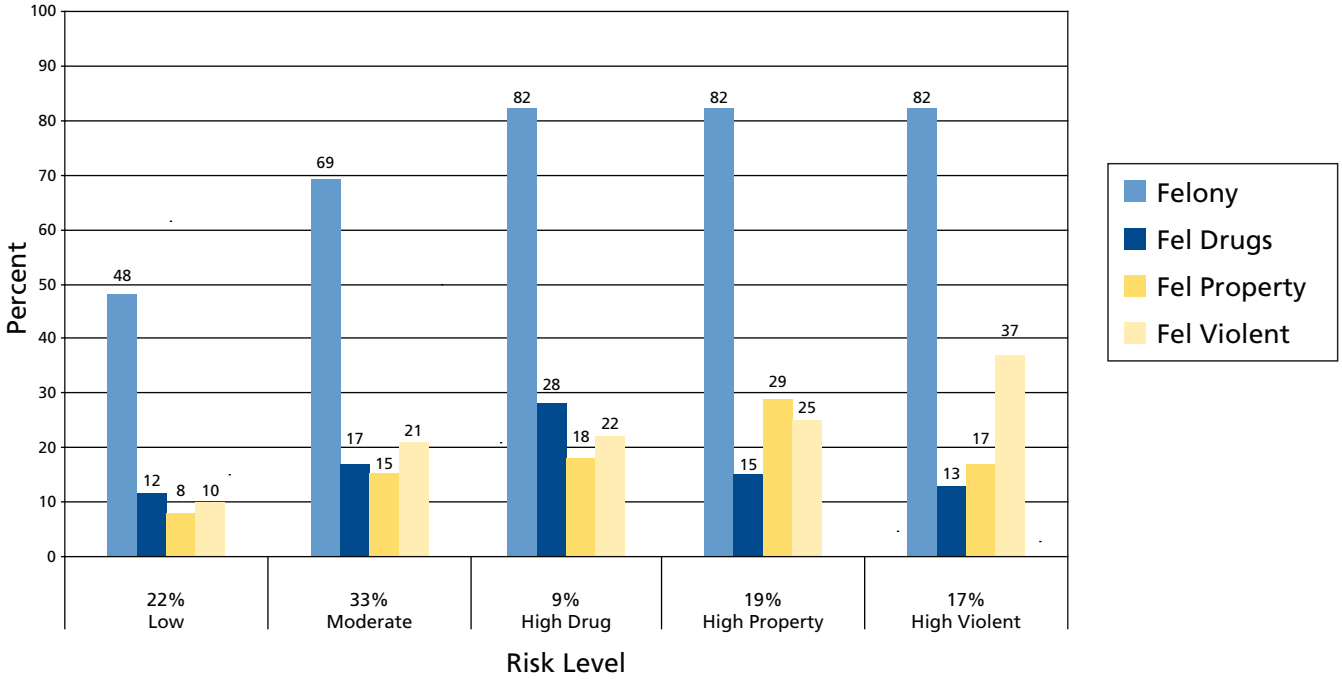
In Figure 1, the categories are not mutually exclusive within a risk level; individuals can appear in more than one offense category and can be counted in the felony drug or property categories, as well as the violent category if their most serious arrest offense for a given arrest cycle is classified by the category. For instance, within the Low Risk group, 48% of offenders were arrested for a felony within the three-year follow-up timeframe; 17% were arrested for a drug felony, 10% were arrested for a property felony, and 11% were arrested for a violent felony. Within the High Violent Risk group, 82% of offenders were arrested for a felony within the follow-up period; 31% were arrested for a drug felony, 31% for a property felony, and 38% were arrested for a violent felony offense.

Figure 1: Recidivism Rates by Risk Level and Offense Type – All Arrests



In Figure 2, only the "most serious" arrest for each offender during the three-year follow-up period is included. For instance, if a parolee were arrested for a violent crime on one date during the three-year follow-up and a property crime on another date, he or she would appear only in the violent crime category. Therefore, while the overall pattern of recidivism is fairly consistent between the two Figures, it is evident that the recidivism rates for property, drug, and violent offenses are slightly lower in Figure 2 than in Figure 1, since violent crimes are classified as the most serious.

Figure 2: Recidivism Rates by Risk Level and Offense Type – Most Serious Arrest



Each figure shows that the CSRA discriminates between high and low risk; approximately three and a half times as many offenders in the High Violent Risk group were arrested for a violent offense, compared with those in the Low Risk group. As expected, due to the way the high risk groups were constructed, the three High Risk categories had the highest overall recidivism rates. Risk groups were correlated with offenses: the High Drug Risk group has the highest percentage of offenders arrested for felony drug offenses; the High Property Risk group had the highest percentage of offenders arrested for a felony property offense; and the High Violent Risk group had the highest percent of offenders arrested for a violent felony offense.

Recidivism by Risk Group and Type – Full Sample

Details on Violent felony and misdemeanor arrest recidivism by risk category for the full sample are depicted in Tables 6 and 7, respectively. The categories in these tables are not mutually exclusive. Additionally, offenders with misdemeanor convictions may also have been arrested for felonies. Just over 10 percent of Low Risk offenders were arrested for any violent felony, 0.3% arrested for homicide or manslaughter, with 2.0% for a violent property felony, 6.4% for assault, 1.1% for a sex offense, and 2.1% for a weapon-related felony. Almost 40 percent of the High Violent risk group were arrested for any violent felony; 1.9% for homicide or manslaughter; 9.6% for a violent property felony; 23.2% for an assault; 1.7% for a sex offense, and 12.1% for a weapons-related felony (Table 5). For the offenders who were arrested for a misdemeanor during the three-year follow-up period, the highest percentages of arrests were for drug offenses across all of the risk groups. In the Low Risk group, 16.0% were arrested for drug offenses, compared to 26.8% in the Moderate Risk group, 44.2% in the High Drug Risk group, 36.7% in the High Property Risk group, and 34.6% in the High Violent Risk group.

Table 6: Violent Felony Arrest Recidivism by CSRA Risk Group and Type, Full Sample

	Low	Moderate	High Drug	High Property	High Violent
Violent	10.4%	21.8%	22.0%	26.0%	38.2%
Homicide/Manslaughter	0.3%	1.0%	0.7%	1.0%	1.9%
Violent Property*	2.0%	5.4%	6.0%	8.2%	9.6%
Assault	6.4%	12.0%	11.8%	13.6%	23.2%
Sex Offenses	1.1%	1.3%	1.1%	1.1%	1.7%
Weapons	2.1%	6.3%	6.4%	7.5%	12.1%

*Violent property offenses include robbery, kidnapping, extortion, first degree burglary and first degree arson.

Table 7: Misdemeanor Arrest Recidivism by CSRA Risk Group and Type, Full Sample

	Low	Moderate	High Drug	High Property	High Violent
Assault – Non Domestic Violence	5.5%	12.0%	14.6%	15.6%	24.1%
Assault – Domestic Violence	0.6%	1.0%	0.9%	1.0%	2.0%
Sex Offenses	1.5%	1.8%	3.6%	1.9%	1.9%
Domestic Violence-Related Property Crime	0.4%	0.7%	0.8%	0.7%	1.7%
Weapons	0.7%	1.6%	1.9%	2.1%	3.5%
Property	8.5%	14.3%	18.4%	21.6%	20.9%
Drug	16.0%	26.8%	44.2%	36.7%	34.6%
Escape	0.0%	0.1%	0.1%	0.1%	0.1%
Alcohol	6.8%	8.4%	7.4%	7.7%	9.8%

Subgroup Analyses – Validation Sample

An important concern for risk assessment instruments is their utility for predicting recidivism for subgroups. For instance, an ideal tool would be equally predictive across genders and ethnicities. We tested the predictive validity of the CSRA for subgroups defined by gender, ethnicity, offender type and status at release. The AUC values for convictions for the validation

sample subgroups are presented in Table 8. Though the lowest of these AUCs is .65 and the highest is .79, most of the values are in the upper 60s, demonstrating that the predictive value for each subgroup is in the range of the overall AUC. However, the AUCs are slightly lower for females for felony, felony drug, and felony violent arrest. Additionally, though the AUCs do not vary greatly by ethnicity, the values for offenders in the black/African American category are the lowest for two of the four listed outcome measures: felony arrest and felony property arrest. For offenders whose prior prison term was for a sex felony, the AUCs were highest for any felony arrest and felony property arrest outcome measures. For those convicted of drug felonies, the AUCs were the highest for any felony and felony violent arrest outcomes. For violent non-sex felony offenders, the AUCs were the highest for the felony drug arrest outcome measure.

Table 8: AUCs for Arrests – Subgroups, Validation Sample

Subgroup	Any Felony	Felony Drug	Felony Property	Felony Violent
Gender				
Males	.697	.683	.670	.656
Females	.669	.667	.672	.640
Ethnicity				
White	.693	.682	.684	.672
Black	.680	.678	.652	.650
Hispanic	.698	.663	.680	.681
Other	.700	.739	.677	.649
Offense Type				
Drug Felony	.696	.666	.680	.694
Property Felony	.666	.653	.651	.664
Sex Felony	.743	.659	.693	.673
Violent Non-Sex Felony	.688	.786	.645	.639
Release Status				
First release	.676	.669	.687	.683
Later release	.649	.665	.647	.648

DISCUSSION

The development and validation of the CSRA instrument is a promising step for corrections in California. This automated risk assessment system has a great deal of utility for standardizing risk predictions, and it represents the first time the California Department of Corrections and Rehabilitation has utilized a risk instrument on such a large scale. This system for automated risk assessment, due to its automation, is reliable and administratively efficient, which are key factors in the implementation of any useful risk prediction system (Austin 2006)[8]. Overall, with an AUC of .70 for the any felony category, an AUC of .68 for the property/violent felony category, and an AUC of .67 for the violent felony category, results indicate that the CSRA instrument is as accurate or better than other risk prediction instruments that incorporate dynamic factors. This remains fairly consistent across each of the subgroups in the analysis.

Limitations

There are some limitations to the CSRA instrument. One concern is that this tool does not contain juvenile record measures. Researchers have found that patterns of juvenile criminal activity are highly correlated with future adult offending; therefore, the inclusion of juvenile record items should increase the predictive accuracy of any instrument (Paternoster, Brame et al. 2001; Piquero and Buka 2002; Austin 2006; Barnoski and Drake 2007). The CSRA tool does not include juvenile criminal history measures because these data are not available for the vast majority of offenders from the California Department of Justice. It is possible that this information will become more accessible in the future; however, without these data, the CSRA has AUCs similar to other risk assessment instruments being used in the field, although not as high as the original tool developed and used in Washington State.

It is also vital to consider the issue of false positives prediction with the development of any risk assessment instrument. As discussed, of the 48% of offenders in the Low Risk category who were convicted of a felony offense, 11% were for violent felonies. If the instrument were 100% accurate in prediction none of the Low Risk offenders would be arrested for violent crimes.

However, this percentage (11%) is a fraction of the offenders in the High Violent category who were arrested for a violent felony (38%). All other risk groups also had higher percentages of arrests for violent felonies than the Low Risk group, showing the ability of the CSRA to discriminate between predicted low and high risk individuals.

Another limitation to the CSRA instrument specifically, as with all risk assessment tools, is that there is little utility in the careful development and implementation of these tools without the provision of appropriate treatment. The principles of evidence-based corrections acknowledge the need to identify risk levels and offender treatment needs appropriately if rehabilitation efforts are truly to be effective (Gendreau 1996; Bonta 2002; Andrews and Dowden 2006; Austin 2006). Risk assessment is only part of the equation; it must be combined with appropriate tools that assess offenders' needs and services targeted to those specific needs.

Additionally, within the actuarial assessment framework there is a difference between determining risk levels in order to identify appropriate supervision and rehabilitative services and determining offender risk levels in order to ascertain likelihood of offender recidivism. The focus of the latter is on failure and fits better within an incapacitation model rather than a rehabilitative model. This issue is especially prominent with the female offender population. CDCR's female offender population tends to have lower risk scores on the CSRA tool than their male counterparts[9]. Because CDCR's primary focus is higher risk offenders, continued use of the CSRA could possibly lead to decreased female program provision, though their programming needs are not necessarily lower than males'. This issue is being addressed to some extent: CDCR is utilizing a separate tool (COMPAS instruments for male and female offenders) to assess offender needs.

Lastly, there is a philosophical issue to consider regarding the incorporation of a risk classification system: will increasing efforts to predict future offending result in increasing criminal behavior? Some research indicates that stigmatization can occur as part of the process of targeting higher risk offenders; it is possible that classifying people as more dangerous or as more likely to recidivate might cause them to live up to this level of dangerousness (Harcourt 2007).

Policy Applications

The development and validation of the CSRA instrument with the California corrections population reflects CDCR's overall movement from an offense-based approach toward one that considers risk (California Department of Corrections 2007). This new framework focuses on reducing recidivism rather than increasing incapacitation efforts by utilizing evidence-based practices to deliver rehabilitation programs that target dynamic risks/criminogenic needs (California Department of Corrections 2007; California Department of Corrections 2007; California Department of Corrections 2009). One of the ways CDCR is going about this is by using the evidence-based practice of assessing risk and providing higher risk offenders with appropriate levels of supervision, treatment, and rehabilitative services to limit opportunities and tendencies to offend. Incorporating risk into programming and policy decisions is a proven strategy for reducing recidivism.

As discussed above, CDCR is utilizing the CSRA in several key initiatives. In response to prison overcrowding, California's Expert Three-Judge Court ordered in 2009 that CDCR devise a plan to reduce its population by 137.5% within two years (Coleman v. Schwarzenegger, 2009). Several proposed reforms were enacted into law as part of Senate Bill X3-18 in January 2010. One reform effort that targets parole requires the Department to utilize a standardized instrument (the PVDMI) to determine the appropriate level of sanctioning for parole violators. Parole agents utilize the PVDMI to rate the severity of violations along with parolee risk level, as assessed by the CSRA score, to determine the appropriate response to violations of parole. Evaluation of this tool on offender recidivism and returns to custody is currently being conducted by the Center for Evidence-Based Corrections at the University of California, Irvine.

The CSRA was also used by CDCR in screening eligible offenders for a non-revocable parole program. This initiative, also mandated by SB-X18, was part of a set of reforms that CDCR undertook in early 2010 to reduce returns to custody and improve use of state resources. Offenders selected for this program were deemed at low or moderate risk to reoffend based on the CSRA score, in addition to other criteria, including non-violent, non-serious, non-sex offender, and non-gang member status (Grattet, Petersilia et al. 2008). This change was designed to allow CDCR to focus its supervision and resources on the higher risk offenders, who would be supervised on smaller caseloads, with a focus on providing services and supervision based on criminogenic needs. Although non-revocable parole will be phased out with California's realignment[10] in which lower level offenders will now be housed at the local level, ongoing studies will be able to test how well a risk-based approach to supervision for low-level offenders impacts recidivism.

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ENDNOTES

1 The following items are included in the Wisconsin tool: addresses changes, time employed, alcohol and drug use, attitude, age at first offense, prior probation/parole and revocations, prior felonies, and conviction characteristics.

2 This program, known as Non-revocable parole will be phased out under California's recent realignment legislation in which lower level offenders serve time locally, rather than in state prisons.

3 Following the procedure used by Washington State, the CEBC included the most serious conviction charge for each offender based on the California Penal Code.

4 The CEBC also ran OLS regressions on "conviction" within the same time period. This article focuses on arrest. CDCR's uses the conviction version of the CSRA. Results for conviction are available from the University of California, Irvine's Center for Evidence-Based Corrections at http://ucicorrections.seweb.uci.edu/pubs#reports.

5 Additional discussion of the weights and their development is contained in the Turner et al. Report, 2009, available from the Center for Evidence-Based Corrections at http://ucicorrections.seweb.uci.edu/pubs#reports.

6 This is based on a policy decision and is not intrinsic to the tool.

7 Misdemeanor findings are contained in the Turner et al. Report, 2009, available from the Center for Evidence-Based Corrections at http://ucicorrections.seweb.uci.edu/pubs#reports.

8 Approximately 5-10 percent of offenders do not have automated criminal history records; staff must complete a CSRA for these offenders manually, by examining hard copy rap sheets.

9 This finding for females is not unique to the California sample. See findings from Latessa et al. (2009).

10 Enacted through Assembly Bill (AB) 109 (Stats 2011, ch 15, Apr. 4, 2011);Assembly Bill (AB) 117 (Stats 2011, ch 39, June 30, 2011); Assembly Bill (AB) 118 (Stats 2011, ch 40, Jun. 30, 2011); Assembly Bill (AB) 116 (Stats. 2011, ch 136, July 27, 2011) and Assembly Bill, First Extra Session (ABX1) 17 (Stats 2011, 1st Extra Sess, ch 12).