Interagency Council on Intermediate Sanctions

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Timothy Wong, ICIS Research Analyst
Department of the Attorney General

State of Hawaii, 2008 – 2016 Reporting Period

Validation of the LSI-R and ASUS Criminogenic Risk Assessment Instruments

This study report is an update of a previously published validation study[1] of the Level of Services – Revised (LSI-R) and Alcohol Substance Use Survey (ASUS) published in June 2013. This update is based on a compilation of adult offender risk assessment data from the Cyzap database, and offender arrest/conviction data from the Criminal Justice Information System (CJIS) for the reporting years of 2008-2016. The report provides detailed analyses of offenders from the Judiciary's Probation Services, Hawaii Paroling Authority, and the Department of Public Safety, who were administered the LSI-R and ASUS. These assessment instruments measure criminogenic and alcohol/drug dependency risk levels, respectively. All offenders are classified by risk levels, which provide valuable information needed for case supervision purposes and determining treatment levels. Both assessment instruments reflect risk and need principles established in evidence-based practices, and necessitate validation, e.g., ascertainment of whether they accurately predict recidivism, and if they correctly classify offenders into distinct risk groups. Recidivism is an important outcome measure, since it distinguishes offenders who have re-offended from those who remained free of crime or technical violations, over a three-year period.

This report presents information on recidivism rates for probationers, parolees, and maximum-term released offenders in the State of Hawaii. It also assesses a variety of offender conditions, including criminogenic dimensions, criminal offenses committed, and socio-demographic variables. The major objective of this report is to assist Interagency Council on Intermediate Sanctions (ICIS) agencies in evaluating longer-term outcomes, and documenting change in criminogenic risk patterns. It also provides information on the ways in which various predictive indicators play important roles in identifying risk assessment patterns.

The statistical charts and tables depicted herein present data relating to the following areas:

I. Recidivism Analysis – Agency, County, and Social Demographics
II. Change in LSI-R and ASUS Criminogenic Risk after Reassessment
III. LSI-R and ASUS Scores and Sub-Domains between Recidivists and Non-Recidivists
IV. Analysis of LSI-R and ASUS Predictive Validity
V. Analysis of Initial and Most Recent LSI-R and ASUS Assessments
VI. Offender Recidivism Rates, by Recommended Treatment Level Cut-off Values
VII. LSI-R and ASUS Tables of Predictive and Correlational Analysis
VIII. Summary and Technical Notes

[1] *Validation of LSI-R and ASUS Criminogenic Risk Instruments, State of Hawaii, 2009-2011 Reporting Period* (http://icis.hawaii.gov/)

Methodology: The recidivism database includes an unduplicated count of 16,880 offenders, with at least one LSI-R and ASUS assessment administered from 2008 through 2016. Each offender record contains data fields that incorporate initial and most recent LSI-R and ASUS assessment information, criminal arrests, and types of charged offenses. Additionally, calculated fields were added to the database to measure change in both the LSI-R total and protective scores, and criminogenic sub-domain percentiles. For the purpose of this report, recidivism is defined as the first (if any) rearrest, revocation, or technical violation that occurs from the onset of probation supervision or release to parole, tracked over a three-year period.

For further information contact:
Timothy Wong, Research and Statistics Branch
Crime Prevention and Justice Assistance Division
Department of the Attorney General
Email: timothy.i.wong@hawaii.gov

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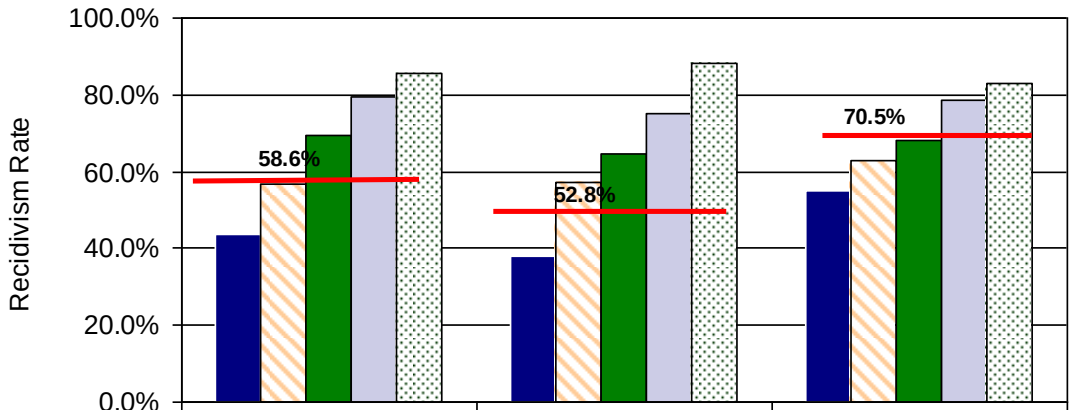
<hawaii.gov/icis>

I. Recidivism Analysis – Agency, County, and Social Demographics

Figure 1:
Recidivism Rates for Current LSI-R Risk Levels, by Agency



	Probation (n=10,427)	Parole (n=4,853)	Maximum-Term Released Prisoners (n=1,600)
Administrative (LSI-R<19) (n=8,117)	43.6% (n=5,176)	37.8% (n=2,565)	55.1% (n=376)
Low (LSI-R 19-20) (n=982)	56.9% (n=620)	57.2% (n=278)	63.1% (n=84)
Medium (LSI-R 21-25) (n=3,304)	69.4% (n=2,048)	64.5% (n=919)	68.0% (n=337)
High (LSI-R 26-35) (n=3,725)	79.5% (n=2,160)	74.9% (n=928)	78.6% (n=637)
Surveillance LSI-R >36 (n=752)	85.8% (n=423)	88.3% (n=163)	83.1% (n=166)
	ϕ=.325, p<.001	ϕ=.336, p<.001	ϕ=.223, p<.001

Φ= Strength of association between variables
Note: The differences in recidivism rates, by individual Agency is statistically significant (p<.001).

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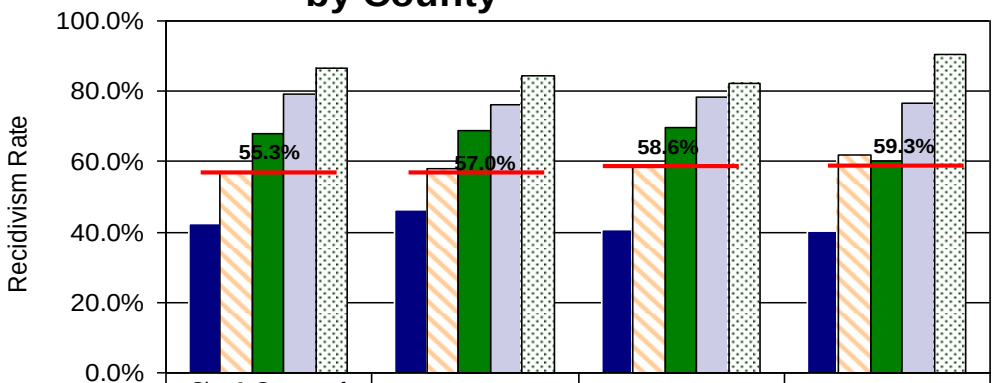
There are statistically significant differences in recidivism rates, by risk levels, for probationers, parolees, and maximum-term released prisoners.

Figure 1 depicts individual agency offender recidivism rates, by LSI-R risk levels. Maximum-term released prisoners have the highest recidivism rate (70.5%), as compared to probationers (58.6%), and parolees (52.8%). Recidivism rates increase significantly (p<.001) by LSI-R risk levels for all individual agencies.

Figure 2:
Recidivism Rates for Current LSI-R Risk Levels, by County



	City & County of Honolulu (n=11,025)	Hawaii County (n=2,455)	Maui County (n=2,498)	Kauai County (n=862)
*Administrative (LSI-R<19) (n=8,091)	42.3% (n=5,221)	46.5% (n=1,206)	40.7% (n=1,235)	40.1% (n=429)
Low (LSI-R 19-20) (n=986)	57.2% (n=635)	58.1% (n=148)	58.3% (n=156)	61.7% (n=47)
Medium (LSI-R 21-25) (n=3,278)	68.1% (n=2,178)	69.0% (n=497)	69.5% (n=462)	60.3% (n=141)
High (LSI-R 26-35) (n=3,733)	79.2% (n=2,467)	76.0% (n=509)	78.2% (n=533)	76.8% (n=224)
Surveillance LSI-R >36 (n=752)	86.6% (n=524)	84.2% (n=95)	82.1% (n=112)	90.5% (n=21)
*ϕ(8,091)=.036, p<.05	ϕ=.337, p<.001	ϕ=.274, p<.001	ϕ=.341, p<.001	ϕ=.331, p<.001

Φ= Strength of association between variables

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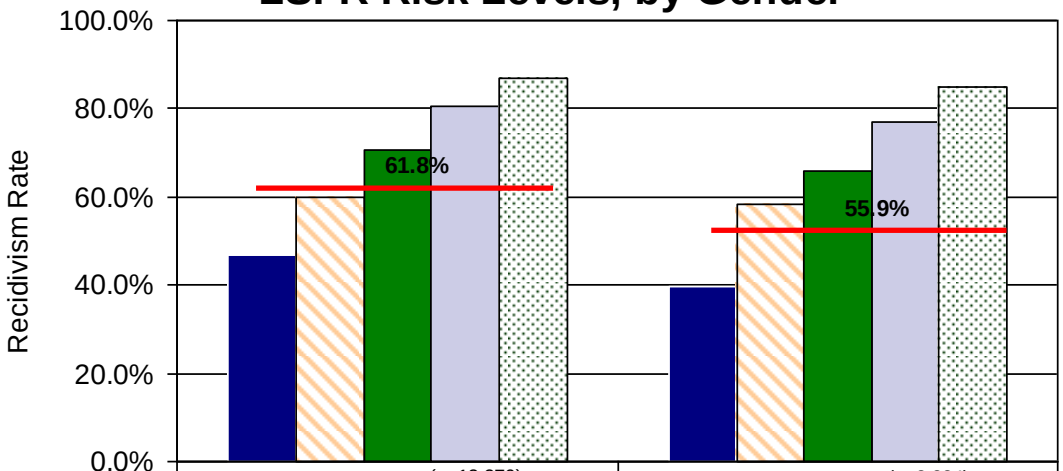
There are statistically significant differences in county-level recidivism rates for offenders who are classified at the Administrative level.

Figure 2 reveals county-level offender recidivism rates, by LSI-R risk levels. There are statistically significant differences in recidivism rates, based on varying offender risk levels in the City & County of Honolulu, and in the counties of Hawaii, Maui, and Kauai.

Figure 3:
Recidivism Rates for Current LSI-R Risk Levels, by Gender



	Male (n=13,279)	Female (n=2,834)
*Administrative (LSI-R<19) (n=7,600)	46.7% (n=6,197)	39.8% (n=1,403)
Low (LSI-R 19-20) (n=946)	59.9% (n=775)	58.5% (n=171)
**Medium (LSI-R 21-25) (n=3,179)	70.8% (n=2,686)	65.7% (n=493)
**High (LSI-R 26-35) (n=3,654)	80.6% (n=3,039)	77.1% (n=615)
Surveillance (LSI-R >36) (n=734)	87.1% (n=582)	84.9% (n=152)
* p<.001; **p<.05	ϕ=.314, p<.001	ϕ=.342, p<.001

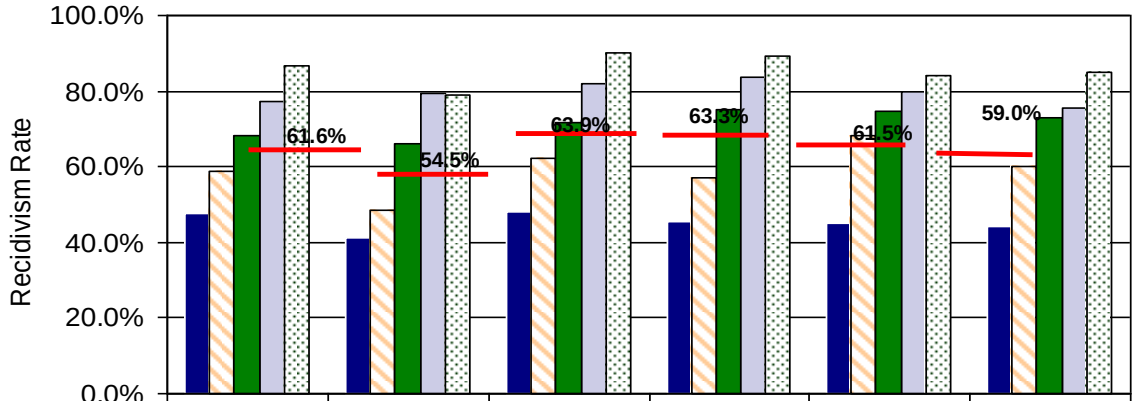
Φ= Strength of association between variables

Note: Males have overall, without regard to risk levels, statistically significant higher recidivism rates than females at (ϕ=.046, p<.001).

There are statistically significant differences in recidivism rates between males and females.

Figure 3 shows that male offenders recidivated at a significantly (p<.001) higher rate (61.8%) than did female offenders (55.9%), due to statistically significant differences in recidivism rates between males and females at the Administrative (p<.001), Medium (p<.05), and High (p<.05) risk levels.

Figure 4:
Recidivism Rates for Current LSI-R Risk Levels, by Racial/Ethnic Group



	Caucasian (n=2,660)	Filipino (n=1,577)	Hawn/Pt-Hawn (n=4,911)	Japanese (n=1,975)	Other Pacific Islanders (n=626)	Other Asians (n=919)
*Administrative (LSI-R<19) (n=7,684)	47.8%	41.2%	48.2%	45.7%	45.2%	44.3%
Low (LSI-R 19-20) (n=968)	59.0%	48.5%	62.3%	57.0%	68.2%	60.0%
**Medium (LSI-R 21-25) (n=3,237)	68.3%	66.3%	71.7%	75.0%	74.5%	72.8%
High (LSI-R 26-35) (n=3,709)	77.3%	79.3%	82.1%	83.5%	80.0%	75.4%
Surveillance LSI-R >36 (n=751)	86.5%	78.8%	90.1%	89.2%	84.0%	85.0%
* p<.01, **p<.05	ϕ=.280, p<.001	ϕ=.321, p<.001	ϕ=.319, p<.001	ϕ=.362, p<.001	ϕ=.324, p<.001	ϕ=.327, p<.001

Offenders by Individual Race Groups, without regard to risk levels, have statistically significant differences in recidivism rates: ϕ(16,349)=.088, p<.001)

Φ= Strength of association between variables

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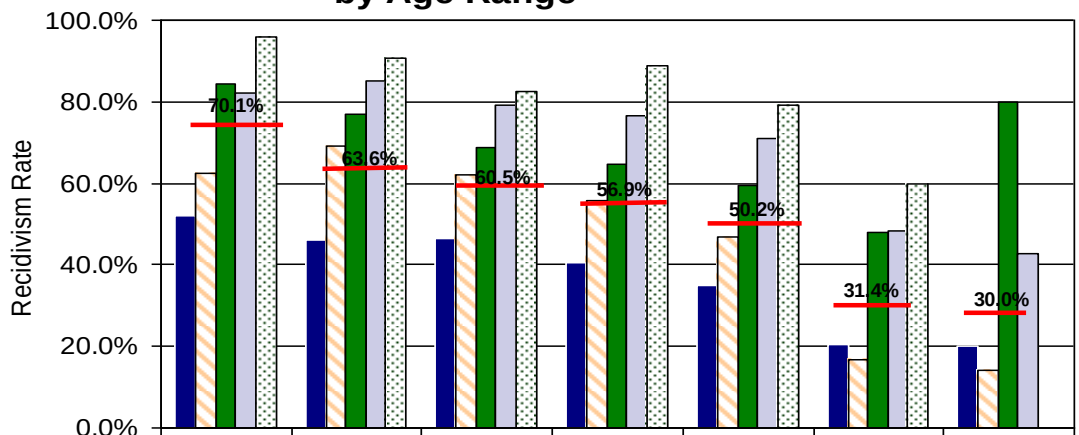
Note: Hawaiian/Part-Hawaiian offenders have statistically significant higher recidivism rates than the other race groups(ϕ=.088, p<.001).

There are statistically significant differences in recidivism rates between individual racial/ethnic groups.

Figure 4 examines the recidivism rates of offenders, by racial/ethnic composition and risk levels. Hawaiian/part-Hawaiian offenders have significantly higher recidivism rates (63.9%), as compared to other individual race. At the Administrative and Medium risk levels, Hawaiian/part-Hawaiian offenders (48.2%) and Japanese (75.0%) have, respectively, the highest recidivism rates across all ethnicities.

Figure 5:
Recidivism Rates for Current LSI-R Risk Levels, by Age Range



	<20 yrs old (n=338)	20-29 yrs old (n=4,345)	30-39 yrs old (n=5,152)	40-49 yrs old (n=4,404)	50-59 yrs old (n=2,232)	60-69 yrs old (n=459)	70+ yrs old (n=70)
*Administrative (LSI-R<19) (n=8,152)	52.1% (n=142)	46.0% (n=2,163)	46.5% (n=2,486)	40.5% (n=2,022)	34.9% (n=1,042)	20.6% (n=252)	20.0% (n=45)
*Low (LSI-R 19-20) (n=995)	62.5% (n=16)	69.2% (n=211)	61.9% (n=312)	55.6% (n=248)	46.8% (n=171)	16.7% (n=30)	14.3% (n=7)
*Medium (LSI-R 21-25) (n=3,317)	84.4% (n=77)	77.0% (n=791)	68.8% (n=959)	64.6% (n=914)	59.6% (n=470)	47.9% (n=96)	80.0% (n=10)
*High (LSI-R 26-35) (n=3,778)	82.1% (n=78)	85.0% (n=984)	79.0% (n=1,161)	76.5% (n=1,014)	70.9% (n=468)	48.5% (n=66)	42.9% (n=7)
*Surveillance LSI-R >36 (n=758)	96.0% (n=25)	90.8% (n=196)	82.5% (n=234)	88.8% (n=206)	79.0% (n=81)	60.0% (n=15)	0.0% (n=1)
* p<.001	ϕ=.309, p<.001	ϕ=.375, p<.001	ϕ=.294, p<.001	ϕ=.333, p<.001	ϕ=.315, p<.001	ϕ=.307, p<.001	ϕ=.476, p<.01

ϕ= Strength of association betw een variables.

Note: Younger age ranges have statistically significant higher recidivism rates than the older age ranges (ϕ=.134, p<.001).

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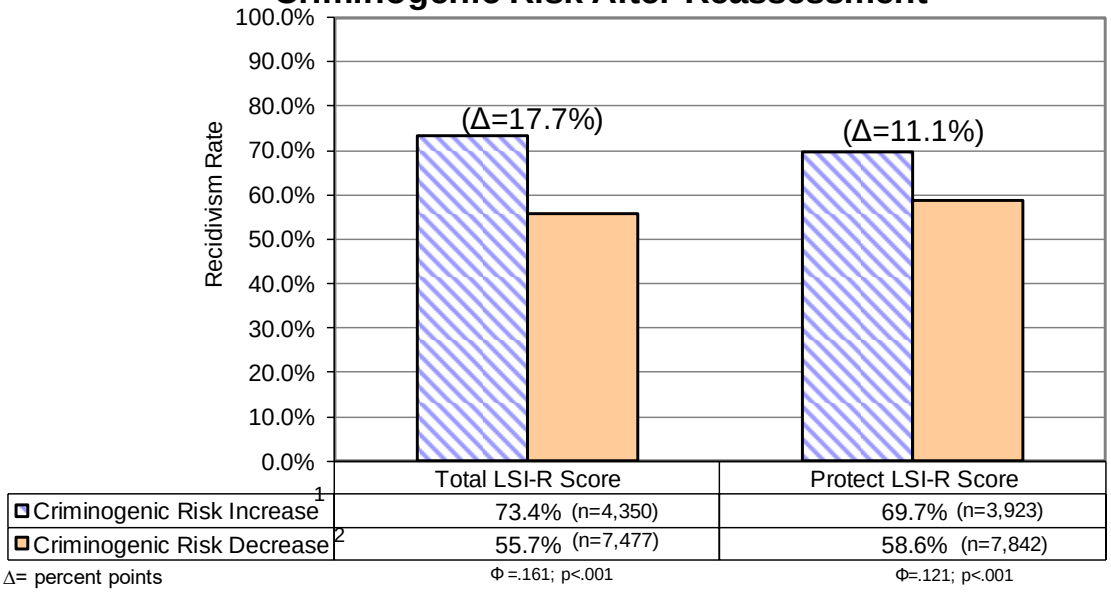
There are statistically significant differences in recidivism rates, between individual age groups.

Figure 5 depicts recidivism rates, by offender age range and risk levels. Offenders under the age of twenty have significantly higher recidivism rates (70.1%) as compared to older age groups. There are also statistically significant (p<.001) differences in recidivism rates, by varying risk levels, for each age range group.

II. Change in LSI-R and ASUS Criminogenic Risk after Reassessment

Figure 6:
Offender Recidivism Rates, by LSI-R Total and Protect Scores for Offenders at Increasing or Decreasing Criminogenic Risk After Reassessment



	Total LSI-R Score	Protect LSI-R Score
Criminogenic Risk Increase[1]	73.4% (n=4,350)	69.7% (n=3,923)
Criminogenic Risk Decrease[2]	55.7% (n=7,477)	58.6% (n=7,842)
	Φ =.161; p<.001	Φ=.121; p<.001

Δ= percent points

Φ= Strength of association between variables

[1]Criminogenic Risk Increase: Reflects an increase in Total Score or a decrease in Protect Score.

[2]Criminogenic Risk Decrease: Reflects a decline in Total Score or an increase in Protect Score.

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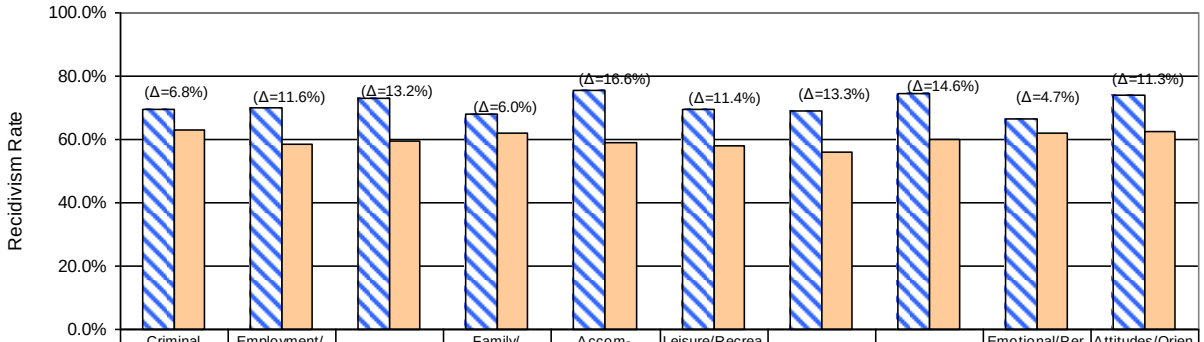
Recidivism rates are significantly lower for offenders with decreasing LSI-R total scores, or increasing protect scores.

Figure 6 reveals a statistically significant (p<.001) change in recidivism rates (17.7%) between offenders with declining total scores (risk decrease) and offenders whose total scores increase (risk increase) after reassessment. Commensurately, the 11.1% difference in recidivism rates between offenders with rising protect scores (risk decrease) and offenders with declining protect scores (risk increase) is also statistically significant (p<.001).

Notes: Criminogenic Risk Increase (thatched bars) is defined as offenders with either increasing LSI-R total scores or declining protect scores, while Criminogenic Risk Decrease (solid bars) is defined as offenders with either declining LSI-R total scores or increasing protect scores after reassessment.

Figure 7
Average Recidivism Rates, by LSI-R Sub-Domains, for Offenders at Increasing or Decreasing Criminogenic Risk After Reassessment



	Criminal History*	Employment/ Education*	Financial*	Family/ Marital**	Accom-modation*	Leisure/Recrea tion**	Companions*	Alcohol/Drug*	Emotional/Per sonal*	Attitudes/Orien tation*
Criminogenic Risk Increase [1]	69.6%	70.1%	72.8%	67.9%	75.4%	69.3%	69.1%	74.5%	66.6%	73.9%
Criminogenic Risk Decrease [2]	62.8%	58.5%	59.6%	619%	58.8%	57.9%	55.8%	59.9%	619%	62.6%
(Δ= percent points)	(n=7,649) ϕ=.060, p<.001	(n=9,555) ϕ=.115, p<.001	(n=7102) ϕ=.137, p<.001	(n=7867) ϕ=.060, p<.001	(n=7,493) ϕ=.169, p<.001	(n=7,335) ϕ=.105, p<.001	(n=7,965) ϕ=.135, p<.001	(n=9,478) ϕ=.147, p<.001	(n=7,483) ϕ=.050, p<.001	(n=6,709) ϕ=.115 p<.001

Φ= Strength of association between variables

[1]Criminogenic risk increase is defined as offenders with higher LSI-R subdomain percentiles, after reassessment.

[2]Criminogenic risk decrease is defined as offenders with lower LSI-R subdomain percentiles, after reassessment.

Note: Recidivism is defined as rearrest, revocation, parole violations, or criminal contempt of court, tracked over a three-year period

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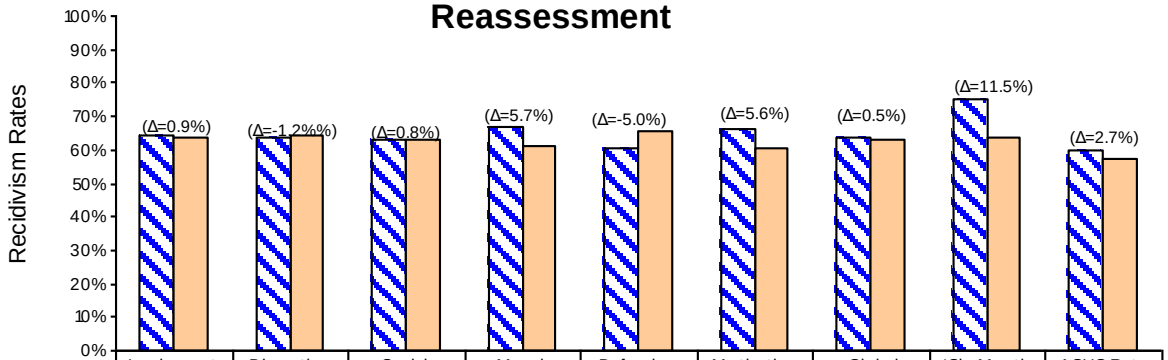
Recidivism rates are significantly lower for offenders with decreasing criminogenic risk patterns, based on LSI-R sub-domains.

Figure 7 depicts statistically significant (p<.001) differences in recidivism rates for offenders whose LSI-R sub-domain percentiles show increasing criminogenic risk (thatched bars) as compared to decreasing criminogenic risk (solid bars). Accommodation (Δ=+16.6%), followed by Alcohol/Drug (Δ=+14.6%), Companions, (Δ=+13.3%), and Financial (Δ=+13.2%) reveal significantly (p<.001) higher recidivism rates for offenders at increased risk.

Figure 8:
Average Recidivism Rates, by ASUS Sub-Domains for Offenders at Increasing or Decreasing Criminogenic Risk After Reassessment



	Involvement	Disruption	Social	Mood	Defensive	Motivation	+Global	*Six-Month	~ASUS Rater
Criminogenic Risk Increase[1]	64.6%	63.4%	63.2%	66.6%	60.7%	66.1%	63.7%	75.0%	59.9%
Criminogenic Risk Decrease[2]	63.7%	64.6%	63.2%	60.9%	65.7%	60.5%	63.2%	63.5%	57.2%
(Δ= percent points)	(n=9,415)	(n=10,904)	(n=9,875)	(n=9,746)	(n=9,716)	(n=9,306)	(n=10,629)	(n=7,394)	(n=8,997)
Δ = percent points				ϕ=.059, p<.001	ϕ=-.052, p<.001	ϕ=.057, p<.001		ϕ=.113, p<.001	ϕ=.026, p<.01

Φ= Strength of association between variables

+ Sum of Involvement, Disruption, Social, and Mood scores
*Substance Disruption over the last six months
~Sum of Evaluator AOD Use Involvement and Disruption Ratings

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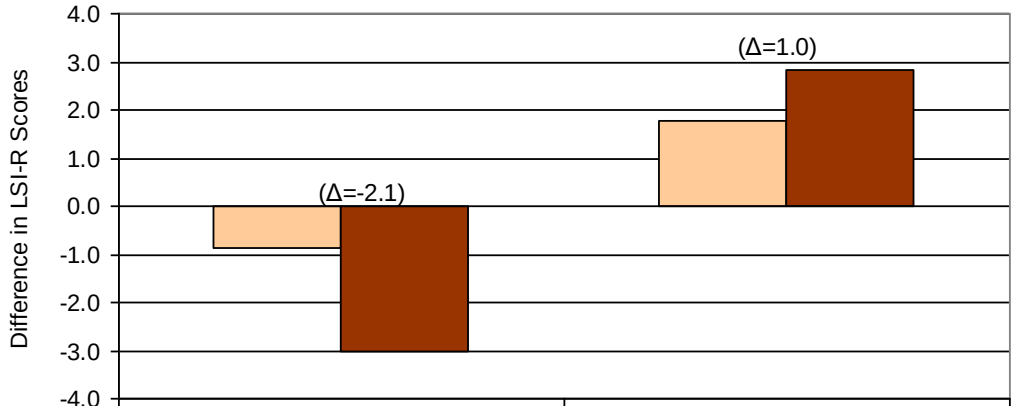
[1]Criminogenic risk increase is defined as offenders with higher ASUS sub-domain percentiles, after reassessment.
[2]Criminogenic risk decrease is defined as offenders with lower ASUS sub-domain percentiles, after reassessment.

Note: Average time between Initial and Current assessments: 34 months.

Recidivism rates are significantly higher for offenders with increasing criminogenic risk patterns, based on ASUS sub-domains.

Figure 8 depicts statistically significant (p<.01) differences in recidivism rates for offenders whose ASUS sub-domain percentiles reflect increasing criminogenic risk (thatched bars) as compared to decreasing criminogenic risk (solid bars). Six-Month (Δ=+11.5%), Mood (Δ=+5.7%), Motivation, (Δ=+5.6%), and ASUS Rater (Δ=+2.7%) show significantly higher recidivism rates for offenders at increasing criminogenic risk, while Defensive (Δ=-5.0%) shows significantly lower recidivism for offenders at decreased risk.

Figure 9
Average Difference in LSI-R Total and Protect Scores, After Reassessment, Between Recidivists and Non-Recidivists



	Ave. Difference in Total Score	Ave. Difference in Protective Score
Recidivists	-0.9 (n=9,956)	1.8 (n=9,982)
Non-Recidivists	-3.0 (n=7,107)	2.8 (n=9,982)
(Δ = percent points)	F=335.5; p<.001	F=88.3; p<.001

F= Analysis of Variance between LSI-R scores and recidivists vs. non-recidivists

Note: Change in LSI-R scores determined by computing the difference between the most recent and initial LSI-R scores.

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Non-recidivists, as compared to recidivists have lower LSI-R total scores and higher protective scores.

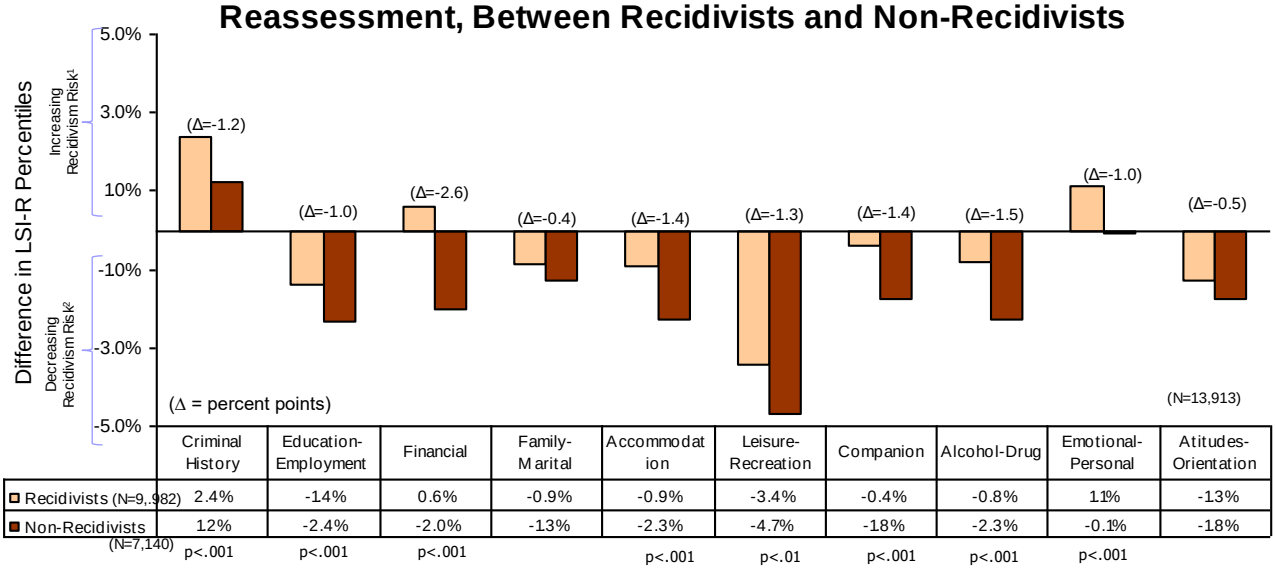
Figure 9 reveals statistically significant (p<.001) differences in the total (Δ=-2.1) and the protect (Δ=+1.0) scores between recidivists and non-recidivists. As compared to recidivists, non-recidivists showed a greater decrease in the LSI-R total score, and a greater increase in the protect score, after reassessment.

Non-recidivists, as compared to recidivists, had lower change in LSI-R percentiles for all sub-domains

Figure 10 examines the difference in LSI-R sub-domain percentile scores after reassessment, between non-recidivists and recidivists. Non-recidivists, as compared to recidivists, shows statistically significant recidivism risk decreases in Leisure/Recreation (-4.7%), Education-Employment (-2.4%), Accommodation (-2.3%), Alcohol/Drug (-2.3%), Financial (-2.0%), Companion (-1.8%), and Emotional/Personal (-0.1%). Although non-recidivists show an increasing recidivism risk in Criminal History (+1.2), the percentile change (Δ=-1.2) from recidivists is statistically significant (p<.001).

Technical Note: A negative change (-△) reflects a lower recidivism risk for non-recidivists, as compared to recidivists.

Figure 10:
Average Percentile Difference in LSI-R Sub-domains, After Reassessment, Between Recidivists and Non-Recidivists



	Criminal History	Education-Employment	Financial	Family-Marital	Accommodation	Leisure-Recreation	Companion	Alcohol-Drug	Emotional-Personal	Atitudes-Orientation
Recidivists (N=9,982)	2.4%	-1.4%	0.6%	-0.9%	-0.9%	-3.4%	-0.4%	-0.8%	1.1%	-1.3%
Non-Recidivists (N=7,140)	1.2%	-2.4%	-2.0%	-1.3%	-2.3%	-4.7%	-1.8%	-2.3%	-0.1%	-1.8%
	p<.001	p<.001	p<.001		p<.001	p<.01	p<.001	p<.001	p<.001	

Note: Average time between Initial and Current assessments: 34 months. The change in LSI-R sub-domain percentiles was determined by computing the difference between the most recent and initial sub-domain percentiles.

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2008-2016 Compilation

[1]Criminogenic risk increase is defined as offenders with higher LSI-R sub-domain percentiles, after reassessment.
[2]Criminogenic risk decrease is defined as offenders with lower LSI-R sub-domain percentiles, after reassessment.

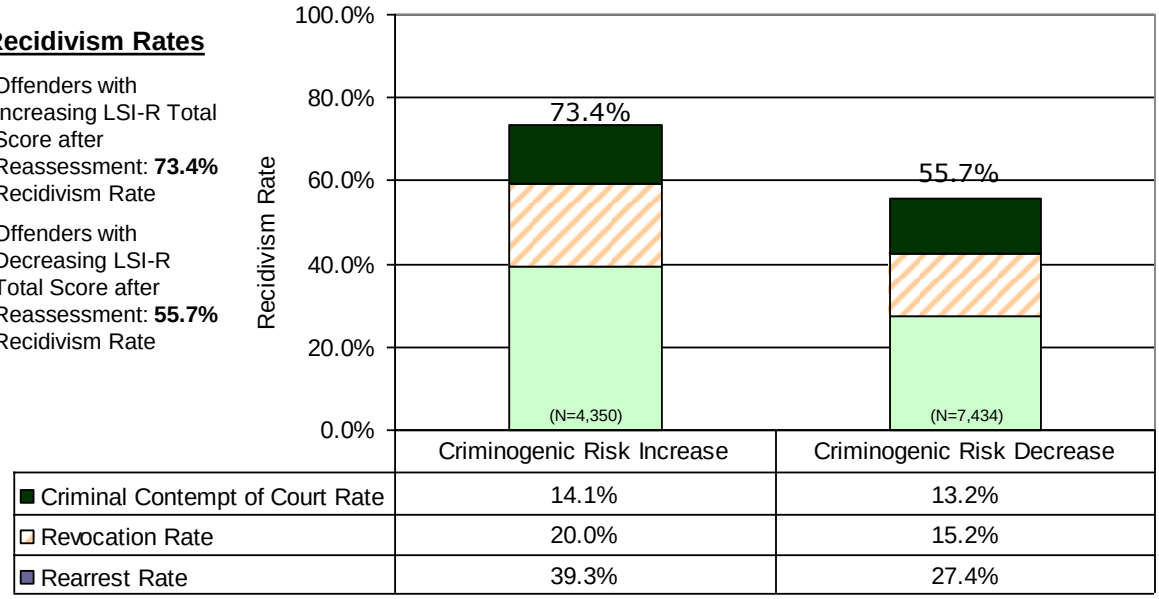
Non-recidivists, as compared to recidivists, showed lower change in ASUS percentiles for all sub-domains.

Figure 11 examines the change in ASUS sub-domain percentile scores between non-recidivists and recidivists, after reassessment. Non-recidivists, as compared to recidivists, shows statistically significant recidivism risk declines for ASUS-Rater (-8.2%), Six-Month Disruption (-7.8%), Mood (-4.4%), and Defensive (-2.9). On the other hand, non-recidivists had increasing recidivism risk in Disruption (+3.3%), Involvement (+2.3%), and Global (+2.1%).

Technical Note: A negative change (-Δ) reflects a lower recidivism risk for non-recidivists, as compared to recidivists.

IV. Analysis of LSI-R and ASUS Predictive Validity

Figure 12
Types of Recidivism for Offenders with Increasing and Decreasing Crimonogenic Risk[1]



	Criminogenic Risk Increase	Criminogenic Risk Decrease
Criminal Contempt of Court Rate	14.1%	13.2%
Revocation Rate	20.0%	15.2%
Rearrest Rate	39.3%	27.4%

[1]Criminogenic risk increase or decrease is respectively defined as offenders with higher or lower LSI-R Total scores, after reassessment,

Note: Recidivism is defined as rearrest, revocation, parole violation, or criminal contempt of court, tracked over a three-year period, all agencies.

Φ(11,784)= .181, p<.001
(Φ= Strength of association between variables)

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The LSI-R has good predictive validity based on the differences in recidivism rates between offenders at increasing criminogenic risk, versus offenders at decreasing risk.

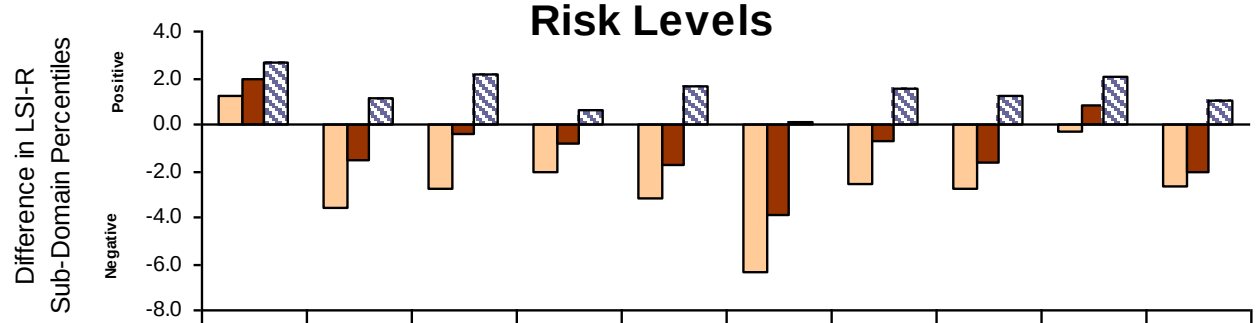
Figure 12 presents the recidivism rates for offenders at increasing criminogenic risk (higher LSI-R total scores at reassessment) and decreasing risk (lower LSI-R total scores at reassessment). Regardless of recidivism type (i.e., rearrest, revocation, and criminal contempt of court), recidivism rates are significantly ($p<.001$) greater for offenders at higher criminogenic risk (73.4%), as compared to offenders at lower criminogenic risk (55.7%).

Validation Analysis:
Statistical tests showed that the LSI-R has good predictive validity as a criminogenic risk instrument. The statistical analyses revealed that as the LSI-R total scores increase, the risk of recidivism also increases at a statistically significant level ($p<.001$), while conversely, as protect scores increase, the risk of recidivism decreases ($p<.001$). The statistical test used is the ROC (Receiver Operating Characteristics), which measures the LSI-R's ability to correctly classify offenders by risk potential. Also, regression analysis was used to estimate recidivism risk probabilities. The analysis revealed that for every incremental one-point increase in the LSI-R total score (or decrease in protect score), there is a higher probability that the offender would recidivate (see Table in Technical Notes Section).

The ten LSI-R subdomain percentile scores also revealed statistically significant ($p<.001$) predictive validity using the ROC statistical test, while regression analysis showed that increases in sub-domain scores led to a higher probability of recidivism in all sub-domains, except for the Family/Marital sub-domain (see Table in Technical Notes Section).

V. Analysis of Initial and Most Recent LSI-R and ASUS Assessments

Figure 13
Average Percentile Difference in LSI-R Sub-Domains, After Reassessment, by Current Risk Levels



	Criminal History	Employ/ Education	Financial	Family Marital	Accom-modation	Leisure/Re creation	Companio n	Alcohol/ Drug	Emotional/ Personal	Attitudes/ Orientation
Banked-Administrative (n=7,827)	12	-3.6	-2.8	-2.1	-3.2	-6.4	-2.6	-2.8	-0.3	-2.7
Low-Medium (n=4,724)	2.0	-15	-0.4	-0.8	-17	-3.9	-0.7	-16	0.8	-2.0
High-Surveillance (n=4,565)	2.7	11	2.2	0.6	16	0.1	15	12	2.1	10

Note: The change in percentiles after reassessment significantly differs (p<.001) from each other, by risk levels.
The average time between initial and current assessments is 34 months.

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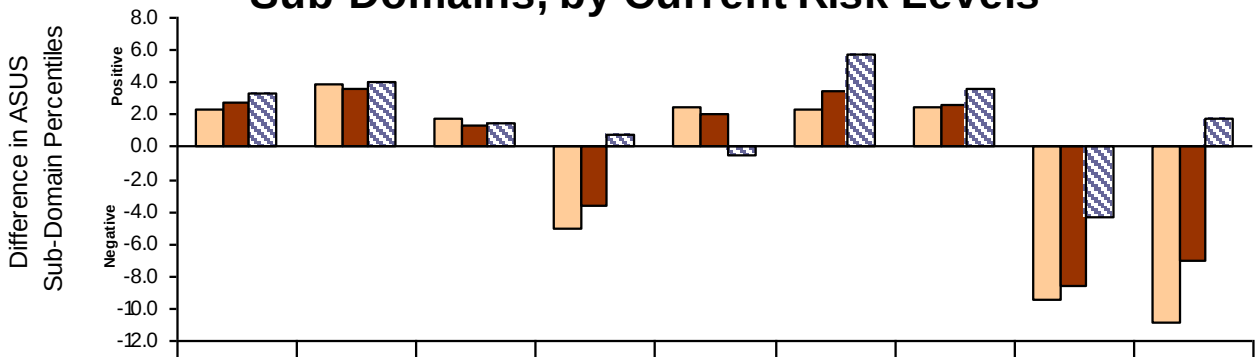
Offenders at High-Surveillance level have the largest positive change in percentiles, as compared to all LSI-R sub-domains.

Figure 13 depicts the percentile change between initial and most recent LSI-R sub-domain scores, by current risk levels. The Criminal History sub-domain has the largest positive change, as compared to all other sub-domains, per risk level. The Leisure/Recreation (Banked-Administrative; -6.4) and (Low-Medium; -3.9) sub-domain has the largest negative change.

Figure 14
Average Percentile Difference in ASUS Sub-Domains, by Current Risk Levels



	Involvement	Disruption	Social	Mood	Defensive	Motivation	+Global	*Six-Month	~ASUS Rater
Banked-Administrative (n=7,606)	2.3	3.9	18	-5.1	2.5	2.3	2.5	-9.5	-10.8
Low-Medium (n=4,588)	2.7	3.6	13	-3.6	2.1	3.4	2.6	-8.6	-7.0
High-Surveillance (n=4,460)	3.3	4.0	15	0.8	-0.5	5.7	3.6	-4.3	18
		p<.05		p<.001	p<.001	p<.001	p<.05	p<.001	p<.001

+ Sum of Involvement, Disruption, Social, and Mood scores
*Six Month Substance Disruption, where substance use has resulted in the loss of functional control over one's behavior over the last six months.
~Sum of Evaluator AOD Use Involvement and Disruption Ratings

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Note: The change in percentiles after reassessment, significantly differs (p<.001) from each other, by risk levels, for each sub-domain except for Involvement and Social.

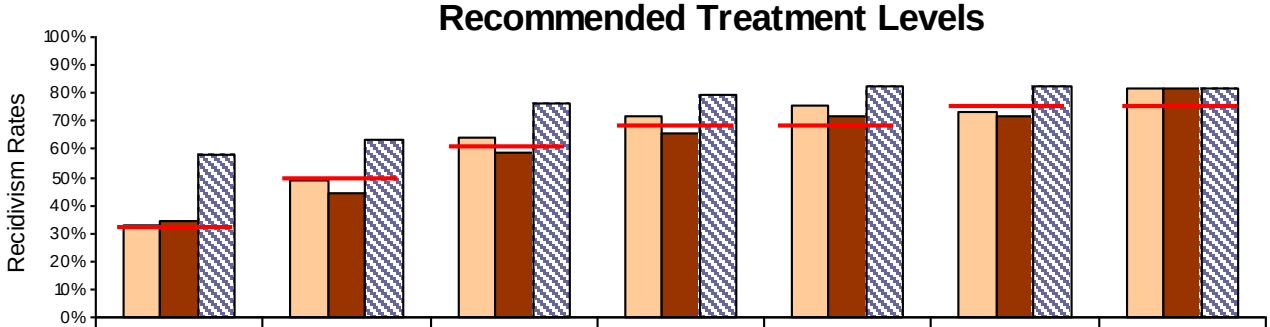
The Average time between initial and current assessments is 34 months.

Offenders at High-Surveillance level are at greater recidivism risk, as compared to offenders at lower risk levels.

Figure 14 depicts the percentile change between initial and most recent ASUS sub-domain scores, by current risk levels. The Disruption (Banked-Admin & Low-Medium) and Motivation (High-Surveillance) sub-domains show the largest positive change. ASUS Rater (Banked-Administrative), Six-Month (Low-Medium), and Defensive (High-Surveillance) sub-domains show the largest negative change.

VI. Offender Recidivism Rates, by Recommended Treatment Level Cut-off Values

Figure 15
Offender Recidivism Rates, by Agency and Current Recommended Treatment Levels



	No Treatment (n=2,206)	Increased UA's; D & A Education (n=3,258)	Weekly Therapy (n=3,427)	Intensive Outpatient (n=2,796)	Residential Treatment (n=1,345)	Therapeutic Community (n=1,535)	Assess for Psychopathy (n=1,535)
Probation	33.1%	49.2%	63.9%	71.7%	75.9%	73.4%	81.5%
Parole	34.5%	44.4%	58.4%	65.5%	71.5%	71.7%	81.3%
PSD*	58.1%	63.5%	76.4%	79.5%	82.3%	82.2%	81.5%
	[1 pt.]	[2 pts.]	[3 pts.]	[4 pts.]	[5 pts.]	[6 pts.]	[7 pts.]

ϕ(3,083)=.256, p<.001
ϕ(10,445)=.2981, p<.001
ϕ(1,542)=.176, p<.001
ϕ(3,258)=.101, p<.001
ϕ(3,427)=.066, p<.001
ϕ(2,796)=.122, p<.001

*Maximum-Term Released Prisoners

All Agencies Recidivism Rates		Counts	Pct.
No Treatment	32.8%	2,206	(16.1%)
Increase UA's	48.4%	3,258	(23.8%)
Weekly Therapy	62.8%	3,427	(25.0%)
Intensive Outpatient	70.8%	2,796	(20.4%)
Residential Treatment	74.6%	1,345	(9.8%)
Therapeutic Community	74.6%	504	(3.7%)
Assess for Psychopathy	81.4%	145	(1.1%)

All Agencies

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ϕ(13,681)=.091, p<.001
(Φ= Strength of association between variables)

As Recommended Treatment Levels increase in intensity, recidivism rates significantly increase.

Figure 15 depicts offender recidivism rates, by agencies, and by current Recommended Treatment Levels (RTLs). The RTL is based on six, increasingly intensive treatment regimens, each determined by LSI-R total score and ASUS disrupt score cut-off ranges. The differences in recidivism rates, by the six RTL categories and between individual agencies, are statistically significant (p<.001).

Figure 16
Drug Felon Recidivism Rates, by LSI-R and ASUS Risk Cut-off Scores

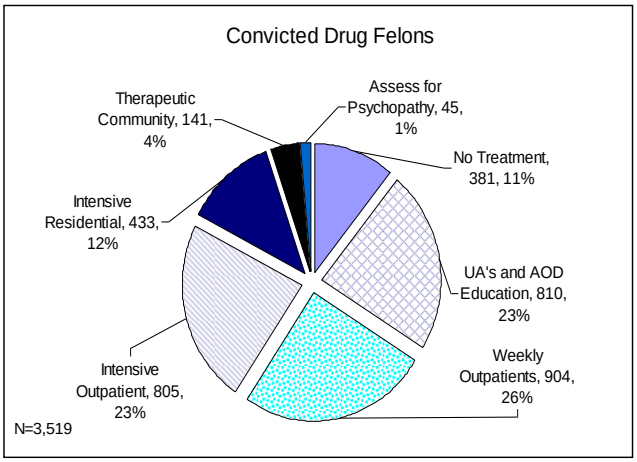
LSI-R Total Score Cut-offs for Recommended Treatment Level		Recidivism Rate
Low (LSI-R < 14)	[1 pt.]	33.3%
Medium (LSI-R = 14 – 20)	[2 pts.]	51.7%
High (LSI-R = 21 – 27)	[3 pts.]	69.9%
Very High (LSI-R = 28 – 54)	[4 pts.]	80.7%

Φ(13,917)=.313, p<.001

ASUS Disrupt Score Cut-offs for Recommended Treatment Level		Recidivism Rate
Low (ASUS < 21)	[0 pts.]	56.4%
Medium (ASUS = 21 – 40)	[1 pt.]	61.4%
High (ASUS = 41 – 60)	[2 pts.]	60.8%
Very High (ASUS > 60)	[3 pts.]	60.5%

Φ(14,148)=.042, p<.001

Note: The Recommended Treatment Level (RTL) is determined by combining the LSI-R Total score and ASUS Disrupt score cut-off ranges.



Drug Felon Treatment Levels	Recidivism Rate
No Treatment (RTL=1)	31.0%
UA's and AOD Education (RTL=2)	45.6%
Weekly Outpatients (RTL=3)	57.7%
Intensive Outpatient (RTL=4)	69.8%
Intensive Residential (RTL=5)	73.7%
Therapeutic Community (RTL=6)	77.3%
Assess for Psychopathy (RTL=7)	75.6%

ϕ(3,519)=.283, p<.001

(Φ= Strength of association between variables)

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Recommended Treatment Levels (RTLs) derived from the LSI-R and ASUS Disrupt scores, show accurate recidivism risk prediction for Dug offenders.

Figure 16 examines the LSI-R and ASUS Disrupt cut-off levels used to determine the RTL for drug felons. The tables reflect statistically significant differences in recidivism rates, as offenders move from Low to Very High risk levels, as established by the LSI-R and ASUS Disrupt cut-off scores. The LSI-R risk levels used to determine the RTL are stronger predictors of recidivism based on their strength of association (Φ=.313) with recidivism rates, as compared to the ASUS Disrupt risk levels (Φ=.042). Drug felons show increasing recidivism rates as their recommended treatment levels increase from No Treatment to higher intensity levels, based on ICIS's treatment referral guidelines.

Notes: The RTL cut-off values are calculated by adding the individual point values from the LSI-R cut-off scores and ASUS Disrupt cut-off scores.

VII. LSI-R and ASUS Tables of Predictive and Correlational Analyses

Table 1
Correlations Between Current LSI-R Sub-Domain Percentile Scores and Rearrest Occurrence

	Rearrest	Criminal History	Education/ Employment	Financial	Family Marital	Accomo-dation	Leisure/ Recreation	Companions	Alcohol/ Drug	Emotional/ Personal	Attitudes/ Orientation	Total Score	Protect Score
Rearrest		.254**	.238**	.175**	.117**	.195**	.145**	.214**	.229**	.104**	.147**	.352**	-.218**
Criminal History	.254**		.202**	.052**	.131**	.206**	.021**	.256**	.181**	.088**	.120**	.521**	-.119**
Education/Employment	.238**	.202**		.374**	.228**	.298**	.351**	.274**	.321**	.152**	.248**	.711**	-.615**
Financial	.175**	.052**	.374**		.241**	.175**	.265**	.077**	.253**	.298**	.221**	.471**	-.436**
Family/Marital	.117**	.131**	.228**	.241**		.266**	.202**	.211**	.249**	.232**	.250**	.488**	-.412**
Accomodation	.195**	.206**	.298**	.175**	.266**		.262**	.356**	.291**	.136**	.272**	.540**	-.389**
Leisure/Recreation	.145**	.021**	.351**	.265**	.202**	.262**		.211**	.278**	.123**	.336**	.479**	-.464**
Companions	.214**	.256**	.274**	.077**	.211**	.356**	.211**		.323**	.066**	.252**	.558**	-.270**
Alcohol/Drug	.229**	.181**	.321**	0.253	.249**	.291**	.278**	.323**		.200**	.266**	.654**	-.461**
Emotional/Personal	.104**	.088**	.152**	.298**	.232**	.136**	.123**	.066**	.200**		.163**	.411**	-.251**
Attitudes/Orientation	.147**	.120**	.248**	.221**	.250**	.272**	.336**	.252**	.266**	.163**		.505**	-.442**
Total Score	.352**	.521**	0.711	.471**	.488**	.540**	.479**	.558**	.654**	.411**	.505**		-.688**
Protect Score	-.218**	-.119**	-.615**	-.436**	-.412**	-.389**	-.464	-.270**	-.461**	-.251**	-.442**	-.688**	

N= 17,128

*p<.05, **p<.01

Note: From Most Recent LSI-R Assessments

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Table 1 identifies correlations between the most recent LSI-R total score, protect score, sub-domain percentile, and rearrest occurrence. The LSI-R total and protect scores, as well as all ten sub-domains, are statistically associated with rearrest occurrence, i.e., there is a greater tendency (likelihood) for a rearrest to occur as the LSI-R total scores/sub-domain percentiles increase. The LSI-R total score has the strongest statistical association (r=.352) with rearrest. Similarly, as LSI-R protect scores increase, the likelihood of rearrest decreases (r=-.218). With respect to sub-domain correlations with rearrest, Criminal History (r=.254), Education/Employment (r=.238), Alcohol/Drugs (r=.229), and Companions (r=.214), have the strongest correlations (p<.01) with recidivism. Additionally, there are strong correlations between Education/Employment and total scores (r=.711) and protect scores (r=-.615).

Note: A correlation is a measure of relatedness (connectedness) between two variables that are mutually associated with each other (see technical notes on correlation analysis; p.24). The correlation coefficient measures the direction of the relationship (positive direct or negative inversely directed), and numeric strength of the relationship, which varies from no correlation value (0.0) to the highest correlation value (1.0).

Table 2
Correlations Between Current ASUS Sub-Domain Percentile Scores and Rearrest Occurrence

Correlations with Rearrests and the Most Recent ASUS Domains (N=14,168)

	Rearrest	Involvement	Disruption	Social	Mood	Defensive	Global	Motivation	Six-Months	ASUS Rater
Rearrest		.094*	.072*	.164*	.087*	.086*	.110*	.111*	.117*	.167*
Involvement	.094*		.686*	.461*	.269*	.312*	..792*	.453*	.183*	.449*
Disruption	.072*	.686*		.514*	.421*	.417*	.931*	.480*	..220*	.419*
Social	.164*	.461*	.514*		.421*	.533*	.689*	.317*	..165*	.287*
Mood	.087*	.269*	.421*	.421*		.661*	.573*	.211*	.282*	.269*
Defensive	.086*	.312*	.417*	.533*	.661		.545*	.281*	.204*	.244*
Global	.110*	.792*	.931*	.689*	..573*	.545*		.490*	.248*	.457*
Motivation	.111*	.453*	.480*	.317*	.211*	.317*	.490*		.130*	.320*
Six-Months	.117*	.183*	.220*	.165*	.282*	.165*	.248*	.130*		.346*
ASUS Rater	.167*	.449*	.419*	.287*	.269*	.244*	.457*	.320*	.346*	

*p<.01

Note: From Most Recent LSI-R Assessments

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Table 2 identifies the correlations (strength of association) between current ASUS sub-domains and rearrest occurrence (see technical notes on correlation analysis; p.24). The ASUS Rater (r=.167), Social (r=.164), Six-Months Involvement (r=.117), Motivation (r=.111), and Global (r=.110) sub-domains are positively correlated (p<.01) with rearrest, i.e., there is a positive direct relationship between sub-domain scores and rearrest, where increases in sub-domain scores are associated with the increasing likelihood of rearrest.

Table 3
Correlations Between Current LSI-R and ASUS Sub-Domain Percentile Scores

ASUS Sub-domains

LSI-R Sub-domains	Involvement	Disruption	Social	Mood	Defensive	Global	Motivation	Six-Months	ASUS Rater
Total Score	.259**	.214**	.299**	.276**	.190**	.294**	.195**	.290**	.444**
Protect Score	-..089**	-.059**	-.098**	-.206**	-.103**	-.110**	-.042**	-.254**	-.285**
Criminal History	.268**	.231**	.353**	.099**	.126**	.286**	.247**	0.015	.224**
Education and Employment	-.040**	-.036**	-.026**	0	-.010	-.035**	-.031**	0.016	-.008
Financial	-.035	-.035**	-.039	.019*	0	-.031**	-.039**	0.016	-.016
Family/ Marital	-.022**	-.020*	-.033**	.017*	0	-.019*	-.036**	.027**	-.006
Accommodation	-0.007	-.016	-.009	.024**	0.01	-.008	-.013	.045**	.032**
Leisure Recreation	-.053	-.054**	-.043**	-.014	-.024**	-.055**	-.057**	0.016	-.017*
Companions	-.023**	-.023**	-.036**	0	-.006	-.024**	-.016	0.017	0.001
Alcohol Drugs	0.014	0.009	-.008	.017*	0.013	0.009	0.01	.065**	.041**
Emotional Personal	-.018*	-.010	-.030**	.043**	.017*	-.007	-.030**	.023**	-.005
Attitudes Orientation	-.016	-.03**	-.011	0.016	-.001	-.020*	-.035**	.027**	.034**

*p<.05; **p<.01

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Table 3 shows the correlations between the LSI-R and ASUS sub-domain percentile scores. The LSI-R total score and protect score are significantly correlated with all of the ASUS sub-domains. The LSI-R total score is significantly associated (p<.01) with the following ASUS sub-domains; ASUS Rater (r=.444), Social (r=.299), Global (r=.294), and Six-Months (r=.290). Also, the LSI-R protect score is significantly associated (p<.01), but negatively correlated with the ASUS Rater subdomain (r=-.285). Finally, the LSI-R Criminal History sub-domain has the highest statistically significant correlation (p<.01) with Social (r=.353).

VIII. Summary

The study results show that offenders at higher LSI-R risk levels have higher recidivism rates, as compared to lower risk offenders. There are also statistically significant differences in recidivism rates based on various offender demographics. Additionally, non-recidivists, as compared to recidivists, have larger declines in LSI-R total scores when compared to previous assessment scores. Finally, there is a moderate correlation between recidivism rates and LSI-R and ASUS subdomain percentile scores.

Technical Notes Section

	Initial LSI-R Total Score	Most Recent LSI-R Total Score	Initial LSI-R Protect Score	Most Recent LSI-R Protect Score
ROC[1]	.626*	.709*	.414*	.368*
Type 2 B-Errors)	41.0% chance of incorrectly classifying a lower risk offender as higher risk.	38.0% chance of incorrectly classifying a lower risk offender as higher risk.	60.0% chance of incorrectly classifying a lower risk offender as higher risk.	57.0% chance of incorrectly classifying a lower risk offender as higher risk.
Exp (B)	1.056*	1.104*	.959*	.934*
Odds Ratio[2]	5.6% increased odds of recidivism	10.4% increased odds of recidivism	4.1% decreased odds of recidivism	6.6% decreased odds of recidivism

[1]ROCs is a coefficient of predictive power, such as a LSI-R subdomain's power to accurately measure the offenders' recidivism potential.

[2]Reflects the risk odds, where for every percentile increase/decrease in a LSI-R sub-domain, there is a corresponding increase/decrease in the odds of recidivism.

	Criminal History	Education Employment	Financial	Family Marital	Accommo-dation
ROC[1]	.646*	.639*	.596*	.565*	.604*
Exp (B)	1.017*	1.008*	1.004*	Not sig.	1.004*
Odds Ratio[2]	1.7% greater odds of recidivism	0.8% greater odds of recidivism	0.4% greater odds of recidivism	Not sig.	0.4% greater odds of recidivism
	Leisure Recreation	**Companion**	**Alcohol Drug**	**Emotional Personal**	**Attitude Orientation**
ROC[1]	.579*	.620*	.632*	.560*	.570*
Exp (B)	1.001**	1.005*	1.008*	1.002***	1.002**
Odds Ratio[2]	0.1% greater odds of recidivism.	0.5% greater odds of recidivism	0.8% greater odds of recidivism	0.2% greater odds of recidivism	0.2% greater odds of recidivism

[1]ROCs is a coefficient of predictive power, such as a LSI-R subdomain's power to accurately measure the offenders' recidivism potential. *p<.001; **p<.01; ***p<.05

[2]Reflects the risk odds, where for every percentile increase/decrease in a LSI-R sub-domain, there is a corresponding increase/decrease in the odds of recidivism.

1. Technical explanation for ROC Curves.

The ROC is a statistical measure that predicts the risk instrument's capability to correctly identify individuals who are at risk for violence or criminal activity. The ROC is a statistical coefficient where a perfect 1.0 represents the highest degree of risk selection success, with little or no potential for making a risk classification error, while a ROC coefficient of 0.50 represents no instrument capability to measure the offenders' risk level.

2. Technical explanation for Regression Statistics.

In logistic regression, Exp (B) is a coefficient that measures the LSI-R's power to predict recidivism. Exp (B) is also an expression of the ODDS Ratio (OR), or the relative risk probabilities between a treatment condition and a hypothetical control or reference condition. The reference is considered to be the null (even odds of risk), which does not anticipate any change in recidivism after reassessment, while the treatment condition anticipates some effect or change on the outcome variable, e.g., recidivism effect. As an example, a hypothetical Exp (B) reveals an odds ratio of 1.41, which means that there is a 41% risk difference in the recidivism ratio (1.41 – 1.0)*100 = .41, or 41% between the change in Criminal History percentiles after reassessment, as compared to a hypothetical group of offenders with Criminal History percentiles that remain unchanged (do not increase or decrease) after reassessment. This represents a statistically significant odds change of 41%, when compared to the reference/control group.

3. Technical explanation for Table 1 – Correlation Analysis.

This analysis provides a statistical representation of the strength of association between selected variable fields in the LSI-R. Correlations reveal the degree of item-by-item relatedness, which measures the direction and strength of association between the variables identified in Table 1. The correlation coefficient measures the direction of the relationship (positive direct or negative inversely directed), where a positive (+) correlation means that as one variable increases in value, the corresponding variable also increases; and conversely, a negative (-) correlation represents an inverse relationship where one variable increases in value while the corresponding variable decreases in value. The correlations represent the strength of association that range from a low of 0.0 (no strength of relationship), to a medium of .50 (moderate strength of relationship), to a high of 1.0 (highest strength of relationship). For example, in a perfect positive correlation, the increase in variable "A" results in the same and identical increase in magnitude for variable "B," whereas a perfect negative correlation means that an increase in one variable will always result in a commensurate decrease in the other variable.