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## Improving Risk Assessments for Sex Offenders: A Comparison of Three Actuarial Scales

R. Karl Hanson<sup>1</sup> and David Thornton<sup>2</sup>

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*The study compared the predictive accuracy of three sex offender risk-assessment measures: the RRASOR (Hanson, 1997), Thornton's SACJ-Min (Grubin, 1998), and a new scale, Static-99, created by combining the items from the RRASOR and SACJ-Min. Predictive accuracy was tested using four diverse datasets drawn from Canada and the United Kingdom (total n = 1301). The RRASOR and the SACJ-Min showed roughly equivalent predictive accuracy, and the combination of the two scales was more accurate than either original scale. Static-99 showed moderate predictive accuracy for both sexual recidivism ( $r = 0.33$ , ROC area = 0.71) and violent (including sexual) recidivism ( $r = 0.32$ , ROC area = 0.69). The variation in the predictive accuracy of Static-99 across the four samples was no more than would be expected by chance.*

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The management of sex offenders within the criminal justice system can be substantially influenced by the offender's perceived risk for recidivism. Those sex offenders deemed high risk may be subject to substantial restrictions, such as postsentence detention, indeterminate sentences, and long-term community supervision. Conversely, sex offenders deemed to be low risk may be placed on probation and, if incarcerated, considered for early release.

Although many decisions require risk assessments, the procedures used for making such assessments often have limited validity. In general, the average predictive accuracy of professional judgment to predict sex offense recidivism is only slightly better than chance (average  $r = 0.10$ ; Hanson & Bussière, 1998). Some researchers have even argued that the accuracy of prediction is sufficiently low that it threatens the very basis of risk-based legal sanctions for sex offenders (Janus & Meehl, 1997).

Recent research, however, has the potential of substantially improving the accuracy of recidivism risk assessments for sex offenders. Hanson and Bussière's

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(1998) meta-analytic review identified a number of risk factors that were associated reliably with sex offense recidivism. Most of these factors were static, historical variables related to sexual deviance (e.g., prior sex offenses, stranger victims) and general criminality (e.g., prior nonsex offenses, antisocial personality disorder). Several different actuarial risk instruments have also been developed to predict recidivism among sex offenders [e.g., Sex Offender Risk Appraisal Guide (SORAG), Quinsey, Harris, Rice, & Cormier, 1998; Minnesota Sex Offender Screening Tool–Revised (MnSOST-R), Epperson, Kaul & Hesselton, 1998; Rapid Risk Assessment for Sex Offense Recidivism (RRASOR), Hanson, 1997; Thornton's Structured Anchored Clinical Judgement (SACJ), Grubin, 1998]. These actuarial scales not only specify the items to consider, but also provide explicit direction as to the relative importance of each item. The items in the scales are similar, although the scales vary as to the relative weight accorded to the general factors of sexual deviance vs. antisociality.

The SORAG (Quinsey et al., 1998) is a variation of the Violence Risk Appraisal Guide (VRAG; Quinsey et al., 1998) for sex offenders. Like the VRAG, the SORAG was designed to assess any violent recidivism, not just sexual recidivism. It contains 15 items addressing early childhood behavior problems, alcohol problems, sexual and nonsexual criminal history, age, marital status, and personality disorders (with a large weight on psychopathy). The MnSOST-R was developed to predict sexual recidivism among rapists and extrafamilial child molesters. The MnSOST-R includes 16 items addressing sexual and nonsexual criminal history, the victim's age and relationship to the offender, substance abuse, unstable employment, age, and treatment history (Epperson et al., 1998). Both the RRASOR (Hanson, 1997) and SACJ (Grubin, 1998) were intended to be relatively brief screening instruments for predicting sex offense recidivism.

The purpose of the present study was to compare the predictive accuracy of two of these actuarial schemes: the RRASOR (Hanson, 1997) and the SACJ (see Grubin, 1998). Although rarely used in North America, the SACJ is routinely used in Her Majesty's Prison Service (England and Wales) and in many police departments in the United Kingdom. The SACJ contains items related to sexual deviance but also places considerable weight on nonsexual criminal history. The RRASOR, in contrast, almost exclusively targets factors related to sexual deviance. The RRASOR is widely used in Canada and the United States, being the most common risk assessment tool used in postsentence detention procedures (Doren, 1999). Given the different emphasis of the RRASOR and SACJ, one goal of the current study was to examine whether a simple combination of these two scales could improve on the predictive accuracy of either original scale.

### **Rapid Risk Assessment for Sex Offense Recidivism**

The aim of the RRASOR (Hanson, 1997) was to predict sex offense recidivism using a small number of easily scored variables. The initial pool of seven items were those that correlated at least 0.11 with sex offense recidivism in Hanson and Bussière's (1998) meta-analysis and were commonly recorded: prior sex offenses, any prior nonsex offenses, any male victims, any stranger victims, any unrelated

victims, never married, and age less than 25 years. In order to identify the most efficient combination of these items, the correlations between these predictor variables were calculated in seven different datasets (total sample of 2592), and then averaged using standard meta-analytic techniques (Hedges & Olkin, 1985). Following a suggestion by Becker (1996), the averaged correlation matrix was then subjected to stepwise regression to identify the best predictor variables.

Of the original seven variables, four contributed substantially to the regression equation ( $\beta > 0.09$ ): prior sex offenses, any unrelated victims, any male victims, and age less than 25 (see Table 1). The scale resulting from the simple combination of these four variables was then tested on an entirely new sample (HM Prison). Overall, the scale showed comparable predictive accuracy in both the development and validation samples (average  $r = 0.27$ ; average ROC area = 0.71).

### Structured Anchored Clinical Judgement

Unlike many actuarial tools, risks scores on the SACJ (Grubin, 1998) are not based on the simple summation of weighted items. Instead, it uses a stepwise approach. The first step classifies offenders into three risk categories (low, medium, and high) based on their official convictions. In the next steps, offenders can be reclassified (up or down) based on protective or aggravating factors. Each stage incorporates different types of information.

The first step considers the following five items: any current sexual offenses, any prior sex offenses, any current nonsexual violent offenses, any prior nonsexual violent offenses, and four or more prior sentencing occasions (see Table 1). If offenders have four or more of the initial factors, they are automatically considered high risk. If two or three factors are present, offenders are considered medium risk, and zero or one factor indicates low initial risk.

The second step considers the following eight items: any stranger victims, any male victims, never married, convictions for noncontact sex offenses (e.g., exhibitionism, obscene phone calls), substance abuse, placement in residential care as a child, deviant sexual arousal, and psychopathy. If two or more of these factors are present, then the offenders' initial risk level is increased one category (i.e., low to medium, or medium to high).

**Table 1.** Items in the RRASOR, SACJ-Min, and Static-99

RRASOR	SACJ-Min	Static-99
Male victims	Male victims	Male victims
	Never married	Never married
	Noncontact sex offenses	Noncontact sex offenses
Unrelated victims		Unrelated victims
	Stranger victims	Stranger victims
Prior sex offenses (3 points)	Current sex offense	Prior sex offenses (3 points)
	Prior sex offense	
	Current nonsexual violence	Current nonsexual violence
	Prior nonsexual violence	Prior nonsexual violence
	4+ sentencing dates	4+ sentencing dates
18–24.99 years		18–24.99 years

The SACJ was designed to be used even when there is missing data. The minimum information required is the step 1 variables and the first four variables from step 2 (strangers, males, single, noncontact offenses). This minimum set of items is called *SACJ-Min*.

The final step of the SACJ (step 3) considers information that is unlikely to be obtained except for sex offenders who enter treatment programs (e.g., treatment drop-out, improvement on dynamic risk factors). Because only the SACJ-Min has been subject to cross-validation, the final step of the SACJ is not considered further in this report.

The SACJ was developed through exploratory analyses on several UK datasets. The primary aim in scale development was the prediction of sexual recidivism, but the prediction of any violent recidivism was also a consideration. The SACJ-Min was then validated on an entirely new sample of approximately 500 sex offenders released from Her Majesty's Prison Service in 1979 (16-year follow-up on the complete cohort). This HM Prison sample included the 303 offenders originally used to validate the RRASOR. In the validation sample, the SACJ-Min correlated 0.34 with sex offense recidivism and 0.30 with any sexual or violent recidivism (Thornton, personal communication, February 10, 1999). The SACJ-Min has yet to be tested on samples from outside the United Kingdom.

### **Static-99**

Preliminary analyses suggested that RRASOR and the SACJ-Min were assessing related but not identical constructs. Both scales contributed unique variance to regression equations when their total scores were used to predict sexual recidivism. Consequently, it was possible that a combination of the two scales would predict better than either original scale. A new scale was created by adding together the items from the RRASOR and SACJ-Min. The scale is called *Static-99* to indicate that it includes only static factors and that it is the 1999 version of a work in progress. The complete list of items is listed in Table 1 and the scoring criteria are given in Appendix I.

The risk scales (RRASOR, SACJ-Min, and Static-99) were compared in four diverse samples selected from Canada and the United Kingdom. Because the datasets were created independently, the variables were not identical in each sample. Any observed variability across samples could therefore be attributed to either variation in scoring procedures or differential validity across samples. However, if similar results are found across samples (despite minor differences in coding rules), then the scale would appear robust.

## **METHOD**

### **Samples**

The first three samples were, with minor modifications, the same samples used in the development of the RRASOR (see Table 2). The results reported here are

**Table 2.** Sample Characteristics

	Sample			
	Institut Philippe Pinel	Millbrook	Oak Ridge	HM Prison, England and Wales
Setting	Secure psychiatric	Provincial prison	Secure psychiatric	All prisoners released in 1979
Minimum sample size	344	191	142	531
Age at release ( <i>SD</i> )	36.2 (10.9)	33.1 (9.9)	30.4 (9.5)	34.4 (12.7)
Child molesters (%)	70.4	100.0	49.3	60.7
Prior offenses				
Sexual (%)	50.5	41.9	31.8	34.0
Any (%)	58.1	72.0	67.7	74.9
Average years of follow-up	4	23	10	16
Recidivism criteria	Convictions	Convictions	Charges/ readmissions	Convictions
Recidivism rates				
Sexual only (%)	15.4	35.1	35.1	25.0
Any violent (%)	21.5	44.0	57.6	37.4

not identical to those reported in Hanson (1997) due to minor recoding of some variables (correcting coding errors, replacing missing data). The fourth sample (HM Prison) was not used in the development of either the RRASOR or SACJ, but a subsample of the HM Prison offenders were used as the validation sample for both risk scales. The HM Prison sample has the important feature of being an unbiased cohort of all the sex offenders released in the target year (1979). In contrast, the other samples primarily comprised sex offenders referred to assessment and/or treatment at particular institutions. The racial ethnicity of the samples was not recorded, but given the demographics of the provinces and countries from which they were selected, the samples can be expected to be predominantly white.

#### *Institut Philippe Pinel (Montreal)*

This study (Proulx, Pellerin, McKibben, Aubut, & Ouimet, 1995; see also Proulx, Pellerin, McKibben, Aubut, & Ouimet, 1997; Pellerin et al., 1996) focused on sexual offenders treated at a maximum security psychiatric facility between 1978 and 1993. The Institut Philippe Pinel provides long-term (1–3 years) treatment for sex offenders referred from both the mental health and correctional systems. Information concerning predictor variables was drawn from their clinical files and recidivism information from RCMP records collected in 1994.

Information was available on all the predictor variables except stranger victims and noncontact sex offences. As well, it was impossible to separate index and prior nonsexual violence because only the total number of charges for nonsexual violence were recorded. Similarly, the variable marking the total number of sex offense charges included index offenses. To estimate the number of prior sex offense convictions, the number of victims for the index offense was subtracted from the total number of charges.

*Millbrook Recidivism Study*

This study (Hanson, Steffy, & Gauthier, 1993b; see also Hanson, Scott, & Steffy, 1995; Hanson, Steffy, & Gauthier, 1992; Hanson, Steffy & Gauthier, 1993a) collected long-term recidivism information (15–30 years) for child molesters released between 1958 and 1974 from Millbrook Correctional Centre, a maximum security provincial correctional facility located in Ontario, Canada. About half of the sample went through a brief treatment program. For the treatment sample, the information concerning the predictors was collected from their clinical files, whereas for the remainder of the sample, the information was extracted from their correctional files. Recidivism information was coded from national records maintained by the Royal Canadian Mounted Police (RCMP).

Information was available on all the relevant predictor variables, except for convictions for noncontact sex offenses (missing for all cases). Information concerning stranger victims was available for the treatment sample only ( $n = 99$ ). As well, the total number of prior convictions was used instead of the total number of prior sentencing dates.

*Oak Ridge Division of the Penetanguishene Mental Health Centre*

The Oak Ridge study (Rice & Harris, 1996; see also Quinsey, Rice, & Harris, 1995; Rice & Harris, 1997; Rice, Harris, & Quinsey, 1990; Rice, Quinsey, & Harris, 1991) followed sexual offenders referred for treatment and/or assessment between 1972 and 1993 to a maximum security mental health center located in Ontario, Canada. The majority of the referrals came from the mental health systems or the courts (e.g., pretrial fitness examinations), with a minority of cases coming from provincial or federal corrections. Follow-up information was based on RCMP records as well as mental health records (i.e., new admissions for sex offenses, regardless of whether new charges were laid).

Information was available for all the predictor variables with the following exceptions. Data for convictions for noncontact sex offense were not available for all cases. Data for relationship to victim were available only for the most serious offense. The dataset counted any male child victims rather than any male victims. The number of prior convictions was used instead of the number of prior sentencing dates. Finally, only the most serious index offense was recorded in the data set. Consequently, index convictions for nonsexual violence that was considered less serious than the index sex offense would not have been recorded.

*Her Majesty's Prison Service (UK)*

This study (Thornton, 1997) provided a 16-year follow-up of 563 sex offenders released from Her Majesty's Prison Service (England and Wales) in 1979. Recidivism information was based on Home Office records collected in 1995. Very few of the offenders in this sample would have received specialized sex offender treatment.

Information was available for all the relevant predictor variables. Data for previous sex offenses, however, were coded based on the offenders' previous sentencing occasions rather than the number of convictions or charges.

## ANALYSIS

### Measure of Predictive Accuracy

The area under the receiver operating characteristic (ROC) curve was used as the primary measure of predictive accuracy (Hanley & McNeil, 1982; Mossman, 1994; Rice & Harris, 1995). The ROC curve plots the hits (accurately identified recidivists) and false alarms at each level of the risk scale. The area under the ROC curve can range from 0.50 to 1.0, with 1.0 indicating perfect prediction (no overlap between recidivists and nonrecidivists) and 0.50 indicating prediction no better than chance. In general, the ROC area can be interpreted as the probability that a randomly selected recidivist would have a more deviant score than a randomly selected nonrecidivist. The ROC area has advantages over other commonly used measures of predictive accuracy (e.g., percentage agreement, correlation coefficients, RIOC) because it is not constrained by base rates or selection ratios (see Swets, 1986).

The correlation coefficient,  $r$ , is also presented to facilitate comparison with the results of other studies. For example, the average correlation between prior sex offenses and sex offense recidivism is 0.19 (95% Confidence Interval 0.17–0.21; Hanson & Bussière, 1998). To have utility in predicting long-term recidivism, risk scales must improve on this minimum standard.

### Comparing Results

Standard meta-analytic procedures were used to compare results across studies (Hedges & Olkin, 1985; Hedges, 1994; McClish, 1992). Variability across studies was indexed by the  $Q$  statistic:  $Q = \sum w_i (A_i - A)^2$ , where  $A_i$  is the ROC area for each sample,  $w_i$  is the weight for each sample (inverse of its variance  $- SE^2$ ), and  $A$  is the weighted grand mean ( $\sum w_i A_i / \sum w_i$ ). The  $Q$  statistic is distributed as  $\chi^2$  with degrees of freedom equal to  $k - 1$ , where  $k$  is the number of groups. The predictive accuracy of the risk scales was compared using the test of correlated ROC areas described by Hanley and McNeil (1983):  $Z = (A_1 - A_2) / (SE_1^2 + SE_2^2 - 2rSE_1SE_2)^{1/2}$ . The ROC statistics were computed using ROCKIT Version 0.9.1 (Metz, 1998).

### Estimating Recidivism Rates

Applied risk assessments are often concerned about whether offenders have a specific probability of recidivism (e.g., >50%). Because recidivism rates are highly influenced by the length of the follow-up period, recidivism probabilities were estimated using survival analysis (Allison, 1984; Soothill & Gibbens, 1978). Survival analysis calculates the probability of recidivating for each time period given that the offender has not yet reoffended. Once offenders recidivate, they are removed from the analysis of subsequent time periods. Survival analysis has the advantage of being able to estimate year-by-year recidivism rates even when the follow-up periods vary across offenders. Readers should be aware, however, that the estimates



**Table 3.** Predictive Accuracy of RRASOR, SACJ-Min, and Static-99 Across Samples (ROC Areas)

	Pinel	Millbrook	Oak Ridge	HM Prison 1979	Average		
					<i>A</i> .	<i>Q</i>	Sample size
Sexual recidivism							
RRASOR	0.71	0.66	0.62	0.71	0.68	3.56	1225
SACJ-Min	0.66	0.61	0.63	0.74	0.69	7.89*	1301
Static-99	0.73	0.65	0.67	0.72	0.70	3.42	1228
Any violent recidivism							
RRASOR	0.65	0.67	0.60	0.65	0.65	1.17	1228
SACJ-Min	0.65	0.65	0.67	0.69	0.67	2.24	1304
Static-99	0.71	0.71	0.69	0.69	0.69	1.52	1231

\* $p < 0.05$ .

for the longest follow-up periods can be unstable if there are few offenders remaining in the later years.

## RESULTS

As can be seen in Table 3, the predictive accuracy of the scales was relatively consistent across the samples. For both the RRASOR and Static-99, the amount of variability was no greater than would be expected by chance (all  $p > 0.30$ ). The SACJ-Min, however, showed significant variability in the prediction of sexual recidivism ( $Q = 7.89$ ,  $df = 3$ ,  $p < 0.05$ ). The SACJ-Min predicted sex offense recidivism best in HM Prison sample ( $A = 0.74$ ) and worst in the Millbrook sample ( $A = 0.61$ ).

The samples were combined to test directly the relative predictive accuracy of the RRASOR, SACJ-Min, and Static-99 (see Table 4). Only subjects who had complete data on all three risk scales were used in the combined sample (total  $n = 1208$ ). The average values of the scales in the combined samples were as follows: RRASOR mean = 1.77,  $SD = 1.29$ ; SACJ-Min, mean = 2.02,  $SD = 0.76$ ; Static-99 mean = 3.15,  $SD = 1.97$ . The comparison of predictive accuracy of the

**Table 4.** Relative Predictive Accuracy of the RRASOR, SACJ-Min, and Static-99

	Combined ( $n = 1208$ )				ROC area	
	ROC area	95% CI	$r$	95% CI	Rapists ( $n = 363$ )	Child molesters ( $n = 799$ )
	Sexual recidivism					
RRASOR	0.68	0.65–0.72	0.28	0.23–0.33	0.68	0.69
SACJ-Min	0.67	0.63–0.71	0.23	0.18–0.28	0.69	0.68
Static-99	0.71	0.68–0.74	0.33	0.28–0.38	0.71	0.72
Any violent recidivism						
RRASOR	0.64	0.60–0.67	0.22	0.16–0.27	0.64	0.66
SACJ-Min	0.64	0.61–0.68	0.22	0.16–0.27	0.62	0.66
Static-99	0.69	0.66–0.72	0.32	0.27–0.37	0.69	0.71

scales used the test for correlated ROC areas described by Hanley and McNeil (1983).

For the prediction of sex offense recidivism, Static-99 ( $A = 0.71$ ) was more accurate than the RRASOR ( $A = 0.68$ ,  $Z = 2.38$ ,  $p < 0.05$ ) or the SACJ-Min ( $A = 0.67$ ,  $Z = 2.84$ ,  $p < 0.01$ ). The RRASOR and SACJ-Min predicted sex offense recidivism with similar levels of accuracy ( $Z = 0.72$ ,  $p > 0.40$ ). For the prediction of any violent recidivism (including sexual), Static-99 ( $A = 0.69$ ) was more accurate than either the RRASOR ( $A = 0.64$ ,  $Z = 5.37$ ,  $p < 0.001$ ) or SACJ-Min ( $A = 0.64$ ,  $Z = 3.84$ ,  $p < 0.001$ ). The RRASOR and SACJ-Min did not differ in the accuracy with which they predicted violent recidivism ( $Z = 0.35$ ,  $p > 0.70$ ).

In order to test the generalizability of the scales across subgroups of sex offenders, the offenders were divided into those who victimized adult females (rapists,  $n = 363$ ) and those who victimized children (child molesters,  $n = 799$ ). The comparison of predictive accuracy across these groups used the test of uncorrelated ROC areas described by McClish (1992). All the scales showed similar predictive accuracy for both rapists and child molesters (all  $Z < 1$ , all  $p > 0.30$ ).

As can be seen from Figs. 1 and 2, the recidivism rates were very similar in the Pinel, HM Prison, and Millbrook samples (for sexual recidivism, Survival  $\chi^2 = 1.62$ ,  $df = 2$ ,  $p > 0.40$ ; for violent recidivism, Survival  $\chi^2 = 0.65$ ,  $df = 2$ ,  $p > 0.70$ ). Survival dates were not available for the Oak Ridge sample. Given the similarity in the samples, the three datasets (Pinel, HM Prison, and Millbrook) were combined for the purpose of creating estimated recidivism rates.

The relationship between Static-99 scores and sexual recidivism is presented

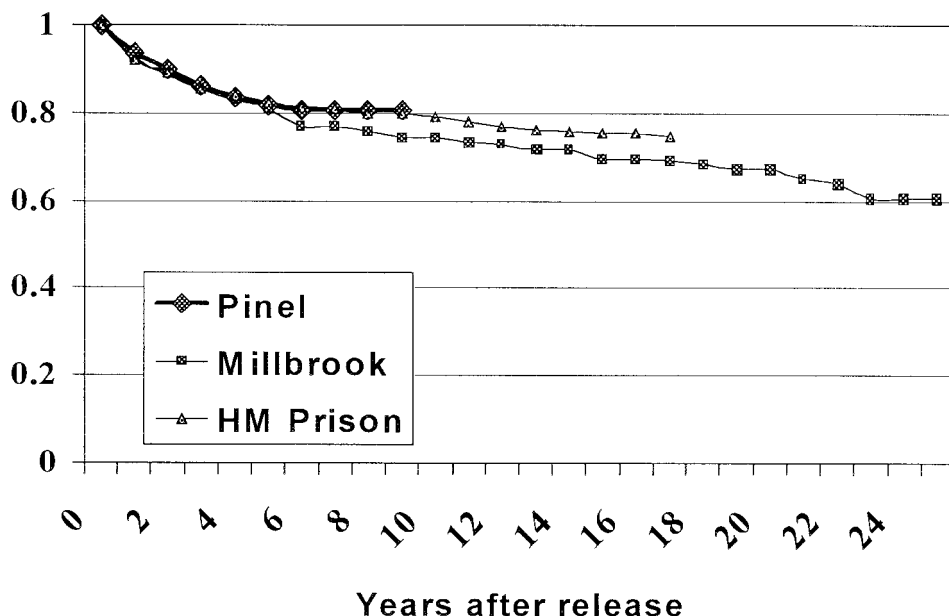


Fig. 1. Sex offense recidivism rates (survival curves) for offenders released from three institutions.

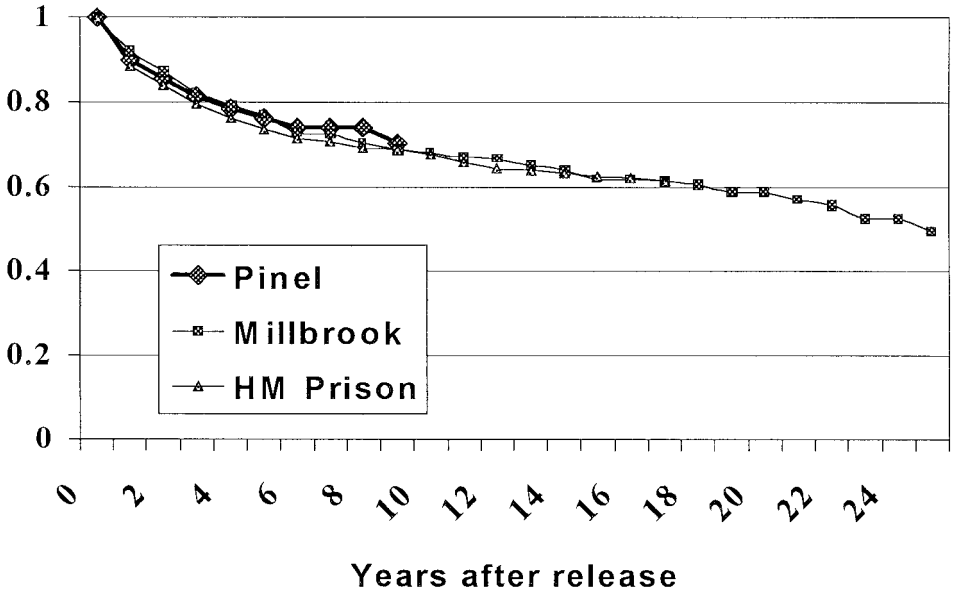


Fig. 2. Violent recidivism rates (survival curves) for offenders released from three institutions.

in Fig. 3. The Static-99 scores were categorized as low (0, 1;  $n = 257$ ), medium-low (2, 3;  $n = 410$ ), medium-high (4, 5;  $n = 290$ ), and high (6+  $n = 129$ ). To minimize the influence of isolated, late recidivism events, the survival curves ended when there were fewer than 15 offenders exposed to risk for a particular year. The observed 5-, 10-, and 15-year recidivism rates are presented in Table 5. The rates up to 15 years should be reasonably reliable because all the offenders in the HM Prison and Millbrook samples were followed for at least 15 years.

Static-99 identified a substantial subsample (approximately 12%) of offenders whose long-term risk for sexual recidivism was greater than 50%. The recidivism rates for the minimum entrant into the high-risk category (score of 6) was 37%, 44%, and 51% after 5, 10, and 15 years, respectively, postrelease. Most of the offenders, however, were in the lower risk categories, with long-term recidivism risk of 10% to 20%.

As can be seen in Fig. 4, offenders with high scores on Static-99 were also at substantial risk for any violent recidivism (approximately 60% violent recidivism rate over 15 years). The violent recidivism rate (including sexual) for the minimum entrant into the high-risk category (score of 6) was 46%, 53%, and 60% over 5, 10, and 15 years, respectively. The violent recidivism rate of Static-99's low-risk category (0, 1) was 17% after 15 years.

## DISCUSSION

The study compared the predictive accuracy of three sex offender risk assessment measures (RRASOR, SACJ-Min, and a combined scale, Static-99) across four

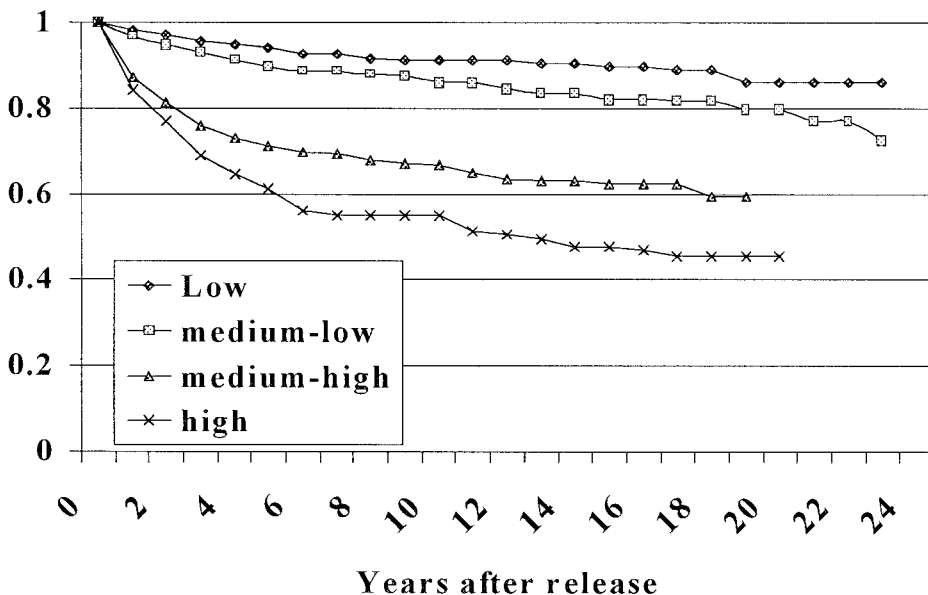


Fig. 3. The relationship of Static-99 scores to sexual recidivism.

datasets. The RRASOR and the SACJ-Min showed roughly equivalent predictive accuracy, and the combination of the two scales was more accurate than either original scale. The incremental improvement of Static-99, however, was relatively small. Static-99 showed moderate predictive accuracy for both sexual recidivism ( $r = 0.33$ , ROC area = 0.71) and violent (including sexual) recidivism ( $r = 0.32$ , ROC area = 0.69). The variation in the predictive accuracy of Static-99 across the four samples was no more than would be expected by chance.

If a risk scale is to be used in applied contexts, then it is important that the degree of predictive accuracy is sufficient to inform rather than mislead. Critics could suggest, for example, that a correlation in the 0.30 range is insufficient for decision making because it accounts for only 10% of the variance. Even if such an argument was correct (and many argue that it is not—see Ozer, 1985), most decision

Table 5. Recidivism Rates for Static-99 Risk Levels

Static-99 score	Sample size	Sexual recidivism			Violent recidivism		
		5 years	10 years	15 years	5 years	10 years	15 years
0	107 (10%)	0.05	0.11	0.13	0.06	0.12	0.15
1	150 (14%)	0.06	0.07	0.07	0.11	0.17	0.18
2	204 (19%)	0.09	0.13	0.16	0.17	0.25	0.30
3	206 (19%)	0.12	0.14	0.19	0.22	0.27	0.34
4	190 (18%)	0.26	0.31	0.36	0.36	0.44	0.52
5	100 (9%)	0.33	0.38	0.40	0.42	0.48	0.52
6+	129 (12%)	0.39	0.45	0.52	0.44	0.51	0.59
Average—3.2	1086 (100%)	0.18	0.22	0.26	0.25	0.32	0.37

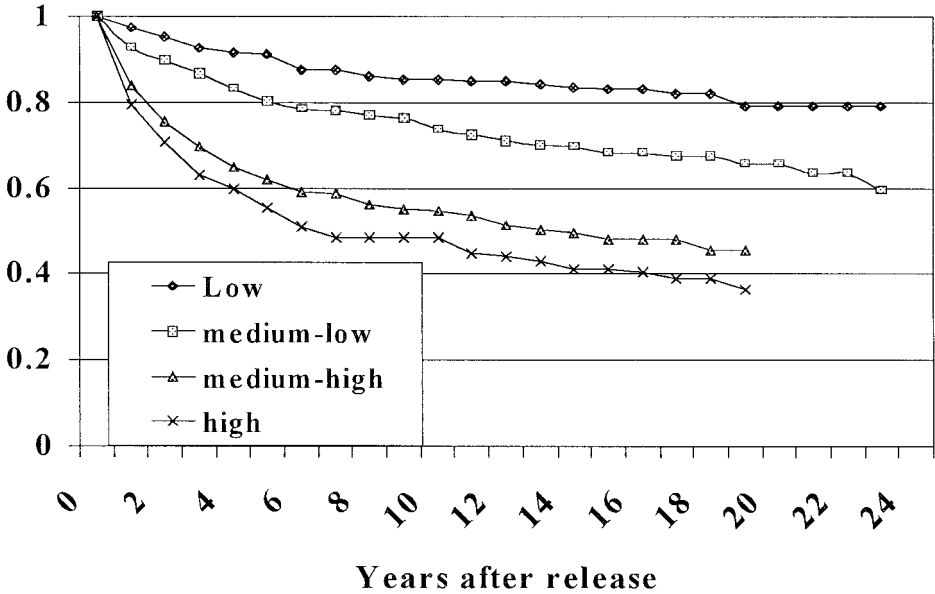


Fig. 4. The relationship of Static-99 scores to violent recidivism.

makers are not particularly concerned about “percent of variance accounted for.” Instead, applied risk decisions typically hinge on whether offenders surpass a specified probability of recidivism (e.g., >50%).

Estimating absolute recidivism rates is a difficult task because many sex offenses go undetected (e.g., Bonta & Hanson, 1994). Observed recidivism rates (especially with short follow-up periods) are likely to substantially underestimate the actual recidivism rates. Nevertheless, Static-99 identified a substantial subsample of offenders (approximately 12%) whose observed sex offense recidivism rate was greater than 50%. At the other end, the scale identified another subsample whose observed recidivism rates was only 10% after 15 years. Differences of this magnitude should be of interest to many applied decision makers.

The similarity in the observed recidivism rates across the samples allows some confidence in conviction rate estimates provided by Static-99. The degree of similarity was remarkable considering that the studies were drawn from different countries, different language groups, different settings (i.e., prison, secure hospital), and different decades. All the studies for which survival data was available used official conviction as the outcome criteria. However, the Oak Ridge sample had a higher recidivism rate than the other three samples. Thirty-five percent of the Oak Ridge sample recidivated with a sex offense recidivism rate within 10 years, whereas only 25% of the HM Prison Service recidivated after a longer follow-up period (16 years). The Oak Ridge recidivism rates were relatively high because they used a broad recidivism criteria (arrests, readmissions) and they may have included particularly high-risk offenders. In support of the later hypothesis, Scheffé’s *post hoc* tests found that the mean score on Static-99 was higher in the Oak Ridge sample (mean =

4.1) than in the other three samples (mean = 3.0). Whether recidivism rate differences would remain after controlling for preexisting risk levels could not be determined with the available data.

Another approach to judging a measure's predictive accuracy is to compare it to the available alternatives. For the prediction of sex offense recidivism, Static-99 is clearly more accurate ( $r = 0.33$ ) than unstructured clinical judgment (average  $r = 0.10$ ; Hanson & Bussière, 1998). The VRAG, one of best established risk assessment instruments, correlated only 0.20, with sex offense recidivism in a cross-replication (Rice & Harris, 1997). Quinsey et al. (1998) proposed a revision of the VRAG, for sexual offenders. In the Oak Ridge dataset, the SORAG and Static-99 predicted sex offense recidivism with similar levels of accuracy. Whether the SORAG shows equal accuracy in other datasets remains to be determined. The MnSOST-R appears to predict sex offense recidivism ( $r = 0.45$ ) somewhat better than Static-99, but the Min-SOST has yet to be fully cross-validated (Epperson et al., 1998).

Although Static-99 was designed to predict sex offense recidivism, it also showed reasonable accuracy in the prediction of any violent recidivism among sex offenders ( $r = 0.32$ , ROC area = 0.69). In comparison, a recent meta-analysis found the average correlation between Hare's Psychopathy Checklist-Revised (PCL-R; Hare, 1991) and violent recidivism was 0.27 ( $n = 1374$ ; Hemphill, Hare, & Wong, 1998). Static-99, however, may not be the instrument of choice when the goal is predicting any violent recidivism. The VRAG, for one, predicts any violent recidivism substantially better than the Static-99 ( $r = 0.47$ , ROC area = 0.77; in a cross-replication sample of 159 sex offenders; Rice & Harris, 1997). Nevertheless, Static-99 may be useful in settings that lack the time, resources, and/or information required to complete the VRAG.

Rater reliability for Static-99 could not be assessed directly in the current study because the scales were scored from existing datasets. An effort was made to promote rater reliability by selecting only clearly defined variables, but a certain amount of disagreement would be expected given the complexity of real cases. Evaluators wishing to minimize coding errors should study the coding rules in Appendix I and the corresponding RRASOR coding rules carefully (Phenix & Hanson, in press).

It is likely that actuarial risk scales can improve on Static-99 by including dynamic (changeable) risk factors as well as additional static variables. Many of the variables used in Static-99 can be grouped into general dimensions that are plausibly related to the risk of sex offense recidivism, such as sexual deviance, range of available victims, persistence (lack of deterrence or "habit strength"), antisociality, and age (young). Victimizing males, for example, has been correlated with deviant sexual preferences (Freund & Watson, 1991), and the willingness to victimize strangers indicates a wide range of potential victims. Deliberate efforts to create variables targeting these general risk dimensions has the promise of substantially improving the prediction of sex offense recidivism. Additional variables could include, for example, repetitive victim choice (same age and sex) as a marker for sexual deviance (see Freund & Watson, 1991), or early onset of sex offending as a marker of "persistence."

The inclusion of dynamic factors would likely increase the scale's predictive

accuracy (Hanson & Harris, 1998, in press). Among nonsexual criminals, dynamic variables predict recidivism as well as or better than static variables (Gendreau, Little, & Goggin, 1996). The research on dynamic factors related to sex offending is not well developed, but some plausible dynamic risk factors include intimacy deficits (Saidman, Marshall, Hudson, & Robertson, 1994), sexualization of negative affect (Cortoni, 1998), attitudes tolerant of sexual assault (Hanson & Harris, 1998), emotional identification with children (Wilson, 1999), treatment failure, and noncooperation with supervision (Hanson & Harris, 1998).

### Use of Static-99 in Sex Offender Risk Assessments

Static-99 is intended to be a measure of long-term risk potential. Given its lack of dynamic factors, it cannot be used to select treatment targets, measure change, evaluate whether offenders have benefited from treatment, or predict when (or under what circumstances) sex offenders are likely to recidivate.

There are several different ways in which empirically derived risk scales can be used in clinical assessments. Quinsey et al. (1998) argue for a pure actuarial approach: risk predictions are those provided by the actuarial scale with no allowances for other factors. They argue that clinical judgment is so much inferior to actuarial methods that any consideration of clinical judgment simply dilutes predictive accuracy.

Their position is plausible and likely true in many situations. When actuarial tools are available, they have generally proved more accurate than clinical judgment (Grove & Meehl, 1996). The prediction of sexual recidivism is no exception (Hanson & Bussière, 1998). Critics of pure actuarial prediction, however, argue that the existing scales fail to consider all relevant risk factors. Consequently, many evaluators conduct clinically adjusted actuarial predictions in which the actuarial predictions are adjusted up or down based on external factors.

Static-99 does not claim to provide a comprehensive assessment, for it neglects whole categories of potentially relevant variables (e.g., dynamic factors). Consequently, prudent evaluators would want to consider whether there are external factors that warrant adjusting the initial score or special features that limit the applicability of the scale (e.g., a debilitating disease or stated intentions to reoffend). Given the poor track record of clinical prediction, however, adjustments to actuarial predictions require strong justifications. In most cases, the optimal adjustment would be expected to be minor or none at all.

The Structured Risk Assessment (SRA) framework developed by David Thornton is one example of a structured approach to combining actuarial risk scales with other empirically based risk factors. The current version of SRA uses Static-99 as the first step in risk assessment. The second step uses the offenders' functioning on dynamic risk factors to revise this initial classification. Medium-risk cases are reclassified up as high risk if their functioning is psychologically similar to high-risk offenders, and it is reclassified down to lower risk if their functioning is psychologically similar to low-risk offenders. The third step uses information devised from response to treatment. The fourth step considers the offenders' typical offense pattern in conjunction with situational risk factors. This kind of system reflects the

complexity of the real situations in which risk assessment takes place. At each stage, the system is empirically based, becoming actuarial where practical and elsewhere using lesser, although still credible, forms of evidence (bivariate analyses, retrospective analyses, etc.). Two recent prospective studies (Allam, 1998; Clark, 1999, personal communication) found that the key dynamic components of the SRA improved on assessments using solely static factors.

Although Static-99 can differentiate meaningfully between sex offenders with higher or lower probabilities of recidivism, the labels used to describe the various risk levels (low, medium-low, medium-high, high) do not reflect any absolute standard of risk. The standard of tolerable risk depends on the context of the assessment. An offender with a 10% chance of sexual recidivism over 15 years may be a good candidate for conditional release (i.e., “low” risk), but an unacceptably high risk for holding positions of trust over children.

## CONCLUSION

The present study is part of growing body of research supporting empirically based risk prediction for sexual offenders. No risk prediction scheme will be entirely accurate, and the measures described in this article are far from perfect. Nevertheless, the current results are a serious challenge to sceptics who claim that sexual recidivism cannot be predicted with sufficient accuracy to be worthy of consideration in applied contexts. The value of unstructured clinical opinion can be questioned, but there is sufficient evidence to indicate that empirically based risk assessments can meaningfully predict the risk for sexual offence recidivism. It is up to future researchers and clinicians to build on the foundations that have already been established.

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## APPENDIX I Coding Rules for Static-99

Risk factor	Codes		Score
Prior sex offenses (same rules as in PRASOR) <sup>a</sup>	Charges	Convictions	
	None	None	0
	1–2	1	1
	3–5	2–3	2
	6+	4+	3



Prior sentencing dates (excluding index) <sup>b</sup>	3 or less	0
	4 or more	1
Any convictions for noncontact sex offenses <sup>c</sup>	No	0
	Yes	1
Index nonsexual violence <sup>d</sup>	No	0
	Yes	1
Prior nonsexual violence <sup>e</sup>	No	0
	Yes	1
Any unrelated victims <sup>f</sup>	No	0
	Yes	1
Any stranger victims <sup>g</sup>	No	0
	Yes	1
Any male victims <sup>h</sup>	No	0
	Yes	1
Young <sup>i</sup>	Age 25 or older	0
	Age 18–24.99	1
Single <sup>j</sup>	Ever lived with lover for at least 2 years?	
	Yes	0
	No	1
Total score	Add up scores from individual risk factors	

*Notes.* Static-99 is intended for males aged at least 18 who are known to have committed at least one sex offense involving a child or a nonconsenting adult. It is not recommended for men convicted only of prostitution, pornography, or public toileting offenses.

<sup>a</sup>Count only officially recorded offenses. These could include (1) arrests and charges, (2) convictions, (3) institutional rules violations, and (4) probation, parole, or conditional release violations arising from sexual assault, sexual abuse, sexual misconduct, or violence engaged in for sexual gratification. Prostitution and pornography offenses would count, provided that the offender has at least one sexual offense against a nonconsenting victim. Count only those prison or community supervision violations that would normally have resulted in a charge for a sexual offense if the offender had not already been under legal sanction. Do not count violations for sexual behavior that is a crime only because the offender is under legal sanction (e.g., failure to register as a sex offender, possession of legal pornography).

Nonsexual charges or convictions resulting from sexual behavior are counted as sexual offenses (e.g., voyeur convicted of trespass by night). When the offense behavior was sexual but resulted in a conviction for a violent offense (e.g., assault, murder), then the offender is considered to have committed both a sexual and nonsexual violent offenses and could receive points for both items.

Count only the number of sexual convictions or charges prior to the index offense. Do not count the sex offenses included in the most recent court appearance. Institutional rule violations and conditional release violations count as one charge. Use either charges or convictions, whichever indicates the higher risk. More detailed examples of scoring prior sex offenses are given in the RRASOR scoring guidelines (Phenix & Hanson, in press).

<sup>b</sup>Count the number of distinct occasions on which the offender has been sentenced for criminal offenses of any kind. The number of charges/convictions does not matter; only the number of sentencing dates. Court appearances that resulted in complete acquittal are not counted, nor is the index sentencing date.

<sup>c</sup>This category includes convictions for noncontact sexual offenses, such as exhibitionism, possessing obscene material, obscene telephone calls, and voyeurism. Self-reported offenses do not count in this category. The index offense does count.

<sup>d</sup>Refers to convictions for nonsexual assault that are dealt with on the same sentencing occasion as the index sex offense. These convictions can involve the same victim as the index sex offense or they can involve a different victim. All nonsexual violence convictions are included providing they were dealt with on the same sentencing occasion as the index sex offenses. Example offenses would include murder, wounding, assault causing bodily harm, assault, robbery, pointing a firearm, arson, and threatening.

<sup>e</sup>This category includes any conviction for nonsexual violence prior to the index sentencing occasion.

The previous items (*a–e* 1–5; prior offenses) are based on official records. The following items (*f–j*) are based on all available information, including self-report, victim accounts, and collateral contacts. Information based solely on polygraph testing (lie detector) would not count without corroborating evidence.

<sup>f</sup>A related victim is one for whom the relationship would be sufficiently close that marriage would normally be prohibited, such as parent, uncle, grandparent, or stepsister.

<sup>s</sup>A victim is considered to be a stranger if the victim did not know the offender 24 hours before the offense.

<sup>b</sup>Included in this category are all sexual offenses involving male victims. Possession of child pornography involving boys, however, would not count in this category. Indecent exposure to a group of boys and girls would not count unless it was clear that the offender was specifically targeting the boys.

<sup>i</sup>This item refers to the offender's age at the time of the risk assessment. If the assessment concerns the offender's current risk level, it would be his current age. If the assessment concerns an anticipated exposure to risk (e.g., release, reduced security at some future date), the relevant age would be his age when exposed to risk. Static-99 is not intended for those who are less than 18 years old at the time of exposure to risk.

<sup>j</sup>The offender is considered single if he has not lived with a lover (male or female) for at least 2 years. Legal marriages involving less than 2 years of cohabitation do not count.

#### Translating Static-99 Scores into Risk Categories

Score	Label for Risk Category
0, 1	Low
2, 3	Medium-low
4, 5	Medium-high
6+	High

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