

Does Static-2002 Fully Allow for the Effects of Age on Release

David Thornton, Leslie Helmus &

R. Karl Hanson

Paper presented at the ATSA 28th Annual Research and Treatment Conference in Dallas, October 2nd 2009

Age & Static Actuarial Assessment

- Existing static actuarial instruments designed to predict sexual recidivism all make some allowance for the offender's age
- A number of authors have argued that they don't make sufficient allowance for age
- Static-2002 deliberately incorporated a more differentiated age variable and weighted it empirically
- This paper uses new samples to ask two questions
 - Does Static-2002 make sufficient allowance for age?
 - How should Static-2002 be adjusted for age?

Static-2002 Age Coding

Age on Release	Points
50 or Older	0
35 - 49.9	1
25 - 34.9	2
18 - 24.9	3

Samples (Static-2002 Cross-Validation)

Sample	N with 5 year Follow Up
DSP	31
Langton	217
Knight & Thornton	433
Harkins & Beech	191
Proulx	199
Boer	296
Haag	190
Bengston	308

Type of Offender (not known for all subjects)

Type	N with 5 Year Follow Up
Rapist	474
Child-Molester	545
Voyeur/Exhibitionist	6
Mixed	45

Age and Five-Year Sexual Recidivism Rates

Age Category	% Recidivism	R/N
18 - 24	18%	42/234
25 - 34	20%	109/541
35 - 49	13%	83/625
50 - 59	9%	12/142
60+	4%	4/105

Age and Ten-Year Sexual Recidivism Rates

Age Category	% Recidivism	R/N
18 - 24	24%	43/176
25 - 34	27%	94/344
35 - 49	20%	77/386
50 - 59	16%	14/87
60+	6%	4/66

Contrasting this to the Static-2002 Age Coding

- The 25 - 34 group may be having their relative risk under stated while the 60+ group may be having it over-stated

Logistic Regression Equation

- Step 1
 - Sample as a categorical variable
- Step 2
 - Static-2002
- Step 3
 - Linear component of age
- Step 4
 - Quadratic component of age

5-Year Sexual Recidivism (N=1647)

	B	Sig
Control Factors		
Sample		
Static - 2002		
Age		
Linear Age	-0.008	NS
Age Age-Squared	+0.063 -0.000	NS 0.082

10-Year Sexual Recidivism (N=1059)

	B	Sig
Control Factors		
Sample		
Static - 2002		
Age		
Linear Age	+0.001	NS
Age Age-Squared	+0.094 -0.001	0.027 0.027

Summary of Results

- Age coding in Static-2002 pretty well allows for the linear effect of age but there is a non-linear (quadratic) effect that should be adjusted for

Getting a clearer Picture

- The shape of the Age effect in these data is easier to see if we drop the Static-2002 age item, then see how the different components of Age (linear and quadratic) add to prediction when the AgeLessStatic-2002 is controlled for

Logistic Regression Equation

- Step 1
 - Sample as a categorical factor
- Step 2
 - AgelessStatic-2002
- Step 3
 - Linear Age
- Step 4
 - Quadratic Age

5-Year Sexual Recidivism (N=1647)

	B	Sig
Control Factors		
Sample		
AgelessStatic-2002		
Age		
Linear Age	-0.027	0.000
Age Age-Squared	+0.020 -0.000	NS NS

10-Year Sexual Recidivism (N=1059)

	B	Sig
Control Factors		
Sample		
AgelessStatic-2002		
Age		
Linear Age	-0.017	0.018
Age Age-Squared	+0.054 -0.000	NS NS

Conclusion

- The effect of age after controlling the effect of the rest of Static-2002 seems to be basically linear
- This is consistent with similar analyses done for Static-99
- This suggests that the problem with the linear coding of the Static-2002 age item is that it doesn't take into account the effect of aging in the oldest age group (60+)

A Way Forward

- A new coding for the Static-99 Age has been developed that more fully takes into account the effect of age
- This item was developed using very large samples
- Would it improve Static-2002 to replace the existing age item with the new Static-99 age item?

Logistic Regression

- Step 1
 - Sample as a categorical factor
- Step 2
 - Static-2002R
- Step 3
 - Linear Age
- Step 4
 - Quadratic Age

New Age Coding

Age Band	Points
18 - 34.999	+1
35 - 39.999	0
40 - 59.999	-1
60+	-3

5-Year Sexual Recidivism (N=1647)

	B	Sig
Control Factors		
Sample		
Static - 2002R		
Age		
Linear Age	-0.005	NS
Age Age-Squared	+0.029 +0.000	NS NS

10-Year Sexual Recidivism (N=1059)

	B	Sig
Control Factors		
Sample		
Static - 2002R		
Age		
Linear Age	+0.004	NS
Age Age-Squared	+0.063 -0.000	NS NS

- Using the new Static-99 Age item in Static-2002 gives a revised scale which better accounts for the effects of age.
- Using this revised version of Static-2002 means that no further adjustment on the basis of age would improve prediction

Comparing Static-2002 to Static-2002R

- Does one add predictive value to the other?
 - Logistic Regression
 - Step 1 - SAMPLE
 - Step 2 - Static-2002 & Static-2002R

Logistic Regression for 5-Year Sexual Recidivism

Predictor	B	Sig
Static-2002	+0.009	NS
Static-2002R	+0.251	0.061

Logistic Regression for 10-Year Sexual Recidivism

Predictor	B	Sig
Static-2002	-0.043	NS
Static-2002R	+0.283	0.046

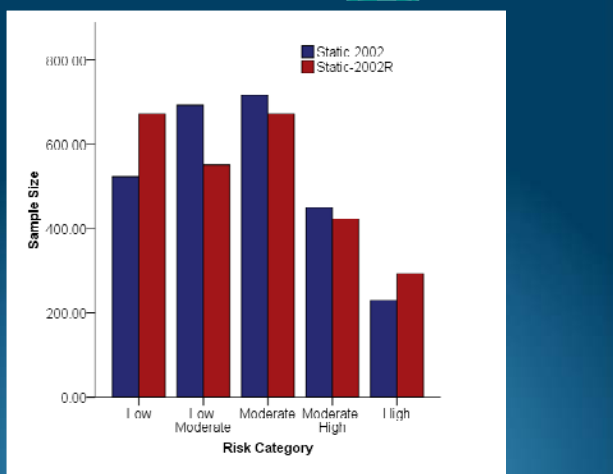
Conclusion

- Static-2002R adds predictive value over and above Static-2002
- The predictive value of Static-2002 is fully incorporated in Static-2002R

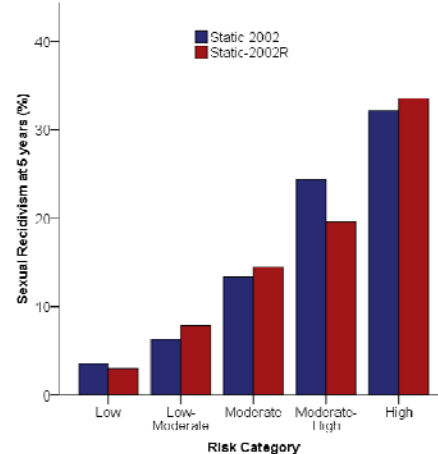
Comparison of Static-2002 and 2002R Scores

- Distributions
- Recidivism Rates
- AUCs within Age Group
- Mean Score by Age Category

Distribution of Sex Offenders by Risk Category



Percentage of Sexual Recidivists by Risk Category



Note. Survival analysis used to compute recidivism rates

ROC Analyses

	n	Static-2002	Static-2002R
< 50	2,146	.698	.693
50+	467	.765	.769
60+	189	.694	.694
70+	51	.280	.280

Note

- Apparent reduction in AUC in the 60+ group is mainly due to a restriction of range on the predictor (few high scores) rather than a real loss of predictive accuracy

Age and Static-2002R

Age	n	Mean Static-2002
< 50	2,146	5.3
50 – 59.999	287	2.3
60 – 69.999	138	0.0
70+	51	-0.2

Static-2002R Results for Different Age-Bands

- Recidivism rates by score within different age bands
- With Ns

Sexual Recidivism (5-year Survival)

Static-2002R category	Less than 50		50+	
	Initial n	% recid	Initial n	% recid
Low	354	4.2	319	1.7
Low-Mod	477	7.0	74	13.3
Mod	624	14.9	49	8.4
Mod-High	399	19.1	24	28.1
High	293	33.5	0	

Sexual Recidivism (5-year Survival)

Static-2002R category	Less than 60		60+	
	Initial n	% recid	Initial n	% recid
Low	519	3.3	154	2.1
Low-Mod	534	7.6	17	13.1
Mod	660	14.6	13	7.7
Mod-High	418	19.6	5	20.0
High	293	33.5	0	

Sexual Recidivism (5-year Survival)

Static-2002R category	Less than 70		70+	
	Initial n	% recid	Initial n	% recid
Low	630	3.1	43	2.3
Low-Mod	548	7.9	3	0.0
Mod	669	14.6	4	0.0
Mod-High	422	19.6	1	0.0
High	293	33.5	0	

Overall Conclusions

- Static-2002R accounts for the effects of age more completely than Static -2002
- AUCs seem to be acceptable for age groups up to and including 60+, but not for the 70+ group
- The Ns available in the older groups are not sufficient to justify recidivism estimates for specific risk categories; although the observed recidivism rate for the Low risk group does indeed seem to be different from that for the higher risk categories
- High risk cases in the older age groups are truly rare