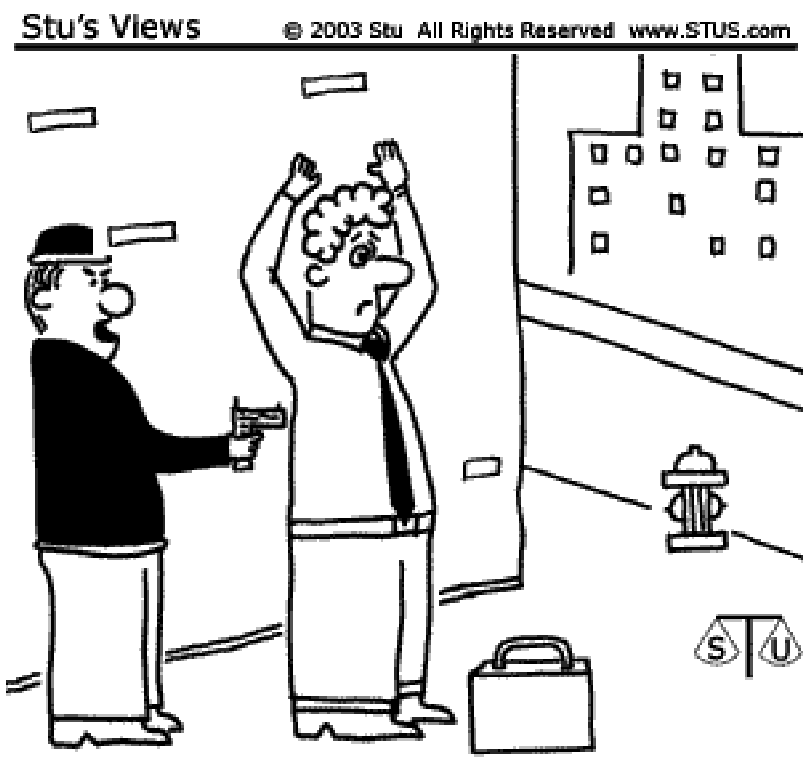
Henry L. Earl
(1949 – 2024)

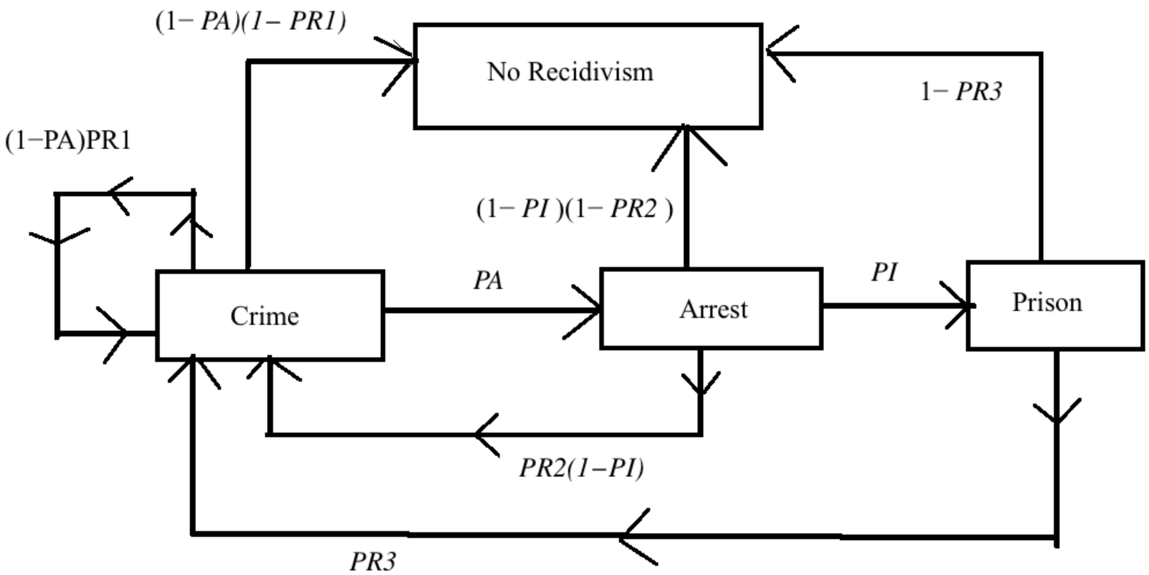
RECIDIVISM:

Part II



"They say computer crime is the wave of the future. But to me, you just can't beat one-on-one human contact."

RECIDIVISM II



P_A = Probability that an offender is arrested after committing a crime

P_I = Probability that arrested offender is incarcerated

P_{R1} = Probability that unapprehended offender commits at least one more crime.

P_{R2} = Probability that offender who has been arrested but not incarcerated will commit at least one more crime.

P_{R3} = Probability that incarcerated offender commits at least one more crime after release.

	No Recidivism	Crime	Arrest	Prison
No **Recidivism**	1	0	0	0
Crime	$(1 - P_A)(1 - P_{R1})$	$(1 - P_A) P_{R1}$	P_A	0
Arrest	$(1-P_{R2})(1 - P_I)$	$P_{R2}(1 - P_I)$	0	P_I
Prison	$1 - P_{R3}$	P_{R3}	0	0

Recidivism can be measured in at least 3 different ways:

Pr(C | C) = Probability (Offender will commit at least one more crime **given** he has just committed one)

Pr(A | A) = Probability (Offender will be arrested at least one more time **given** he has just been arrested).

Pr(I | I) = Probability (Offender will be incarcerated at least one more time **given** he has just been incarcerated)

Last Time: We showed

$$\Pr(C \mid C) = P_{R1}(1 - P_A) + P_A P_{R2}(1 - P_I) + P_A P_I P_{R3}$$

$$\Pr(A \mid A) = \frac{P_A [P_{R2} (1 - P_I) + P_I P_{R3}]}{1 - P_{R1}(1 - P_A)}$$

$$\Pr(I \mid I) = \frac{P_{R3} P_A P_I}{1 - P_{R1}(1 - P_A) - P_A (1 - P_I) P_{R2}}$$

"I think what I miss most is robbing people."

"It's interesting –with each conviction I learn a little more about myself."

Comparison of The Three Measures

Simplifying Assumptions:

1) The criminal justice system has no effect on an individual's propensity to return to crime:

$$P_{R1} = P_{R2} = P_{R3} = P$$

Then Pr(C | C) = P

$$Pr(A \mid A) = \frac{P\,P_A}{1 - Pr(1 - P_A)}$$

$$Pr(I \mid I) = \frac{P\,P_A P_I}{1 - P + P_A P_I P}$$

2) $PA = PI = 1/4$

These assumptions yield

$$Pr(C \mid C) = P$$
$$Pr(A \mid A) = P/(4 - 3P)$$
$$Pr(I \mid I) = P/(16 - 15P)$$

so the transition matrix looks like

$$\begin{array}{c} \text{No Recidivism} \\ \text{Crime} \\ \text{Arrest} \\ \text{Prison} \end{array} \begin{pmatrix} 1 & 0 & 0 & 0 \\ \frac{3(1 - P)}{4} & \frac{3P}{4} & \frac{1}{4} & 0 \\ \frac{3(1 - P)}{4} & \frac{3P}{4} & 0 & \frac{1}{4} \\ 1 - P & P & 0 & 0 \end{pmatrix}$$

The fundamental matrix $N = (I - Q)^{-1}$ is

$$N = \frac{1}{1 = P} \begin{array}{c} \\ \text{Crime} \\ \text{Arrest} \\ \text{Prison} \end{array} \begin{array}{c} \begin{array}{ccc} \text{Crime} & \text{Arrest} & \text{Prison} \end{array} \\ \begin{pmatrix} 1 & 1/4 & 1/16 \\ P & (4-3P)/4 & (4-3P)/16 \\ P & P/4 & (16-15P)/16 \end{pmatrix} \end{array}$$

"It hasn't been easy, but I'm very proud of their low recidivism rate."

$$\Pr(C \mid C) = P_{R1}(1 - P_A) + P_A P_{R2}(1 - P_I) + P_A P_I P_{R3}$$

$$\text{If } P_{R1} = P_{R1} = P_{R1} = p$$

$$Pr(C \mid C) = p(1 - P_A) + P_A\, p\,(1 - P_I) + P_A P_I\, p$$

$$= p\,[1 - P_A) + P_A(1 - P_I) + P_A P_I]$$

$$= p$$

$$Pr(A \mid A) \quad =$$

$$\frac{P_A\,[P_{R2}\;(1 - P_I) \;+ P_I\,P_{R3}\,]}{1 - P_{R1}\,(1 - P_A\,)}$$

$$= \frac{P_A\,[p\;(1 - P_I) \;+ P_I\,p\,]}{1 - p(1 - P_A\,)}$$

$$= \frac{pP_A}{1 - p\,(1 - P_A\,)}$$

$$Pr(I \mid I) =$$

$$\frac{P_{R3}\, P_A\, P_I}{1 - P_{R1}\,(1 - P_A) - P_A\,(1 - P_I)\, P_{R2}}$$

$$= \frac{p\, P_A\, P_I}{1 - p\,(1 - P_A) - P_A\,(1 - P_I)\, p}$$

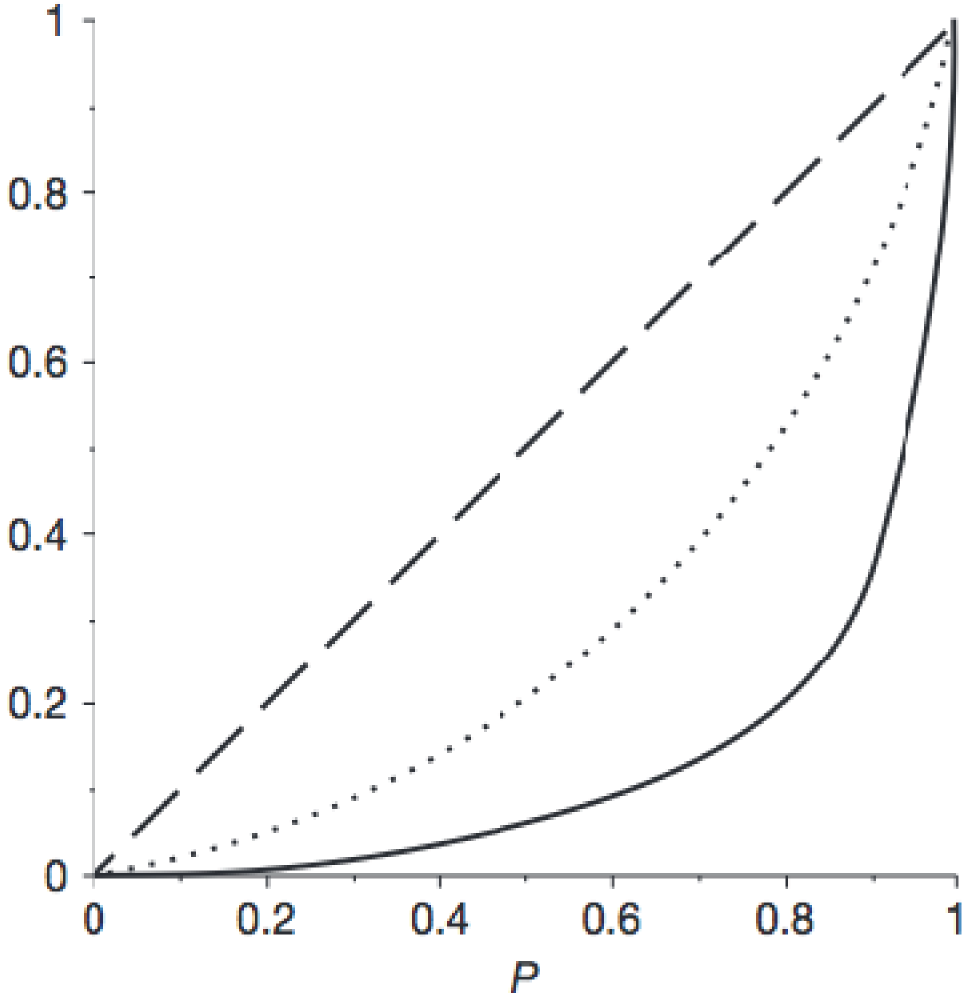
$$= \frac{p\, P_A\, P_I}{1 - p + pP_A\, P_I}$$

***Second Assumption:* PA = PI = 1/4**

$$Pr(C \mid C) = p$$

$$Pr(A \mid A) = \frac{pPA}{1 - p\,(1 - PA)} = \frac{\frac{p}{4}}{1 - \frac{3p}{4}} = \frac{p}{4 - 3p}$$

$$Pr(I \mid I) = = \frac{p\,PA\,PI}{1 - p + pPA\,PI} = \frac{p\,\frac{1}{4}\,\frac{1}{4}}{1-p+\frac{1}{4}\,\frac{1}{4}\,p} = \frac{p}{16 - 15p}$$



$$Pr(C \mid C) = p$$

$$Pr(A \mid A) = \frac{p}{4 - 3p}$$

$$Pr(I \mid I) = \frac{p}{16 - 15p}$$

Example:

$p = .9$ (high rate of crime repetition)

Then $Pr(A \mid A) = \dfrac{p}{4 - 3p} = .69$

$$Pr(I \mid I) = \frac{p}{16 - 15p} = .36$$

(low rate of reincarceration)

Going in the opposite direction:

Suppose $Pr(I \mid I) = 1/10$

Then $$\frac{p}{16 - 15p} = \frac{1}{10}$$

so $p = 16/25 = .64 = Pr(C \mid C)$

and $Pr(A \mid A)$

$$= \frac{\frac{16}{25}}{4 - \frac{48}{25}} = \frac{16}{52} \sim .31$$

$$t_{Crime} = \frac{1 + \frac{1}{4} + \frac{1}{16}}{1 - p}$$

$$t_{Arrest} = \frac{p + \frac{4-3p}{4} + \frac{4-3p}{16}}{1-p} = \frac{p + 20}{16\,(1 - p)}$$

$$t_{Incarceration} = \frac{\mathrm{p} + \frac{p}{4} + \frac{16 - 15p}{16}}{1 - p} =$$

$$\frac{5p + 16}{16\,(1 - p)}$$

$$t = \frac{1}{16(1-p)} \begin{pmatrix} 21 \\ 20 + p \\ 16 + 5p \end{pmatrix}$$


STOP THE CYCLE
REFORM THE SYSTEM
DEPT.
OF
CORRECTIONS

With $p = 9/10$,

$$N = \begin{array}{c} \\ \text{Crime} \\ \text{Arrest} \\ \text{Prison} \end{array} \begin{array}{c} \text{Crime Arrest Prison} \\ \begin{pmatrix} 10 & 5/2 & 5/8 \\ 9 & 13/14 & 13/16 \\ 9 & 9/4 & 25/16 \end{pmatrix} \end{array}$$

We can't observe:

$N_{CC}, N_{CA}, N_{CI}, N_{AC}, N_{IC}$

But we can observe:

$N_{AA}, N_{AI}, N_{IC}, N_{II}$

BLUMSTEIN-LARSON

The number of subsequent arrests on index charges of a person arrested for a first index change ranged from 2.2 to 2.8:

Now $N_{AA} = \frac{4 - 3p}{4 - 4p}$ so with $x = \frac{4 - 3p}{4 - 4p}$, we have $p = \frac{x - 1}{x - 3/4}$

$$t = \frac{1}{16(1-p)} \begin{pmatrix} 21 \\ 20 + p \\ 16 + 5p \end{pmatrix}$$

With $p = 9/10$

$$t = \begin{pmatrix} 210/16 \\ 209/16 \\ 205/16 \end{pmatrix} \sim \begin{pmatrix} 13.125 \\ 13.06 \\ 12.81 \end{pmatrix}$$

x	$\frac{x-1}{x - 3/4}$
1	0
3/2	.67
2	.8
5/2	.86
3	.89
3.2	.9
7/2	.91
3.8	.92
4	.92
5	.94
6	.95
7	.96
8	.97

For range [3.2, 3.8], p varies between .9 and .92

With p =.91:

$N_{AI} = .89$ $N_{IA} = .2.53$

$N_{II} = 1.67$ $N_{CC} = 11$

Blumstein-Larson model predicts that the average number of prison sentences for someone who has just been incarcerated is 1.67.

The *Uniform Parole Reports Newsletter* *(*November 1972), issued by the National Council on Crime and Delinquency: A large national sample of men released on parole showed the mean number of prison arrests to be ….

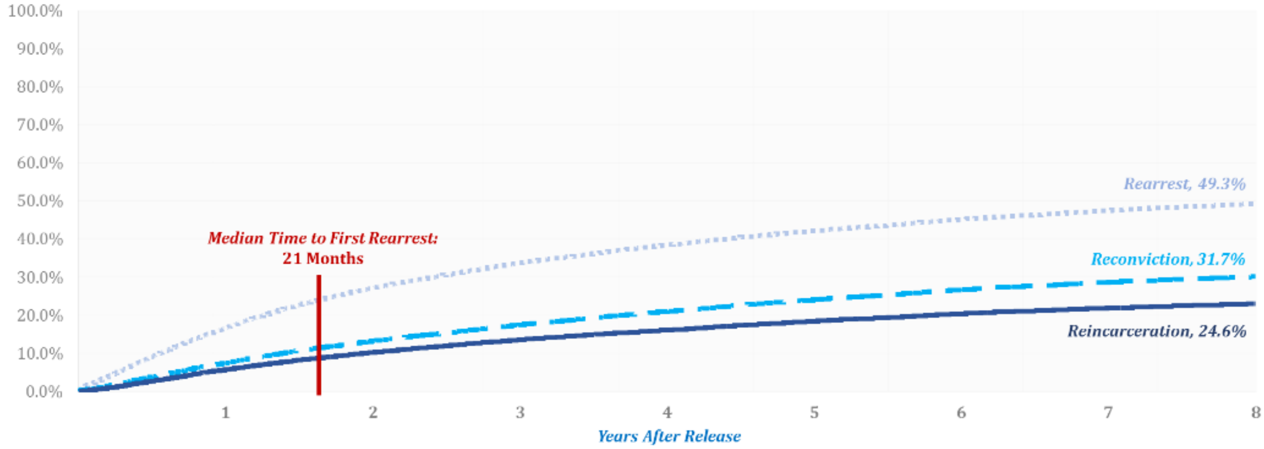
1.67

The Commission found that two factors – offenders' criminal histories and their ages at the time of release into the community – were most closely associated with differences in recidivism rates.

Younger offenders recidivated at significantly higher rates than older offenders, and offenders with more extensive criminal histories recidivated at significantly higher rates than offenders with lesser criminal histories.

Figure 4.
Time to First Rearrest of Recidivism Study Offenders

SOURCE: U.S. Sentencing Commission's 2005 Recidivism Release Cohort Datafile, RECID05.



SOURCE: U.S. Sentencing Commission's 2005 Recidivism Release Cohort Datafile, RECID05. The reconviction and reconfinement lines indicate time to first arrest that led to a conviction and time to first arrest that led to a confinement, respectively.

Table 2.
Rearrest Rates for Recidivism Study Offenders

Years After Release	%	Cumulative %
One Year After Release	16.6%	16.6%
Two Years After Release	10.5%	27.1%
Three Years After Release	6.6%	33.7%
Four Years After Release	4.7%	38.4%
Five Years After Release	3.7%	42.1%
Six Years After Release	3.0%	45.1%
Seven Years After Release	2.3%	47.5%
Eight Years After Release	1.8%	49.3%

SOURCE: U.S. Sentencing Commission's 2005 Recidivism Release Cohort Datafile, RECID05.

"This next song is for everyone who has ever been incarcerated."

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Prison based college education effectively lowers recidivism.


IT'S EITHER BUYING NEW PRISONS OR RELEASING 10,000 INMATES- WHAT'S THE ALTERNATIVE?
STOP SENDING NON-VIOLENT CRIMINALS TO PRISON