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EB - 020

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Exploring Causes of Recidivism and Rehabilitative Inefficiencies

Abstract:

Since 1954, the United States government has focused heavily on implementing and improving rehabilitative programs in an attempt to decrease recidivism. However, despite their best efforts, over a 10 year span, at least 82% of criminals who are released from prison end up incarcerated again as a result of them reoffending. This highlights two separate issues. Firstly, current rehabilitation programs are not successfully reeducating criminals before releasing them back into society. Secondly, the root cause of recidivism has gone unaddressed both societally and governmentally. This project examines data on criminal recidivism in order to determine where and how our rehabilitation program falters, and in the process uncover how to better protect civilians from reoffending criminals. Societal safety is best achieved when rehabilitation programs widen their focus from drug treatment and anger management courses to include education and employment opportunities.

Introduction:

Thomas Jefferson once remarked: "The first duty of government is the protection of life, not its destruction". While one might argue that the government of a militarily powerful country such as the United States of America has fulfilled its duty, it is crucial to note that this responsibility is not exclusive to protecting against foreign threats but also includes deterrence against domestic ones as well. Under this expanded framework, cracks begin to show when the United States's criminal justice system is placed under closer scrutiny. According to an official report published by the Federal Bureau of Investigation's Criminal Justice Information Services Division, each year, the lives of more than fourteen million Americans are irreparably changed by criminal activity that our government should be trying its best to curtail ("FBI Releases 2023 Crime in the Nation Statistics"). Many of these crimes are committed by people the government has labelled as "re-offenders"; those who, once released from prison at their sentence's conclusion re-enter society only to commit another crime and be reincarcerated. Despite this sounding like an irregular occurrence, the observed rate at which these perpetrators end up back in jail, also known as the recidivism rate, is estimated to be eighty two percent over a ten year period (*Justice Department Releases Ten-Year Recidivism Study | Prison Legal News*). When these two statistics are jointly taken into consideration the shortcomings of America's justice system becomes clear. A disproportionate percentage of the crimes committed are by re-offenders whom the government improperly deemed "safe" to release back into society, which suggests that on an annual basis, nearly eleven and a half million preventable crimes are a consequence of recidivism, an alarming number considering how many decades this has continued for.

Theoretical Framework:

It is my hypothesis that rehabilitative efforts in inadequate methods of combating recidivism, and that the United States Federal Government ought to pivot to a more educational and employment-centric re-entry system.

Data Description:

In 1954, the United States Federal Government adopted rehabilitative programs across all federal prisons in an attempt to combat rampant criminal activity (Wikipedia contributors). Despite their well-intentioned efforts, more than seventy years later they have very little to show for their efforts. This suggests that there are several flaws in the way that these programs are run, and whether or not they truly address the root cause of recidivism. These two assumptions can be quantified numerically by running regressions on available data. The United States Department of Justice released cross-sectional data with 25,835 observational units over a span of 3 years with each one representing a specific criminal. They were measured across 57 variables including but not limited to gender, age, education, years spent in prison, drug test results, prior charges, gang affiliation, whether they recidivated, and what percentage of time outside of prison the individual was employed for (*NIJ's Recidivism Challenge Full Dataset | Office of Justice Programs*).

Empirical Analysis:

(Set up):

Since the project's goal is to examine the effect of these variables on recidivism to determine where the current rehabilitative infrastructure falls short, recidivism is going to be predominantly used as the (Y_i)dependent variable and calculated based on (X_i)independent variables such as education, employment, and gang affiliation.

Rehabilitation:

Before examining alternative paths, I ran a regression that represented the status quo, i.e. the raw effect of rehabilitation on recidivism. For each rehabilitative program attendance, the coefficient was a -0.04, which while highly significant, when inputted into a probability model only led to a 10% decrease in someone's likelihood to recidivate given that everyone attended the maximum number of rehabilitation sessions possible.

```
Coefficients:          Estimate Std. Error z value Pr(>|z|)
(Intercept)            0.429914   0.016201   26.54   <2e-16 ***
Program_Attendances   -0.040335   0.003378  -11.94   <2e-16 ***
Prediction:
x predicted   conf.low conf.high
1    0 0.6058530 0.5982458 0.6134093
2    1 0.5961812 0.5894023 0.6029235
3    2 0.5864340 0.5802050 0.5926353
4    3 0.5766186 0.5705652 0.5826491
5    4 0.5667423 0.5604427 0.5730204
6    5 0.5568128 0.5498786 0.5637249
7    6 0.5468376 0.5389668 0.5546850
8    7 0.5368247 0.5278058 0.5458196
9    8 0.5267820 0.5164738 0.5370674
10   9 0.5167176 0.5050284 0.5283885
11  10 0.5066396 0.4935112 0.5197588
```


Recidivism Probability by Program Attendance
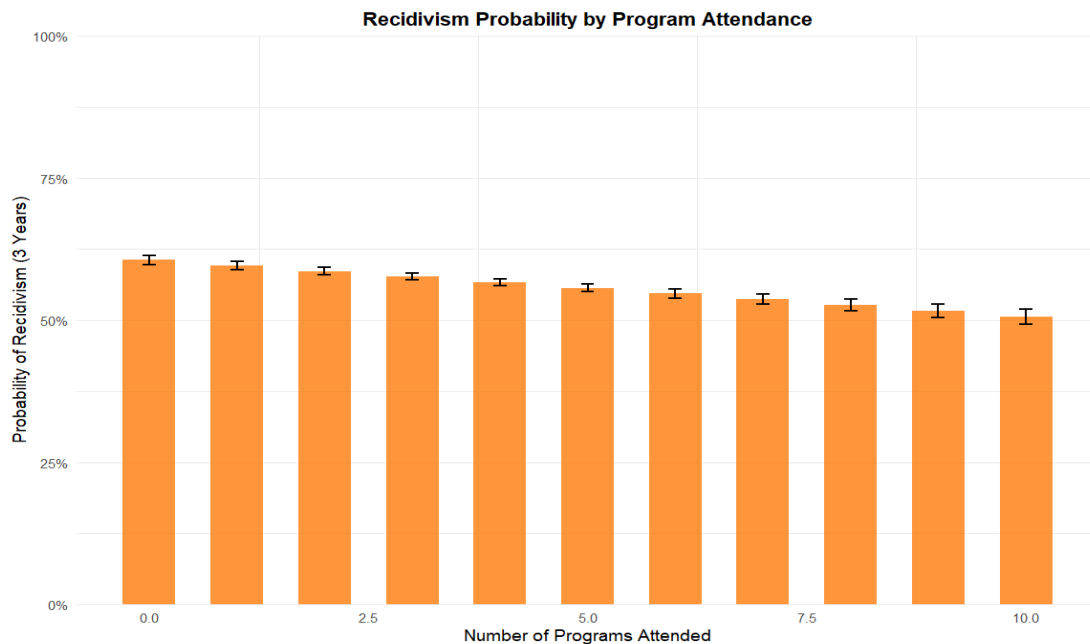
Severity of Punishment(Length of Sentencing):

Given that rehabilitation at it's best was only able to reduce recidivism by a middling amount, I checked to see the effect of more stringent punishment on someone's likeliness to re-offend. The data table's variable: Prison_Years, when regressed on recidivism had progressively more impactful coefficients. Using the least stringent punishment as a reference point, which was less than a year in prison, the category of criminals that spent between one and two years had a coefficient of -0.172. This value significantly increased in correlation with stricter punishment, as the category of those imprisoned for longer than three years had a coefficient of -0.728. Not only were both of these figures significant, when this variable was plugged into a probability simulation it posited that stricter punishment was associated with an 18% decrease in recidivism, nearly double that of rehabilitation.

```
(Intercept)                          0.59065    0.02327  25.379  < 2e-16 ***
Prison_Years_Ordinal1-2 years       -0.17197    0.03253  -5.286 1.25e-07 ***
Prison_Years_Ordinal2-3 years       -0.41286    0.03873 -10.660  < 2e-16 ***
Prison_Years_OrdinalMore than 3 years -0.72842  0.03568 -20.417  < 2e-16 ***
Prediction:        x predicted  conf.low conf.high
1  Less than 1 year 0.6435139 0.6329826 0.6539082
2          1-2 years 0.6031667 0.5924544 0.6137811
3          2-3 years 0.5443309 0.5292456 0.5593353
4 More than 3 years 0.4656114 0.4524508 0.4788199
```


Recidivism Probability by Length of Stay

Education:

Having determined that keeping criminals locked up for slightly longer had a positive impact on general safety, the question becomes where this time should be allocated to. Given that the standard rehabilitative's best case scenario is only a 10% decrease in recidivism, it is reasonable to assume it needs some type of adjustment. While anger management courses and drug addiction treatment are important, statistically, they are best complemented by educational courses as well. The data divided criminals into those who had and had not gone to college in order to determine the efficacy of higher education on recidivism. Regressing education on recidivism outputted a coefficient of -0.633, which in probability terms, is equivalent to a 16% decrease in recidivism, measurably outpacing standard rehabilitative procedures.

```
Coefficients:                      Estimate Std. Error z value Pr(>|z|)
(Intercept)                         0.42552    0.01404   30.31   <2e-16 ***
Education_UnorderedSome College    -0.63344    0.03279  -19.32   <2e-16 ***
Prediction:     x predicted  conf.low conf.high
1 Without College 0.6048045 0.5982095 0.6113616
2    Some College 0.4482085 0.4338920 0.462611
```


**Recidivism Probability by Education Level**
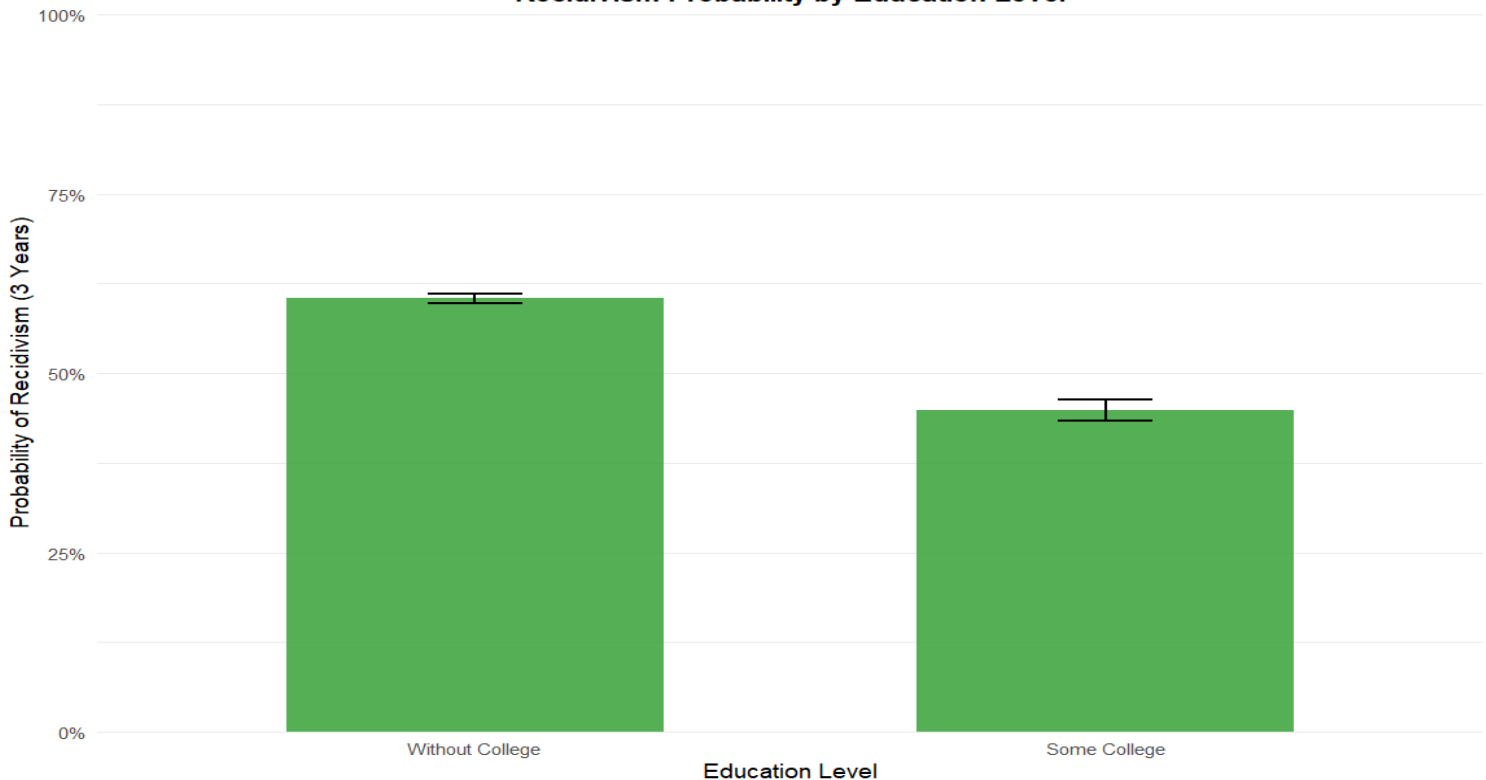
Employment:

Education's significant impact on recidivism is intuitive. Higher education unlocks employment opportunities that draw people away from crime ridden social circles while simultaneously decreasing their financial incentive and temporal availability to commit crime. The data set measured the percent of days spent employed once released from prison, which I regressed on recidivism. I used 0% as the reference point and broke the available data into 5 categories with each interval of 25% representing a new employment bracket. This produced a coefficient of -1.196, and a recidivism probability reduction of 29%, significantly beating out all other measures and proving that providing access to employment via higher education, which was made available by extending criminals stay to ensure its completion, was the ideal route for rehabilitative programs that seek to reduce recidivism rates.

```
Coefficients:               Estimate Std. Error z value Pr(>|z|)
(Intercept)                  0.95242    0.02090   45.57   <2e-16 ***
Percent_Days_Employed       -1.19580    0.03125  -38.27   <2e-16 ***
Prediction:
     x predicted  conf.low conf.high
1 0.00 0.7216007 0.7132970 0.7297550
2 0.25 0.6577909 0.6508661 0.6646492
3 0.50 0.5877120 0.5814468 0.5939490
4 0.75 0.5138876 0.5065477 0.5212215
5 1.00 0.4394522 0.4298447 0.4491053
```


Recidivism Probability by Employment Level
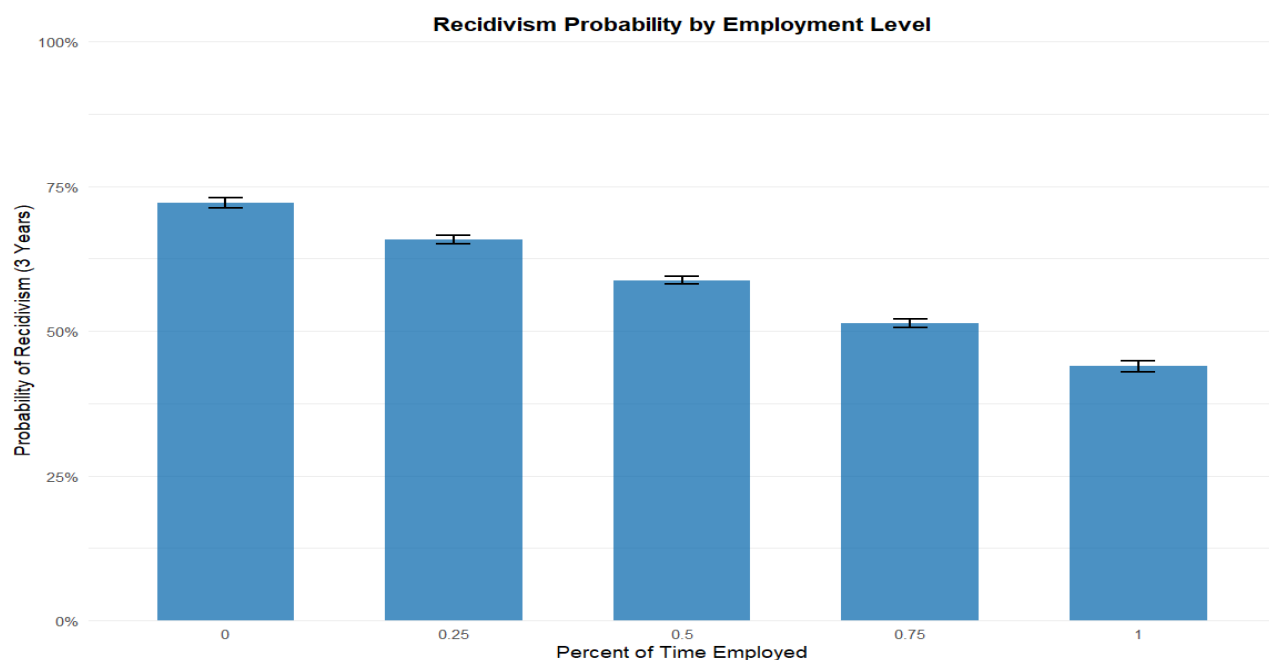
Limitations:

All of these variables have focused on measurable individual characteristics without much attention to social and economic factors which are undoubtedly integral for gaining an accurate picture of how to best combat recidivism. Unfortunately the data of interest is largely missing from the data set. There are three specific areas of particular importance with regards to recidivism: economic status, whether or not the criminal was raised in a single parent home, and if they had some affiliation with some gang(the only socio-economic variable accounted for in the data). A study conducted by Michigan State University found that impoverished neighborhoods had recidivism rates 4.6 times higher than their wealthier counterparts (Holtfreter et al.). This conclusion aligns logically with the assumption that much of the observable criminal activity in the United States of America is linked to some type of financial desperation or incentive. The recidivism statistic associated with juveniles raised in single parent homes corroborates this finding. Sustaining a household on a single source of income results in higher financial incentive for crime, as suggested by a study conducted by the America First Policy Institute, which found that 80% of juvenile detainees, much of whom will recidivate within ten years, came from fatherless homes ("Fatherhood and Crime").

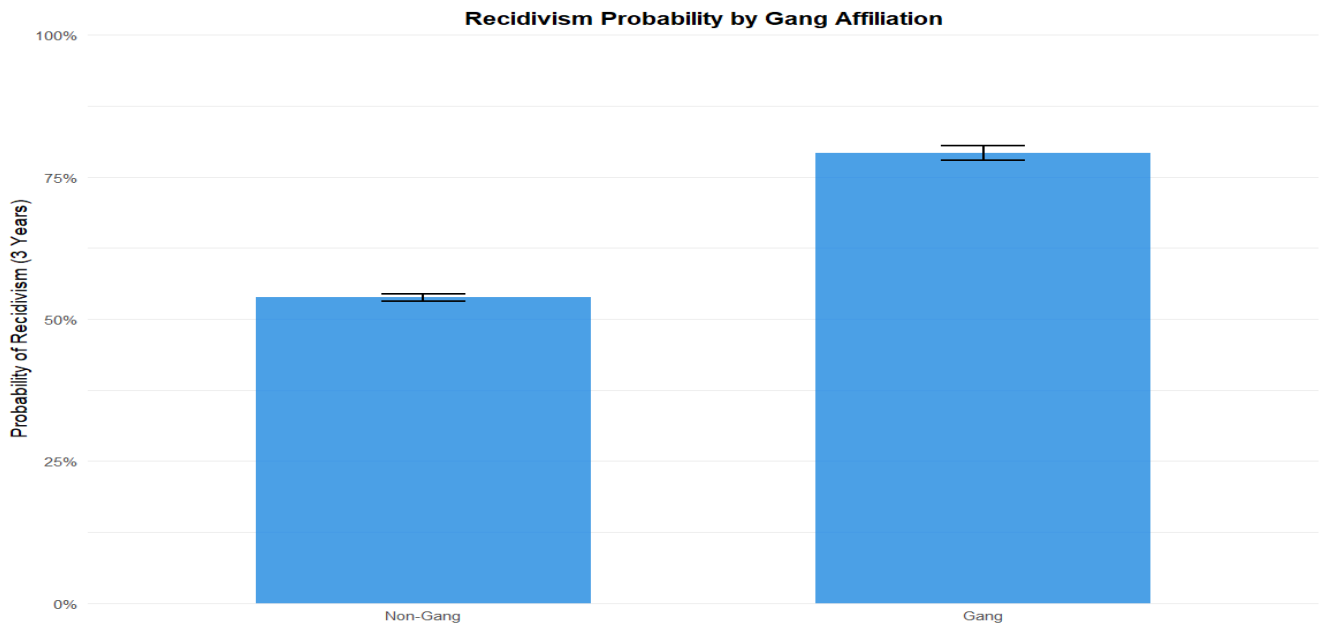**Limitation:** *Gang Affiliation(OVB)*

Additionally, gangs provide their members with a sense of community and family, encouraging and enabling criminal activity while discouraging behavior that would decrease recidivism such as pursuing higher education or conventional employment. While not perfect, gang affiliation rolls poverty, fatherlessness, and social aspects together and is present in the data. Two independent studies by the U.S Department of Justice's Office of Justice Programs discovered that 90% of gang members came from impoverished neighborhoods (*Concentrations of Poverty and Urban Gangs | Office of Justice Programs*), and furthermore that a large

proportion of them also came from single parent homes ("Single-Parent Families Cause Juvenile Crime"). As such, it's not a surprise that the coefficient from regressing gang affiliation on recidivism was +1.184, essentially the most significant positive indicator for recidivism. The probability model indicated that those affiliated with gangs were at least 26% more likely to recidivate, negating the effect of recidivism's best counter: employment.

```
Coefficients:          Estimate Std. Error z value Pr(>|z|)
(Intercept)             0.15310    0.01356   11.29   <2e-16 ***
Gang_AffiliatedGang     1.18408    0.04154   28.51   <2e-16 ***
Model Prediction:
        x predicted  conf.low conf.high
1 Non-Gang 0.5382016 0.5315921 0.5447977
2     Gang 0.7920264 0.7790655 0.8044179
```


Recidivism Probability by Gang Affiliation

Solution:

This calls into question the validity of the previous suggested reforms to rehabilitative programs since gang affiliation could have introduced bias into the regression results by being omitted. Fortunately, this is not a major issue as these changes will find success regardless. The

new regressions' coefficients generally decrease but only ever so slightly. Rehabilitation program

attendance changes from a -0.04 to -0.039.

```
Coefficients:             Estimate Std. Error z value Pr(>|z|)
(Intercept)               0.271106   0.017049   15.90   <2e-16 ***
Program_Attendances      -0.039549   0.003438  -11.51   <2e-16 ***
Gang_AffiliatedGang       1.180875   0.041618   28.37   <2e-16 ***
```

Longer sentencing found further success under this new regression equation, increasing from

-0.728 to -0.829, due to incarceration cutting off one's ability to interact with their fellow gang

members and increase their chances of recidivism in the process.

```
Coefficients:                       Estimate Std. Error z value Pr(>|z|)
(Intercept)                          0.46427    0.02378  19.524  < 2e-16 ***
Prison_Years_Ordinal1-2 years       -0.19582    0.03304  -5.927 3.09e-09 ***
Prison_Years_Ordinal2-3 years       -0.49272    0.03962 -12.435  < 2e-16 ***
```

The efficacy of education dropped from -0.633 to -0.543, while the effect of employment on

recidivism increased from -1.142 to -1.196.

```
Coefficients:                       Estimate Std. Error z value Pr(>|z|)
(Intercept)                          0.25997    0.01510   17.21   <2e-16 ***
Education_UnorderedSome College     -0.54301    0.03324  -16.34   <2e-16 ***
Gang_AffiliatedGang                  1.12705    0.04176   26.99   <2e-16 ***
```

```
Coefficients:             Estimate Std. Error z value Pr(>|z|)
(Intercept)                0.78057    0.02176   35.88   <2e-16 ***
Percent_Days_Employed     -1.14236    0.03168  -36.06   <2e-16 ***
Gang_AffiliatedGang        1.09960    0.04312   25.50   <2e-16 ***
```

Conclusion:

While gang affiliation generally caused the results of the regression to overestimate the

effect of different measures on recidivism, even /when included the argument remains the same:

our current rehabilitative systems should favor longer sentencing, allowing the justice system to

introduce more programs to the inmates, such as ones that provide a higher education equivalent,

so that once released they will have access to well-paying employment opportunities that will

excise their financial incentive to recidivate, thus creating a safer America for you and me.

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Appendix: (Table that adds in variables one by one to get a grasp of OVB in the project)

Table 1: Stepwise Logistic Regression Predicting Recidivism

	Dependent variable:				
	Recidivism within 3 Years				
	Rehab Only	Add Punishment Severity	Add Gang Affil.	Add Education	Add Employment (Full Model)
	(1)	(2)	(3)	(4)	(5)
Program Attendances	−0.040***	−0.036***	−0.034***	−0.036***	−0.023***
	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
1-2 years (vs. ¡1)		−0.151***	−0.176***	−0.192***	−0.126***
		(0.033)	(0.033)	(0.033)	(0.034)
2-3 years		−0.388***	−0.469***	−0.488***	−0.406***
		(0.039)	(0.040)	(0.040)	(0.041)
More than 3 years		−0.703***	−0.805***	−0.778***	−0.638***
		(0.036)	(0.037)	(0.037)	(0.039)
Gang Affiliated			1.265***	1.209***	1.124***
			(0.042)	(0.042)	(0.044)
Some College (vs. Without College)				−0.518***	−0.452***
				(0.034)	(0.035)
Percent Days Employed					−1.091***
					(0.032)
Constant	0.430***	0.681***	0.552***	0.661***	1.144***
	(0.016)	(0.025)	(0.025)	(0.027)	(0.031)
Observations	25,835	25,835	25,835	25,835	25,373

Note: $^{*}p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$

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