Building Criminal Capital behind Bars: Social Learning in Juvenile Corrections[*]

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Abstract

This paper analyzes the influence that juvenile offenders serving time in the same correctional facility have on each other's subsequent criminal behavior. The analysis is based on data on over 8,000 individuals serving time in 169 juvenile correctional facilities during a two-year period in Florida. These data provide a complete record of past crimes, facility assignments, and arrests and adjudications in the year following release for each individual. We find strong evidence of peer effects for various categories of theft, burglary, and felony drug and weapon crimes; the influence of peers primarily affects individuals who already have some experience in a particular crime category. We also find strong evidence that older individuals exert more powerful peer effects than younger individuals, in part because of their more extensive criminal experience, and they exert these peer effects more intensely on younger individuals. Taken together, the results suggest that grouping juvenile offenders with others of similar ages but different criminal backgrounds can be an effective tool in slowing the passing of crime-related information from one cohort to the next, thereby reducing the aggregate amount of crime-related knowledge in society.

"Danbury wasn't a prison. It was a crime school. I went in with a bachelor of marijuana and came out with a doctorate of cocaine."
George Jung (Johnny Depp) describing his introduction
to the cocaine industry in the motion picture *Blow*.

I. Introduction

Juvenile crime is a serious problem in modern American society. In 2000, law enforcement agencies throughout the United States made approximately 2.4 million arrests of juveniles under the age of eighteen, or approximately one arrest for every 10 individuals between the ages of thirteen and eighteen (FBI, 2001; Puzzanchera *et al.*, 2002). More than 500,000 of these arrests were for property crimes; more than 200,000 were for drug-related violations; and almost 100,000 were for violent crimes (FBI, 2001). On any given day in 1999, over 100,000 juvenile offenders were being held in residential placement (Sickmund, 2002). Concerned with the magnitude of these statistics, a number of researchers have attempted to identify the factors that influence juvenile crime. In particular, studies have often focused on factors illuminated in Becker's economic model of crime (1968), such as the deterrent effect of sanctions, the probability of getting caught, and legitimate sources of income.[1] Few papers, however, have considered how the characteristics and behavior of an individual's peers affect his or her propensity to engage in criminal activity. The purpose of this paper is to provide empirical evidence on such peer effects in juvenile crime. We do so by examining them in a setting where interactions among individuals with criminal experience are likely to be particularly intense: juvenile correctional facilities.

Criminal behavior may be affected by peer effects that occur in the family, in school, on the street corner, in a gang, in the neighborhood, or in prison. Such peer effects may arise from any number of underlying mechanisms related to the social interactions between two individuals or a group of individuals; it is helpful for interpreting the results of our analysis to enumerate some of these mechanisms here.[2] We focus on potential mechanisms related to the criminal

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[1] For example, Levitt (1998) shows that harsher punishments for juveniles are strongly associated with lower rates of juvenile offending for both violent crimes and property crimes. Grogger (1998) finds a negative relationship between market wages and youth crime. Mocan and Rees (1999) study the impact of juvenile arrest rates, unemployment, and family structure on the propensity of juveniles to commit both violent crimes and property crimes.

[2] The theoretical literature in sociology and, more recently, in economics describes many of the potential channels through which social interactions may work. Sutherland (1939) highlights learning from peers, in the form of information, skill acquisition, and behavioral norms; this mechanism is also incorporated into the models of Sah (1991) and Calvo-Armengol and Zenou (2003). Ethnographic studies by Anderson (1990, 1999) and the theoretical model of Silverman (2002) describe social interactions that arise through reputational effects. Criminal gangs and other crime networks may also have productive in addition to learning effects (Sarnecki, 2001; Warr, 2002).

experience of an individual's peers, grouping these mechanisms into three broad categories: (i) those related to a social stigma, (ii) those related to the reinforcement of addictive behavior, and (iii) those related to information dispersion and network formation. Social stigma refers to the impact that an individual's peers have on behavior related to perceived pressures, social norms, and other similar social influences. The standard hypothesis in this case is that when an individual is exposed to peers who regard criminal activity in a negative way, the individual is less likely to participate in such behavior. Similarly, exposure to peers with a greater intensity of criminal experience can reduce or reverse this stigma, thereby increasing the propensity of the individual to participate in criminal activity. Second, especially in the case of drug crimes, addiction or habit-formation may play a significant role in an individual's propensity to recidivate with such a crime. Peer interactions would be important in this case if exposure to peers with similar habits or addictions reinforces an individual's own addiction.

The third mechanism listed above relates to the dissemination of crime-related information through peer interactions, which we label social learning, and the development of criminal networks.[3] Social learning may occur because individuals use the experiences of their peers to update their beliefs concerning the expected benefits or punishments of committing particular crimes, making individuals more or less likely to commit these crimes. Alternatively, social learning may take the form of the acquisition of crime-specific skills and knowledge, such as how to steal a car, how to disconnect a burglary alarm, or how to avoid being caught by the police. In this case, interactions with individuals who have experience committing a particular type of crime may allow an individual to acquire this knowledge more easily, thereby leading to increased activity in the corresponding crime category. Finally, access to individuals with experience in a given criminal activity might assist in the formation or expansion of an individual's criminal network. Networking of this sort is especially important in more complicated criminal activities such as those related to illegal drugs, which require a great deal of coordination among manufacturers, distributors, sellers, and users.

While distinguishing the existence and magnitude of peer effects or social interactions has been the focus of a large body of recent empirical research in economics,[4,5] empirical work

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[3] There is a small but growing body of research in economics on social learning and network formation, including Besley and Case (1994), Foster and Rosenzweig (1995), Munshi (1999), and Conley and Udry (2002).

[4] The goal of much of the recent literature in economics has been to deal explicitly with the three traditional difficulties involved in the estimation of social interactions in linear models: the simultaneity (reflection) problem, the non-random selection of individuals into peer groups, and the presence of correlated unobservable factors that affect the behavior or outcomes of everyone in a peer group. Moffitt (2001)

exploring the importance of social interactions in criminal behavior has been relatively limited. The few papers that attempt to provide direct evidence of social interactions are generally subject to serious concerns regarding the non-random selection or assignment of an individual's peers.[6] Indirect evidence of social interactions is provided by Sah (1991) and Glaeser, Sacerdote, and Scheinkman (1996); these authors conclude that social interactions must play an important role in criminal behavior as crime exhibits variation across time and space that is difficult to explain with observable differences in the economic and social environment.[7] Additionally, Jacob and Lefgren's (2003) finding, that school attendance increases the amount of violent crimes but decreases the amount of property crimes, underscores the role played by social interactions in explaining violent crimes.

In light of the paucity of credible direct evidence to date, the central goal of this paper is to estimate the effects of peer characteristics on criminal behavior in a manner that deals directly with the non-random assignment of individuals to correctional facilities and, consequently, to their peers. Specifically, we examine whether the behavior of a juvenile offender after being released from a correctional facility is influenced by the characteristics of individuals with whom he concurrently served time in that facility. The analysis is based on data on over 8,000 individuals serving time in 169 juvenile correctional facilities during a two-year period in Florida. These data provide a complete record of past crimes, facility assignments, and arrests and adjudications in the year following release for each individual.

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provides an excellent overview of these difficulties. See Brock and Durlauf (2001) for a discussion of these issues in a nonlinear context.

[5] A great deal of recent work in the economics of education literature, in particular, has explicitly attempted to deal with the non-random selection of individuals into schools and classrooms. See, for example, Evans, Oates, and Schwab (1992); Hanushek *et al.* (2000); Hoxby (2000); Sacerdote (2000); Boozer and Cacciola (2001); and Angrist and Lang (2002).

[6] Reiss (1988) and Warr (1996) provide a summary of sociological research based on co-offender surveys, which universally do not control for the non-random selection of peers as well as other endogeneity issues. Thornberry *et al.* (1993, 2003) provide evidence that criminal behavior increases once individuals become members of gangs, but no attempt is made to control for the non-random timing of the decision to join a gang. More recently, Ludwig, Duncan, and Hirschfield (2001) use the Moving to Opportunity experiment to study the effects of neighborhoods on criminal behavior. They find that a shift to a wealthier neighborhood decreases violent while increasing property crimes, but it remains unclear whether their results are driven by changes in private incentives or social interactions. Gaviria and Raphael (2001) find strong evidence of peer-group effects in the crime-related behaviors of drug use, alcohol drinking, and cigarette smoking for a sample of high school students. But there is mixed evidence on the extent to which endogenous sorting across schools inflates their peer effects measures.

[7] Imrohoroglu, Merlo, and Rupert (2001) are able to explain much of the aggregate dynamic variation in crime over the past quarter-century without relying explicitly on social interactions.

Our empirical analysis consists of a series of regressions that relate recidivism in each of a number of crime categories to individual demographic and criminal history characteristics, peer demographic and criminal history characteristics, and interactions between these individual and peer characteristics. To control for the non-random assignment of juveniles to facilities, we include facility fixed effects in these regressions. This ensures that the impact of peers on recidivism is identified using only the variation in the length of time that any two individuals serving a sentence in the same facility happen to overlap.

Relative to other settings where the estimation of social interactions has proven more difficult, this empirical strategy exploits a unique feature of correctional facilities—namely, that the peer group is constantly evolving over time with the admittance and release of individuals as their sentences begin and expire.[8] As long as the date at which a given individual is assigned to a facility within the two-year sample period is random with respect to the peers in the facility at that time, this empirical strategy properly controls for the non-random assignment of individuals to facilities. In our analysis, we provide evidence that this is indeed the case by demonstrating that the within-facility variation in peer characteristics is orthogonal to individual characteristics.[9]

We find strong evidence of the existence of peer effects in juvenile correctional facilities. In many instances, these peer effects have a reinforcing nature, whereby exposure to peers with a history of committing a particular crime increases the probability that an individual *who has already committed the same type of crime* recidivates with that crime. This form of a reinforcing peer effect is positive and significant for the cases of burglary, felony drug offenses, felony weapon offenses, and felony sex offenses in our main specification, and it is positive and significant for auto theft, grand larceny, petty larceny, misdemeanor drug offenses, and robbery in alternative specifications that refine the peer measure in various ways. There is much less evidence that exposure to peers with particular criminal histories increases an individual's propensity to recidivate in a crime category in which the individual has no prior experience; in

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[8] Recent research in other settings has generally relied on particular randomizing events, such as the random assignment of roommates (Sacerdote, 2000) or randomization derived from social experiments such as the Moving to Opportunity experiment in Boston (Katz, Kling, and Leibman, 2001) or the STAR experiment in Tennessee schools (Boozer and Cacciola, 2001). Relying on such events or experiments, however, can severely limit the settings where peer effects can be studied and the generalizability of the findings.

[9] In the context of juvenile correctional facilities, the simultaneity problem (first described by Manski (1993)) is that the influence of peer characteristics, such as the intensity of peer criminal history, cannot be distinguished from the influence of future peer behavior. While it is possible that spending time in the same correctional facility increases future interactions among individuals upon release, this is likely to explain a relatively small portion of the peer effects measured in this paper. Thus, we simply assume that peer effects operate through the influence of peer characteristics rather than subsequent peer behavior.

our main specification, the corresponding coefficient is positive and significant only for felony sex offenses and negative and significant only for robbery. The latter result suggests that individuals may learn the returns to robbery are not sufficient, in the face of relatively severe punishment, to justify committing one. Our results also provide strong evidence that older individuals exert stronger peer effects than younger individuals, in part because of their more extensive criminal experience, and they exert these peer effects more intensely on younger individuals.

The remainder of the paper is organized as follows. Section II describes the data. Section III outlines our basic empirical methodology, identification strategy, and measurement issues. Section IV presents the main results, and Section V examines a series of policy issues related to these results. Section VI concludes.

II.   Data

The primary data source for this study is the internal database that the Florida Department of Juvenile Justice (DJJ) maintains for juvenile offenders under its care. We were granted access to the DJJ's records on all youths released from a Florida-based juvenile correctional facility between July 1, 1997 and June 30, 1999. These data provide complete histories of the experience of each individual in the Florida juvenile justice system, including records of all past arrests, adjudications,[10] sentences, and facility assignments. The data also provide some basic socio-demographic information, such as date of birth, race, and zip code of residence at the time of the individual's most recent assignment to a facility. 16,164 youths are included in the full sample.

For each individual in the initial sample, the data detail whether or not the individual recidivates within the first year following release. The type of crime committed upon recidivating, however, is only available if the individual is younger than age eighteen at the date of re-arrest and, thus, still a juvenile in the Florida system. In analyzing post-release criminal behavior, we therefore eliminate from the sample all individuals who are older than age seventeen when released; for all individuals remaining in the sample, we observe if the individual recidivates and (if so) the details of the recidivism offense. While the initial sample contains records for 16,164 individuals, only 9,382 of these individuals remained juveniles for at least one year after release. For an additional 1,166 of these individuals, the data are either missing facility assignment or admit/release date information. Thus, the primary sample used in our analysis contains 8,216 juveniles. However, data for the full set of individuals for whom facility

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[10] An adjudication, in the vernacular of the juvenile justice system, is analogous to a conviction in the adult system.

assignment and admit/release date information is available are used in constructing the measures of peer characteristics used in the analysis.

The sample includes not only detailed information on recidivism behavior, but also data on the youths' correctional facility assignments, criminal histories, personal characteristics, and home neighborhoods. Descriptive statistics are presented in Table 1. 67 percent of the sample recidivated—meaning they had a subsequent juvenile adjudication within one year after being released from a correctional facility to the community or to a conditional release program. Rather than focusing on whether or not an individual recidivates with any offense, we study the types of offenses with which an individual recidivates. Table 1 shows that 14 percent of the sample recidivates with a burglary offense, 12 percent recidivates with a petty larceny offense, and approximately 9 percent recidivates with a felony drug offense, a misdemeanor drug offense, an auto theft, and a grand larceny offense. Because individuals can be adjudicated for multiple offenses simultaneously, the sum of the recidivism rates in all possible crime categories is greater than the overall recidivism rate of 67 percent.

Each individual was assigned to one of 169 correctional facilities in Florida. These facilities vary greatly in type: there are halfway houses, group treatment homes, boot camps, contracted day treatment programs, intensive residential treatment programs, sex offender programs, work and wilderness programs, etc. One of the primary distinguishing characteristics of a facility is whether it is residential or non-residential.[11] In addition, there is some variation in the size of these facilities. The average number of individuals released from a facility is 197 (averaged across the individuals in the sample), with a minimum of 13 and a maximum of 981. The average number of individuals in a facility on a given day is 48, with a large standard deviation of 74.[12]

The individual characteristics listed in Table 1 provide basic information on the youths' age, gender, race, and sentence length. The criminal history variables in Table 1 encompass all charges formally brought against the youth within the Florida system prior to placement in a correctional facility during the two-year evaluation period. The individual criminal history variables are dummy variables that are equal to one if an individual has *any* history of committing a particular type of offense, regardless of the number of times the individual has committed the offense. Thus, we see that 61 percent of the individuals in the sample have a history of petty larceny, 58 percent have a history of burglary, 37 percent have a history of a felony weapon

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[11] In non-residential facilities, the committed juveniles are allowed to return home at night.

[12] The corresponding median facility size (across individuals), however, is only 20 individuals, as a couple of facilities are particularly large. We examine specifications below that limit the sample to individuals in facilities with less than 20 peers.

offense, 13 percent have a history of a felony drug offense, and so on. The neighborhood characteristics variables are constructed using each individual's zip code of residence. With the exception of Youth Crime Rate in Zip, which comes directly from DJJ records, these neighborhood measures are derived from the 1990 Census of Population of Housing.

Table 1 also presents descriptive statistics for the measures of peer characteristics. For the most part, the list of peer characteristics parallels the list of individual characteristics (the demographic, criminal history, and neighborhood characteristics). The peer characteristics are calculated as weighted averages of the individual characteristics, where the weights are the number of days an individual is exposed to each peer. Not surprisingly, the average peer group to which an individual is exposed generally reflects the distribution of crimes in the individual criminal histories. Slight differences arise because the individual crime histories are averaged over individuals while the peer measures are averaged over days, thus weighting more heavily the crimes of individuals serving longer sentences.

III.   Empirical Methodology and Measurement Issues

The primary analysis presented in this paper relates recidivism to vectors of individual characteristics, peer characteristics, and interactions between the two. Recidivism is used as an imperfect proxy for criminal behavior throughout our analysis. Clearly, recidivism is a function of both actual criminal activity and the probability of arrest and adjudication. To the extent that some peer effects take the form of learning to avoid arrest and adjudication, we expect our analysis to *understate* the overall level of increased criminal activity that follows exposure to peers with a greater intensity of experience in a given crime category. The general specification that we take to the data can be written as

$$R_{ij} = P_{ij}\alpha + X_{ij}\beta + P_{ij}X_{ij}\gamma + \lambda_j + \varepsilon_{ij} \qquad (1)$$

where R_{ij} is a dummy variable that is equal to one if individual i, having served time in facility j, recidivates; P_{ij} is a vector of peer characteristics; X_{ij} is a vector of individual characteristics; and λ_j is a facility fixed effect. For each individual, the associated peer characteristics are a weighted average of the characteristics of an individual's peers in a facility, where the weights are equal to the number of days an individual is exposed to each peer in the facility. In this way, because individuals are admitted and released on a regular basis throughout our sample period, the characteristics of the peers to whom any particular individual is exposed vary depending on when exactly that individual enters and leaves a facility.

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The inclusion of facility fixed effects in equation (1) controls for the non-random assignment of individuals to facilities as well as any part of the error structure correlated across all of the individuals in a facility. This ensures that the impact of peers on recidivism is identified using only the variation in the length of time that any two individuals serving a sentence in the same facility happen to overlap.[13] In order for this methodology to yield unbiased peer effects, the timing of the assignment of individuals to facilities, with respect to the peers in the facility at that time, must be random within the two-year sample period. To provide evidence concerning the validity of our identification strategy, Table 2 shows the correlations between the measures of peer characteristics used in the analysis and a wide range of individual demographic and criminal history variables. The upper panel of Table 2 (labeled 2a) displays these correlations when the peer characteristics include variation both within and across facilities. The lower panel of Table 2 (labeled 2b), on the other hand, shows these correlations when the peer characteristics only include variation from within the facilities; in other words, the peer measures used in the lower panel are the residual peer measures that result from regressing the original peer measures on facility dummies.

The correlation coefficients in the upper panel are in many instances quite large and typically much greater than the corresponding correlation coefficients in the lower panel. In fact, while the vast majority of the correlations between an individual's own experience with particular crimes and that of his or her peers are positive and significant in the upper panel, these correlations are all negative in the lower panel.[14] Moreover, while the vast majority of the correlations between individual and peer criminal history in different crime categories is positive and significant in the upper panel, these correlations are almost never significant in the lower panel. Accordingly, we conclude that the residual variation in the peer measures, having been projected onto the vector of facility dummy variables, is orthogonal to the included individual characteristics and, therefore, also almost certainly orthogonal to any unobserved individual

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[13] A natural concern that arises when including facility fixed effects is whether there is sufficient variation in the peer measures within facilities to identify peer effects precisely. While the amount of variation in the peer measures does decrease with the inclusion of facility fixed effects, it is not eliminated. This can be seen by comparing the overall standard deviation to the within standard deviation for each peer measure presented in Table 1. The within standard deviation is the standard deviation of the residual peer measures that result from regressing the original peer measures on facility dummies.

[14] That these correlations are negative reflects the fact that we treat an individual as not being exposed to himself or herself as a peer. The alternative assumption, treating an individual as his or her own peer, would lead to a correspondingly small positive correlation between individual and peer criminal experience. Note also, that the raw correlations between own and peer criminal experience shown in the upper panel are positive despite the fact that we do not treat an individual as his or her own peer. In the empirical specifications below, we always include a full set of variables describing both individual and peer criminal history.

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characteristics related to recidivism. Moreover, these correlations suggest that the timing of the assignment of individuals to facilities within this period is random. That is, the slightly negative correlations between individual and peer criminal experience in a given crime category implies that, conditional on facility assignment, there is not any undo clustering in the timing of assignment to correctional facilities for individuals with particular criminal histories.

Another indication that the constructed peer measures are orthogonal to individual characteristics in a manner relevant for studying recidivism can be seen in Table 3. This table shows the estimated coefficients from a regression of recidivism (with any crime) on individual characteristics when a vector of peer variables is included and excluded, respectively, in the estimation. Inclusion of the vector of peer characteristics in the estimation has only a minimal effect on the magnitude and significance of the estimated individual characteristic coefficients. Hence, Tables 2 and 3 provide evidence that our strategy for identifying peer effects, in the presence of non-random assignment of individuals to facilities or correlation in the error term at the facility level, is well-grounded.

Pre- and Post-Censoring

An important data-related issue in constructing the peer measures used in equation (1) arises because we only observe individuals who are *released* in the two-year period from July 1, 1997 to June 30, 1999. Thus, for individuals who are released towards the beginning of the sample period, any peers who are released before the sample period begins will not be observed in the data (pre-censoring case). Likewise, for individuals who are released towards the end of the sample period, any peers who are released after the sample ends will be unobserved (post-censoring case).

Therefore, in order to provide an unbiased estimate of each individual's peers, we estimate each individual's exposure to peers who would have been released either before or after the sample period by using the characteristics of the individuals observed to be released from the facility during the full sample period. In this way, we form the peer measure used in the analysis by averaging (i) the characteristics of those peers actually observed to overlap with the individual and (ii) a properly weighted measure of the estimated characteristics of the peers with whom this individual would have overlapped, but who were released outside of the sample period.[15] This ensures that the peer measure used in the analysis is an unbiased measure of the true peer measure

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[15] This procedure relies on the assumption that, conditional on facility assignment, the exact date at which a given individual is assigned to a facility is random with respect to the peers in the facility at that time—an assumption supported by the evidence described above.

for each individual. Thus, while measurement error still exists in the peer characteristics, this error is uncorrelated with the individual characteristics included in the regression. We describe the exact procedure used to construct the peer measure, dealing with four separate cases of censoring, in the appendix. We also provide evidence below that the remaining measurement error is likely to have only a negligible effect on the results.

IV.   Results

The earlier discussion of the potential channels through which peers may influence an individual's subsequent criminal behavior informs the empirical specifications we take to the data. In particular, we consider the following primary specification

$$R_{ij}^h = \beta_0 \left(Offense_{ij}^h * Peer\_offense_{ij}^h \right) + \beta_1 Peer\_offense_{ij}^h + \beta_2 Offense_{ij}^h + P_{ij}\alpha + X_{ij}\gamma + \lambda_j + \varepsilon_{ij} \quad (2)$$

The dependent variable, R_{ij}^h, is a dummy variable for whether or not individual i in facility j recidivates with offense type h. $Peer\_offense_{ij}^h$ represents an individual's exposure to peers with a history of offense type h, while $Offense_{ij}^h$ is a dummy variable indicating whether or not individual i has a history of offense type h himself. P_{ij} is a vector of additional peer demographic and criminal history characteristics, including all other crime categories. Similarly, X_{ij} represents a number of individual demographic and criminal history controls, including all other crime categories.

While the specification described in equation (2) includes a complete set of controls for individual and peer criminal offenses, the central focus of the analysis below is on the question of whether exposure to peers with a history of committing a particular crime increases the likelihood that an individual recidivates with that same crime. We also aim to distinguish whether or not this effect varies with an individual's own characteristics, especially an individual's own history of the offense in question. This interaction would pick up the reinforcement of addictive behavior by others who may share a similar addiction. Moreover, the peer effect mechanisms related to social learning and network formation developed in the introduction suggest that individuals with a prior history in a particular criminal activity may be especially receptive to additional training or to expanding network ties related to this activity. Consider, for example, an individual who already has a high rate of return from stealing cars but has no experience in drug crimes. For this individual, the drug-specific human capital gained from exposure to peers with a history of drug crimes may not provide sufficient incentive to switch from auto theft to drug crimes, as the gap

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between the rates of return for the two types of crimes may be too large. On the other hand, additional exposure to peers with a history of auto theft may increase this gap in returns (as well as the gap between returns from auto theft and legitimate activity), thereby potentially increasing an individual's propensity to commit auto theft upon release.

Each column of Table 4 depicts the coefficients β_0, β_1, and β_2 for a specification of the type shown in equation (2) for a particular offense type h.[16] The particular offenses shown here are chosen using three criterion: (i) the offense is serious enough to contribute to the FBI crime index; (ii) the crime is defined well enough to interpret the results; and (iii) enough individuals recidivate with the crime so that the estimation is reasonably precise. Disorderly conduct is not included, for example, because the exact nature of the offense may vary greatly across crimes, and misdemeanor sex offense is not included because only 27 of the 8,216 individuals recidivate with this crime. The full specification for each offense type h is shown in Appendix Table 1.

Specialization

The estimated coefficient on $Offense^h{}_{ij}$, an individual's own history of the crime in question, describes the degree to which individuals specialize in crime category h—that is, the extent to which past activity predicts future activity. The peer measures used in the analysis are constructed to have mean zero and, consequently, the test of specialization is simply a test of whether $\beta_2 > 0$. The estimates of β_2 reported in Table 4 are positive and statistically significant in every instance. The magnitudes of the effects are best understood in relation to the proportion of individuals who recidivate with each crime. For example, having committed a felony drug crime in the past increases one's likelihood of recidivating with a felony drug crime by approximately 19 percentage points; this is relative to the baseline that 9.3 percent of the individuals released from a juvenile facility recidivate with a drug felony within a year. Similarly, large effect sizes relative to the proportion of individuals who recidivate with a crime can be seen for felony sex crimes (5.2 percentage points versus 1.3 percent of individuals), misdemeanor drug crimes (11 percentage points versus 9 percent), robbery (4.2 percentage points versus 4.5 percent), auto theft (8 percentage points versus 9.3 percent), and felony weapon crimes (7.8 percentage points versus 13.6 percent).

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[16] While we look for evidence of peer effects in particular crime categories (such as grand larceny), it is certainly possible that individuals specialize in groups of particular crime categories (such as all thefts) rather than in just one particular crime category. Appendix Table 1 reports the results of the full impact of an individual's criminal history on the propensity to commit each crime, generally revealing broad specialization across drug crimes as well all forms of theft.

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There are a number of potential explanations for the relatively large degree of specialization in felony drug crimes, many of which relate back in some way to the various peer effects mechanisms described in the introduction. Specialization in drug crimes, as opposed to other types of crimes, may be due to habit formation or addiction concerning personal drug usage. Moreover, crime-specific human capital and networks play an especially large role in felony drug crimes, which require a great deal of coordination in transferring the product from source to end user. Thus, a potential explanation for the particularly strong specialization in felony drug crimes is that the human capital accumulation and network ties resulting from past activity in felony drug crimes are more important than those associated with past robbery activity, for example.

In order to explore the role of specialization further, Table 5 reports the results for a series of specifications that add a vector of dummy variables, which characterize an individual's most recent offense, to the specifications reported in Table 4. This specification examines whether the timing of an individual's past participation in a particular type of criminal activity is important in predicting recidivism with that crime. The results indicate that having committed an offense recently has little to no additional effect on recidivism, over and above the effect of having any history of the offense. In fact, the point estimates are more often negative than positive and only significant (in opposite directions) for misdemeanor drugs and robbery. A possible explanation for this negative relationship is that an individual who has recently been caught and punished for a particular type of crime may have an especially strong aversion to repeating this offense. This might indicate that youths have short-term memories—such that getting caught a few years ago does not have the same negative impact as getting caught recently—or that judges are likely to deal with an immediate re-arrest for the same crime more harshly.[17]

Evidence of Peer Effects

The first row of Table 4 reports β_0, the coefficient on the interaction between an individual's history of having committed the relevant offense and the fraction of peers who have ever committed this offense. The second row reports β_1, the coefficient on the fraction of peers who have ever committed this offense.[18] These parameter estimates reveal little evidence that the

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[17] We also explored whether controlling for the total number of crimes committed to date affects these specialization results, finding almost no effect from including this additional control.

[18] It is interesting to note that specifications run at an earlier stage of our analysis show that it is whether or not peers have a history of *ever* committing a particular offense, rather than the number of times they have committed the offense, that matters in the context of peer effects. In other words, the peer effects

intensity of exposure to peers with experience in a particular crime category affects the behavior of individuals who *do not have* any prior experience in that crime category. β_1 is negative as often as it is positive, with statistically significant evidence of increases in activity only for the case of sex crimes and of decreases in activity only for the case of robbery. One possible explanation for the evidence of negative peer effects in this latter case is that individuals learn that the risk-return tradeoff for robbery is less favorable to the criminal than the tradeoff for other types of property crimes (auto theft, larceny, and burglary). Levitt and Lochner (2001) estimate that the average return to both a property crime and a robbery is about $200, but because victims are more likely to report robberies to the police, they assert, there is a higher arrest rate for robbery and more severe punishments conditional on arrest. They estimate that the average sentence length *per crime committed* served by juveniles for robbery is more than twenty times that served for other types of property crimes. An analysis of our data yields similar statistics for sentence length (conditional on arrest and a punishment that involves assignment to a correctional facility);[19] for example, a first-time adjudication for robbery is associated with a sentence length almost sixty days longer on average than the sentence length for a first-time adjudication with another form of theft.[20] A regression of sentence length on recent and past criminal activity is reported in Appendix Table 2.

The parameter estimates for β_0 reported in the first row of Table 4, however, are positive in every case and statistically significant for burglary, petty larceny, felony drug crimes, and felony weapon offenses. In the case of burglary, felony drug crimes, and felony weapon offenses, the combination of β_0 and β_1 reveals a statistically significant, positive peer effect for individuals who *have* prior experience in a crime category. Thus, exposure to a greater percentage of peers with a history of having committed burglary, for example, increases the likelihood that an individual with prior burglary experience commits burglary upon release. As in

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associated with the peers' first offense in a crime category appear to be much more important than the peer effects associated with the third or fourth offense in that category.

[19] Because our data consists of only those individuals released from facilities in a given period, we do not observe a representative sample of those arrested for a particular type of crime or even those adjudicated (convicted) for such crimes if some of these individuals are not assigned to a correctional facility.

[20] In a qualified attempt to examine whether individuals learn from their peers to avoid crimes with particularly long sentences, we examined specifications that included the weighted average sentence length of all of an individual's peers and also specifications that included the crime-specific weighted average sentence length for peers. Such peer sentence length measures do not significantly affect an individual's propensity to recidivate with a particular crime category. This non-result may arise, of course, because peers serving longer sentences are likely to be more serious offenders in unobserved ways, thereby affecting recidivism in the opposite direction.

the case of specialization, the strongest reinforcing peer effects occur for felony drug crimes.[21] For an individual who has a felony drug offense history, exposure to a group of peers who *all* also have a history of felony drug offenses would increase his propensity to recidivate with a felony drug offense by 55 percentage points, relative to a mean of 9.1 percent of individuals who recidivate with a felony drug crime. There are a variety of potential explanations for the particularly strong reinforcing peer effects estimated for felony drug crimes. To the extent that some felony drug crimes involve the use rather than the distribution of drugs, exposure to peer drug offenders may make it more difficult for an individual to break an addiction and may even reinforce the addiction. Moreover, because crime-specific human capital accumulation and network formation are likely to be particularly important for the distribution of drugs, exposure to peers with a history of drug felonies is likely to lead to large increases in an individual's returns from felony drug crimes.

Taken as a whole, the evidence presented in Table 4 helps to distinguish between the potential mechanisms through which individuals might be influenced by their peers. The general pattern of this evidence is that exposure to peers with a history of having committed a particular offense has a much stronger influence on those individuals who already have some experience with that offense than it does for individuals with no prior experience. One explanation that fits well with this pattern, especially for drug crimes, is that peers reinforce addictive behavior. Another explanation is that individuals may experience different returns from participation in different types of crimes (or the legitimate sector of the economy) related to natural abilities, opportunities, human capital accumulation, involvement in crime networks, or other factors. In this case, individuals who have a history of committing a particular offense have already revealed themselves to have high returns and, likely, substantial human capital related to this type of crime. Consequently, access to peers who can increase the individual's returns to this type of crime may lead to increased intensity of activity in this type of crime. Access to peers who can increase returns for *another* type of crime may be much less valuable, as this may not decrease the gap in returns between crime categories enough to change an individual's choice of type of crime.[22]

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[21] Additional specifications, not included in the paper, show that the strong evidence of peer effects seen for felony drug crimes is primarily being driven by felony non-marijuana drug crimes. We also find evidence of reinforcing peer effects in the case of marijuana misdemeanor offenses.

[22] We also explored the possibility that exposure to peers with certain criminal histories enables individuals to "graduate" to more serious crimes within a broad category of crimes. We focused primarily on the broad category of drug crimes. While many of the results are insignificant, we do find that individuals with a misdemeanor marijuana offense history are significantly more likely to recidivate with a felony non-marijuana offense as result of exposure to peers with a felony non-marijuana offense history.

Before examining further specifications, it is important to stress that the evidence just presented regarding peer effects for each of the crime categories is based on a specification that includes a full set of peer criminal history characteristics, a number of other peer characteristics (such as age, age at first offense, and neighborhood characteristics), and a broad set of individual controls. These full specifications are reported in Appendix Table 1.

Age, Peer Effects, and Recidivism

An additional pattern revealed by exploring the full set of parameter estimates shown in Appendix Table 1 is the positive correlation between the age of an individual's peers and the individual's propensity to recidivate in almost every crime category, even after controlling for a full set of peer criminal history measures. This relationship is statistically significant in the cases of burglary and grand larceny. To explore the role of age further, Tables 6 and 7 present two additional specifications that involve age interactions. One might expect older individuals to exert stronger peer effects, and for these peer effects to have their largest impact on younger individuals, for at least two reasons. First, younger individuals may be more impressionable and look towards their older peers as role models. Second, younger individuals have probably accumulated less crime-specific human capital and are less likely to be tied into crime networks; as a result, they have more potential for additional gains from such knowledge or network ties. Conversely, more experienced, older individuals have more crime-related knowledge to transfer and are more likely to help an individual get tied into an existing network.

Table 6 reports parameter estimates for a series of regressions that relate recidivism with a particular offense type h to an individual's own age at exit, the average age at exit of the individual's peers, and the interaction of the two:

$$R_{ij}^h = \gamma_0 \left(Age_{ij} * Peer\_age_{ij} \right) + \gamma_1 Peer\_age_{ij} + \gamma_2 Age_{ij} + X_{ij}\beta + \lambda_j + \varepsilon_{ij} \qquad (3)$$

This regression also includes: (i) the full set of individual controls used in the initial regressions; (ii) a vector of basic peer characteristics including gender, neighborhood per capita income, neighborhood incarceration rate, age at first offense, and number of prior felonies; and (iii) interactions between these peer characteristics and the parallel individual characteristics. Table 6 reports estimates of γ_0, γ_1, and γ_2 for each crime category. The point estimates are unanimously positive for both individual and peer age and unanimously negative for the interaction of the two. This supports two broad conclusions: (i) criminal behavior increases with age, and (ii) older

individuals exert stronger peer effects than younger individuals—exerting these peer effects almost exclusively on younger individuals. The effect of exposure to older peers declines to zero as individuals approach adulthood. Age plays a statistically significant role for almost all forms of theft, as older individuals are significantly more likely to recidivate with auto theft, burglary, and petty larceny offenses. In addition, exposure to older peers significantly increases the propensity of younger individuals to recidivate with auto theft, burglary, grand larceny, and petty larceny offenses.

Table 7 presents results from a series of regressions that are identical to equation (2), except that they include additional interactions of age with the three variables of interest. The clearest evidence that age influences crime-specific peer effects is seen for auto theft. Younger individuals, both with and without a past history of auto theft, are significantly more likely than older individuals to commit auto theft as a result of exposure to peers who have a past history of auto theft. The magnitude of the estimated positive peer effect for younger individuals significantly decreases as individuals get older; in fact, it declines so much that the average effect across all ages presented in Table 4 is indistinguishable from zero. Likewise, younger individuals, regardless of their own history, are significantly more likely to commit robberies than older individuals when exposed to a greater proportion of peers who have committed robbery.[23] Finally, younger individuals with a prior felony drug offense are significantly more likely to recidivate with a felony drug crime when exposed to a greater percentage of individuals with a prior history of having committed such a crime.

Table 7 also provides broad evidence that specialization declines with age. Specifically, the propensity of individuals with a prior history of an offense to recidivate with that offense significantly declines with age for felony drug crimes, burglary, robbery, and auto theft. A potential explanation for this pattern could be that opportunities to accumulate human capital in certain crime categories increase with age or with past criminal experience in other categories. Individuals may face declining learning costs with age, especially for crimes (such as felony drug crimes) that younger individuals are not as likely to commit, as the total stock of criminal experience for individuals in their cohort increases.[24] Individuals may also begin to face harsher punishments as they repeat these more serious offenses at a later age.

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[23] Note that the total peer effect for individuals with a history of committing a given crime combines the direct peer effect and the effect associated with the interaction of peer and individual history of an offense.

[24] It is possible that an individual's age also proxies for the total number of different crimes that an individual has committed. In this way, the fact that specialization declines with age, for example, might simply signify that individuals are less likely to participate in any given category in which they have experience due to their having experience in more categories on average. In the course of our empirical

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Robustness I: Refining Peer Measures

Thus far, we have defined an individual's peer measures as a weighted average of the characteristics of all other individuals serving time in the correctional facility concurrently with this individual at some point during his sentence. This definition potentially measures an individual's peer exposure with error; this would occur if an individual does not actually interact with all of the individuals within a facility or interacts more intensely with certain individuals, biasing the estimated peer effects toward zero.[25] To explore this possibility, we present a number of additional specifications analogous to those shown in Table 4, but using alternative definitions of the peer group. We report the key parameters of interest for these alternative specifications in the next four tables. Table 8 reports the parameter estimates that result when the peer group is instead defined as individuals of the same race serving sentences in a facility concurrently.[26] Table 9 restricts the sample to only facilities with an average of 20 or fewer individuals serving sentences concurrently, while Table 10 restricts the sample to only residential facilities. Finally, Table 11 restricts the sample to only those individuals with a relatively long sentence length.

Redefining the peer group in accordance with an individual's race would reduce measurement error in the peer variables if youths interact primarily with others of the same race while incarcerated.[27] Table 8 presents the results from estimating equation (2) with the redefined peer group. For the most part, these results conform to the same qualitative pattern as the original specification presented in Table 4. When race is used as the defining characteristic of the peer group, the resulting parameter estimates reveal statistically significant peer effects for individuals with a history of a particular crime category in the cases of burglary, petty larceny, felony drug offenses, misdemeanor drug offenses, and felony weapon offenses. The magnitude of the

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analysis, therefore, we also included variables for the total number of crime categories in which an individual has a history of participating and interactions of this variable with peer characteristics. The coefficients on these additional variables were never significant and, somewhat surprisingly, had almost no impact on the effect of age and age interactions in the specification reported in Table 7.

[25] Identification of the appropriate peer group is a common problem in the peer effects literature. Arcidiacono and Nicholson (2002) find no evidence that peer groups are formed along racial lines in medical school, though they find some evidence that peer groups are formed along gender lines. Similarly, Sacerdote (2000) examines whether peer effects among college students occur at the room or dorm level.

[26] Based on the DJJ's classification system, race is defined according to three categories: white, black, and other.

[27] Anecdotal evidence suggests that this may be the case. A January 2003 MSNBC special on the San Quentin correctional facility in California, for example, stated that everyone in the prison belongs to a "gang," generally comprised of people of the same race. These gangs are racially segregated in that members of a gang primarily interact with each other during meals and exercise periods.

coefficients on the interaction terms, $\hat{\beta}_0$, are very similar (sometimes smaller) to those presented in Table 4. However, the t-statistics are generally greater, thereby ensuring that the effect for misdemeanor drug crimes is statistically significant in this case. On the other hand, evidence of new activity in a crime category following exposure to peers with a prior history in that category disappears completely, as the formerly statistically significant results for felony sex offenses and robbery are no longer significant. The overall weight of this evidence does not generally lead to the conclusion that the peer group is more precisely defined along racial lines.

Table 9 presents the results from estimating equation (2) for the sample of 4,266 individuals in the 115 smallest facilities, with a maximum average size of 20 individuals serving time concurrently in these facilities.[28] One would expect there to be greater interaction between all youths in a facility with 10 individuals than in one with 100; thus, restricting the sample to smaller facilities ought to increase the precision of the measures of peer exposure. This specification strengthens the general pattern of the results—that the effect of peers on recidivism is significantly greater for individuals with a prior history of having committed the same offense. The interactions between an individual's own experience with an offense and the intensity of exposure to peers with experience in that crime category are positive and statistically significant for robbery and grand larceny in this specification, as well as for burglary, petty larceny, and felony drug offenses. As in the initial specification of Table 4, there is also a positive and significant coefficient on the exposure to peers who have committed a felony sex offense. In comparison to the results obtained when using the entire sample of facilities, the magnitudes of the coefficients are generally greater for the portion of the sample assigned to relatively small facilities. This suggests that the peer group is more precisely measured in relatively small facilities and that the coefficients estimated using the full sample are likely to understate the actual magnitudes of peer effects in correctional facilities.

One might also expect the original peer exposure measure to be more precise in residential facilities, as individuals committed to them have more time to interact with all of the other individuals in the same facility. Table 10 presents the results for equation (2), restricting the sample to the 6,992 individuals in residential facilities. The peer effect patterns are again very

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[28] One issue in looking at facility size is that we only know the number of individuals released from a facility as opposed to the number of individuals incarcerated in a facility. Using the number of individuals released as a measure of facility size may be an inaccurate reflection of actual facility size since one may expect to see more releases from facilities with shorter sentences. Thus, we create an index of facility size that equals the number of individuals released from a facility multiplied by the average sentence length in each facility. These 4,266 individuals are from facilities with a facility size index less than 15,000.

similar to the original results presented in Table 4.[29, 30] Lastly, we examine whether the average peer measures are more powerful for individuals who have relatively long sentence lengths and, consequently, are exposed to their peers for a longer period of time. Of course, by the very fact that individuals serving longer sentences received these sentences in the first place, they have revealed themselves to be different than individuals serving shorter sentences. With this in mind, we view these results as providing suggestive rather than conclusive evidence of the effect of longer peer exposure on the intensity of the peer effect. Table 11 presents the results of estimating equation (2) for individuals with a sentence length of at least 155 days. This includes slightly more than half of the sample. In this case, the interaction of individual history and the peer measure continues to be positive and significant for individuals with a history of burglary, petty larceny, felony drug crimes, and felony weapon offenses, while exposure to peers with a history of robbery decreases the propensity for any individual to recidivate with robbery. The primary difference from the original results presented in Table 4 is that there is no longer evidence of peer effects for felony sex offenses while there is in the case of auto theft—regardless of an individual's own history, exposure to peers with a history of auto theft increases the propensity of the individual to recidivate with auto theft. Possible explanations for the presence of peer effects related to auto theft in this case, while absent in other specifications, are that auto theft is a more difficult skill to learn while in a correctional facility or that auto theft networks require a more intense level of screening of potential candidates that can only be accomplished over a longer period of time.[31]

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[29] Note that all offenders serving time in Florida's maximum security juvenile correctional facilities are kept in single cells; one might therefore expect there to be minimal peer interaction among these offenders. Yet, since there are only 15 juveniles under the age of seventeen in the maximum-security facilities, the results presented in Table 10 do not differ when these facilities are excluded from the estimation.

[30] We also ran these specifications for the sample of non-residential facilities, which includes 1,224 individuals. With the exception of felony drug offenses, peer effects in non-residential facilities do not appear to be reinforcing in nature. Rather, the recidivism behavior of individuals *without* a history of burglary, grand larceny, misdemeanor drug offenses, or felony sex offenses is significantly impacted by their exposure to peers who have a history of these offenses. The effect is positive for burglary and misdemeanor drug offenses and negative for grand larceny and felony sex offenses. A potential explanation for this finding is that non-residential facilities contain younger, more inexperienced individuals who have not accumulated substantial amounts of crime-specific human capital; thus, exposure to peers with criminal histories different from themselves may increase the returns to participating in a new criminal activity enough to cause the individual to switch activities.

[31] Ayres and Levitt (1998) describe the types of networks that exist in auto theft rings. Stolen cars must be transferred from the individual who steals the car to a chop-shop or another appropriate sales outlet. As in other forms of organized crime, such a transaction may require a level of confidence that the individual will not reveal the network if arrested.

In general, the results of these four specifications, which seek to define an individual's peer exposure measure more accurately, imply that the results presented in Table 4 may understate the actual influence of an individual's peers on his or her subsequent behavior. Taken together, the specifications reported in Tables 8 through 11 suggest that peers are likely to influence criminal behavior in some form or another for *all* of the crime categories considered in this analysis.

Robustness II: Censoring and Measurement Error

To test the robustness of our measures of peer exposure to the measurement error associated with the censoring of the sample (the fact that we do not observe peers released before the beginning or after the end of our sample period), we estimate equation (2) using only those individuals who are released during the middle year of our sample, December 30, 1997 through December 30, 1998. Because the average sentence length for the sample is less than six months, only a small portion of the peer exposure measure must be estimated for these individuals. The estimated coefficients of interest for this regression are presented in Table 12. The results are generally consistent with those presented for the entire sample in Table 4, continuing to reveal: (i) a positive coefficient on the interaction between individual criminal history and peer experience in the crime categories of burglary, petty larceny, and felony drug offenses; (ii) statistically significant evidence of increases in new activity only for the case of sex crimes; and (iii) statistically significant evidence of decreases in new activity only for the case of robbery. The coefficient on the interaction between individual and peer experience with an offense becomes statistically significant for misdemeanor drug offenses and dips just below statistical significance for felony weapon offenses. Compared to the results obtained using the entire sample, the magnitude of the coefficients related to peer characteristics is somewhat larger in the cases of burglary, robbery, misdemeanor drug offenses, and felony sex offenses and somewhat smaller or almost identical in the cases of petty larceny and felony drug offenses. As a whole, this specification suggests that while the measures of peer exposure for individuals released towards the beginning and the end of the sample contain some measurement error, the bias associated with this measurement error is not sufficient to conceal the general pattern of results.

V. Policy Considerations

Given the strong and robust evidence of reinforcing peer effects in correctional facilities, two policy-related issues merit further examination: the optimal assignment of individuals to facilities and how peer quality is distributed across individuals and facilities. With regards to

optimal assignment, our results point to two broad conclusions. First, because the social interactions estimated in juvenile correctional facilities flow more readily from older to younger individuals, assignment policies that aim to reduce the exposure of young individuals to their older peers may substantially diminish the transference of crime-related human capital from one cohort to the next. Second, the evidence presented in this paper overwhelmingly supports the notion that exposure to peers with experience in a particular crime category has its greatest effect on individuals who themselves already have some experience in that category. Given these results, a policy of optimal assignment should generally involve grouping individuals with others of similar age but not with others who have a history of committing the same crimes.

To examine whether Florida's assignment of individuals to facilities is generally in line with these recommendations, we return to Table 1, which in addition to reporting means and overall standard deviations for each variable also reports the standard deviation within facilities (eliminating that part of the variation resulting from variation across facilities). As the figures in the table clearly demonstrate, almost all of the variation in individual experience in each crime category is within facilities rather than across facilities. This implies that Florida does not generally isolate individuals who have committed a particular offense, such as a drug offense, in specific facilities. The average age of individuals in a facility, on the other hand, does vary significantly across facilities, as the standard deviation of age within facilities is 0.87 as opposed to 1.10 overall. Thus, the evidence suggests that Florida's facility assignment mechanism is fairly consistent with a policy aimed at reducing the impact of peer effects in correctional facilities.

The second policy-related issue we consider is how peer quality is distributed across individuals and facilities. Specifically, we explore two types of questions: Are individuals with certain demographic or criminal history characteristics more likely to be exposed to a better or worse peer group? And to what extent is peer quality correlated with facility characteristics such as security level or management type (e.g., private for-profit, private nonprofit, or publicly operated)?

While one could directly examine the distribution of peers across facilities on the basis of any given observable characteristic, we seek to summarize how all the characteristics of one's peers contribute to the propensity to commit particular crimes. To this end, we construct a measure for each facility that summarizes the average impact of the peers in that facility on recidivism of each type of crime. In other words, we use the estimated coefficients from the regression described by equation (2), and presented in Appendix Table 1, to calculate

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$$\hat{R}_j^h = \hat{\beta}_0 \left(\overline{Offense_j^h * Peer\_offense_j^h} \right) + \hat{\beta}_1 \overline{Peer\_offense_j^h} + \overline{P}_j \hat{\alpha} \qquad (4)$$

$\hat{R}_j^h$ is the average effect of peer characteristics on recidivism with crime category h in facility j. To provide a single summary measure of the impact of peers on crime in general, we also create a total crime index, which is a weighted average of $\hat{R}_j^h$ across the nine crime categories. For weights, we use the average sentence length associated with committing each crime, which captures to some degree the seriousness of the crime. Felony sex offenses, robbery, and felony weapon offenses receive the three largest weights, respectively.[32]

We then regress the estimated peer effect for crime category h, $\hat{R}_j^h$, on a vector of individual and facility characteristics:

$$\hat{R}_j^h = X_{ij}\beta + F_j\delta + \varepsilon_{ij} \qquad (5)$$

The vector of individual characteristics, X_{ij}, includes demographic, criminal history, and neighborhood variables; these variables are identical to those included in equation (2). F_j contains two sets of dummy variables—the first indicates the risk level associated with the facility, and the second indicates whether the facility is publicly managed by the state, publicly managed by a county,[33] or privately managed by either a nonprofit or for-profit corporation. A significant and positive coefficient on an individual characteristic implies that this characteristic predicts the assignment to facilities with peers who, on average, increase the propensity to recidivate with a particular crime. Similarly, a significant and positive coefficient on a facility characteristic implies that this type of facility generally contains worse peers. The results from this estimation, for each of the nine crime categories and the total crime index, are presented in Table 13.

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[32] Appendix Table 2 displays the regression used to determine the average sentence length associated with each of the nine crime categories. Sentence length is regressed on individual characteristic variables, dummy variables for the most recent crime committed, and dummy variables for whether a particular crime was committed in the past. All variables are constructed to have mean zero. The weight on felony drug crimes, for example, is then equal to the constant plus the coefficient on having committed a felony drug crime as the most recent offense. The weights are normalized such that their sum is equal to one.

[33] All county-operated facilities in Florida are boot camps. They are managed directly by their counties' sheriff's departments, with oversight from the DJJ.

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A number of interesting and significant patterns stand out. First, females are more likely to be exposed to bad peers overall and in six of the nine crime categories. However, females are exposed to peers who decrease the propensity to recidivate with the more serious crimes of felony drug offenses, felony weapon offenses, and felony sex offenses. A leading potential explanation for this pattern is that the majority of facilities are single-sex and there are many more male facilities than female ones. Due to these constraints, Florida may be unable to optimally allocate females to facilities. For example, there may be an insufficient number of single-sex facilities to adequately group female offenders by age.[34] Race, on the other hand, is not systematically related to peer quality. This result holds whether or not facility characteristics are included in the regression.[35]

Table 13 also shows that age is significantly and positively correlated with assignment to bad peers for six of the nine crime categories and the total crime index. Having a felony sex offense history or a history of escapes significantly increases exposure to peers who increase an individual's overall propensity to recidivate, while a history of grand larceny significantly decreases such exposure. In the case of felony sex offenses, much of this effect is attributable to the fact that these individuals are often assigned to particular, specialized facilities, where these serious offenders are exposed to one another.

Facility type, especially risk level, also plays a significant role in determining the quality of an individual's peers. Relative to assignment to a minimum risk facility, assignment to high and maximum risk facilities significantly increases exposure to bad peers for all types of crimes and the total crime index, while assignment to a moderate risk facility increases exposure to bad peers for every type of crime category except auto theft, burglary, and grand larceny. This finding fits with that of Chen and Shapiro (2003), which provides evidence based on a regression discontinuity design that assignment to higher risk facilities leads to an increased propensity to recidivate for adults. While not directly comparable, the results presented here imply that Chen and Shapiro's results may be driven in part by increased exposure to bad peers in higher risk facilities. We also find that, relative to state-operated facilities, assignment to a private nonprofit facility significantly decreases exposure to bad peers in the cases of felony sex offenses, grand

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[34] We explored this possibility by including an interaction between gender and age in equation (5). The coefficient on the interaction is negative and significant for almost all types of crimes and the total crime index, while that on female is positive and significant in almost all cases. This implies that young girls are exposed to much worse peers on average than are young boys—certainly a downside to segregation across facilities on the basis of gender.

[35] In fact, the inclusion of facility characteristics does not change the qualitative nature of the results for any of the individual characteristics.

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larceny, and overall crime; assignment to for-profit facilities, on the other hand, significantly increases exposure to bad peers in the cases of felony drug offenses and petty larceny.

VI.   Conclusion

Taken as a whole, these results provide strong evidence of the existence of peer effects in juvenile correctional facilities. In many instances, these peer effects have a reinforcing nature, whereby exposure to peers with a history of committing a particular crime increases the probability that an individual *who has already committed the same type of crime* recidivates with that crime. This form of a reinforcing peer effect is positive and significant for the cases of burglary, felony drug offenses, felony weapon offenses, and felony sex offenses in our main specification and for auto theft, grand larceny, petty larceny, misdemeanor drug offenses, and robbery in alternative specifications that refine the peer measure in various ways. There is much less evidence that exposure to peers with particular criminal histories increases an individual's propensity to recidivate in a crime category with which the individual has no prior experience, as the corresponding coefficient is positive and significant for only felony sex offenses in our main specification and negative and significant for robbery.

In addition, we find strong evidence of specialization—for every crime category, having a history of committing a particular crime increases the likelihood that an individual will recidivate with that crime. The results also provide strong evidence that older individuals exert stronger peer effects than younger individuals, in part because of their more extensive criminal experience, and they exert these peer effects more intensely on younger individuals.

The magnitudes of the estimated peer effects are generally greater when we limit the sample to individuals in relatively small facilities, to individuals in residential facilities, or to individuals with relatively long sentence lengths. The results also appear robust to the measurement error that arises because some peers are released either before or after the sample period, which requires a portion of the peer measure to be estimated in these cases.

While we do not attempt to distinguish explicitly between the many potential mechanisms through which individuals might influence their peers, a few mechanisms do seem particularly capable of explaining the general pattern of our results (primarily the result that exposure to peers with a history of having committed a particular offense has a much stronger influence on those individuals who already have some experience with that offense). One explanation that fits well with this pattern is that peers reinforce addictive behavior, which may explain part of the large reinforcing peer effect for felony drug crimes. Another explanation is that individuals may experience different rates of return from participation in various types of

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legitimate or illegitimate activities; this variation in returns could be related to natural abilities, opportunities, human capital accumulation, or involvement in criminal networks. In this case, individuals who have a history of committing a particular offense have already revealed themselves to have high returns and, likely, substantial human capital related to this type of crime. Access to peers who can disseminate additional crime-specific knowledge or aid in the expansion of a criminal network may increase the individual's returns to this type of crime, leading him to increase the intensity of his activity in it. On the other hand, access to peers who can increase returns for another type of crime may be unhelpful, as this may not decrease the gap in returns between crime types enough to change an individual's choice of type of crime. Other potential social mechanisms related to stigma or to the general spread of information do not fit the pattern of our estimated peer effects as well.

The results of our analysis also provide insight into the distribution of exposure to peer quality across individuals and facilities. Not surprisingly, older individuals and those with more extensive criminal histories (in some dimensions) tend to be exposed to worse peers. More surprisingly, females tend to be exposed to worse peers on average. This effect is almost entirely driven by the fact that the assignment of juvenile females to correctional facilities, in an effort to place them in single-sex facilities, often results in an increased exposure to older (female) individuals than is the case for juvenile males. Thus, one consequence of the fact that juvenile crime is primarily a male activity (85 percent of the individuals in our sample are male) is that Florida may have a hard time isolating juvenile females in single-sex facilities with individuals of an appropriate age. This problem is likely to be even greater in smaller states.

These results have several broad policy implications. First, in the broadest sense, the existence of peer effects in juvenile criminal behavior suggests that any current reduction in crime leads, at least through the correctional system channel, to future reductions in crime by reducing the overall level of crime-related human capital. It is important to account for these dynamic benefits when considering the overall benefits of reducing crime in a given period. Notice that this does not imply a good course of action would be to lock up more juveniles for the purposes of deterring crime, as the intense exposure of juvenile offenders to one another in correctional facilities may, through the variety of channels discussed in this paper, increase the amount of criminal behavior upon release.[36] However, other programs for reducing juvenile crime—so long as they do not increase the intensity of juvenile offenders' exposure to one another or so long as

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[36] Our paper does not explicitly provide any evidence that the intensity of peer effects is greater inside a correctional facility than on the outside, but one might certainly imagine that this is the case.

they maintain a controlled social environment—might have dynamic benefits that greatly enhance the short-term benefits derived from the decreased criminal behavior of program participants.

A second broad conclusion of our analysis concerns the mixing of older and younger individuals, both in juvenile correctional facilities and in other social settings. Because the social interactions estimated in juvenile correctional facilities flow almost exclusively from older to younger individuals, policies aimed at reducing the exposure of young individuals to their older peers, especially in high crime-risk environments, may substantially diminish the transference of crime-related human capital from one cohort to the next and thereby reduce the aggregate amount of crime-related knowledge in society. In this way, the greater segregation of juveniles on the basis of age in juvenile correctional facilities, schools, or other social settings might have important dynamic effects in reducing crime.

Finally, the evidence presented in this paper overwhelmingly supports the notion that exposure to peers with experience in a particular crime category has its greatest effect on individuals who themselves already have some experience in that category. Thus, while a policy of grouping offenders with others who have committed the same crimes may seem prudent to prevent the learning of new crimes, such a policy may inadvertently increase human capital precisely in those crime categories where it is likely to be of greatest use.

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Appendix

This appendix describes the exact procedure we use to calculate the peer characteristics used in the analysis. More specifically, when calculating an individual i's peer exposure, we allow each observed potential peer, j, in the facility to contribute to this measure in two ways—directly and indirectly. A potential peer contributes directly to the peer measure if his sentence actually overlaps with individual i's sentence, in which case, we weight the relevant peer characteristic, c_j, by the number of days that individual i is exposed to the jth peer, d_{ij}. A potential peer also contributes indirectly to the peer measure in certain circumstances, leading to an additional weight, w_{ij}, on the relevant peer characteristic. This weight is based on the fraction of sentences of the length served by the potential peer j that would not have been observed for those peers who overlap with the individual. In this way, peer exposure to characteristic c_j is calculated by the following equation

$$Exp_{ij} = \frac{\sum_j (d_{ij} + w_{ij}) \bullet c_j}{\sum_j (d_{ij} + w_{ij})} \qquad (A1)$$

We estimate w_{ij} by calculating the expected number of days that individual i is exposed to an individual with a sentence the length of individual j's who would have been released either before or after the sample period. In doing so, we make the assumption that each facility is in a steady state with respect to the peers served over the relevant period and that the release date of each individual is randomly distributed across the sample period. The calculation of w_{ij} is best understood by considering an example. Consider individual i released 30 days after the sample period begins, having served a sentence of 150 days. Additionally, consider a peer, j, in the same facility with a sentence of 50 days. This information is depicted in the following diagram, where the horizontal axis represents time, t, and the vertical axis represents the number of days individual i would be exposed to peer j if peer j is released at date t.

Scenario 1:   *date_release[i] <= days_in[i] - days_in[j]*
Example: date_release[i] = 30; days_in[i] = 150; days_in[j] = 50
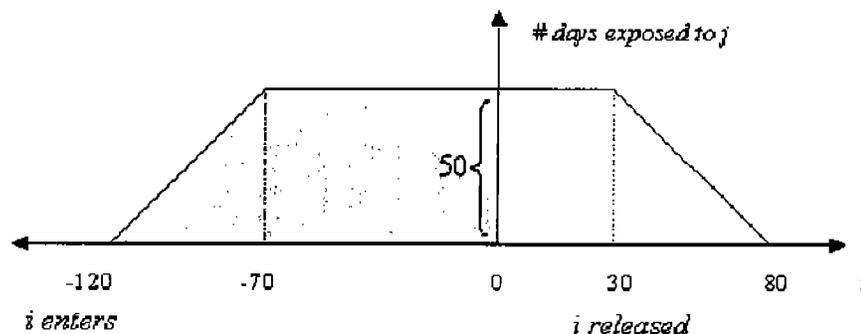
Any individuals who are released before $t = 0$ will be unobserved in the sample. To calculate the average number of days that individual i is expected to have been exposed to individual j, we simply divide the area of the shaded region by 729 (the number of days in the observed sample). To see this more clearly, imagine, for example, that one individual with a 50-day sentence is released during the sample period. In this case, the probability that such an individual was also released in the 120 days before the sample period is 120/729 and the average exposure of individual i to this individual is simply the average height of the shaded region. Thus, the correct weight for individual j, w_{ij}, is simply the area of the shaded region (length * average height) divided by 729.

This example depicts the correction made for just one case of pre-censoring. For peers with very long sentences, pre-censoring can occur such that the unobserved region is just the shaded triangular portion of the diagram above. Similarly, there are two cases of post-censoring

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that parallel those of pre-censoring. The following are examples and diagrams that depict the three additional censoring scenarios. In each scenario, w_{ij} is set equal to the area of the shaded region divided by 729.

Scenario 2:   *days_in[i] - days_in[j] < date_release[i] <= days_in[i]*
Example: date_release[i] = 30; days_in[i] = 150; days_in[j] = 160
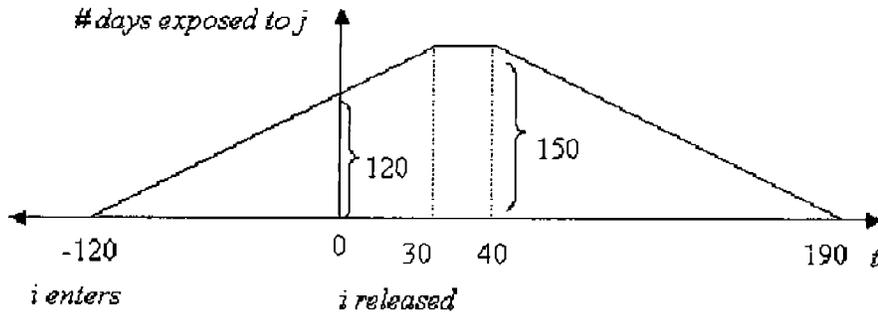
Scenario 3:   *days_in[j] >= 729 - date_release[i] + days_in[i]*
Example: date_release[i] = 700; days_in[i] = 50; days_in[j] = 100
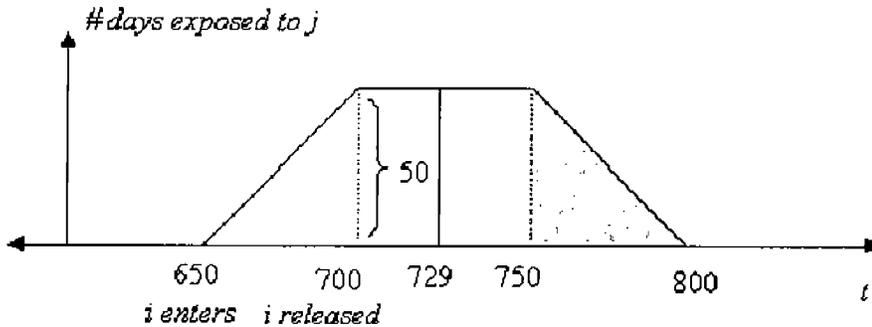
Scenario 4:   *729 - date_release[i] <= days_in[j] <= 729 - date_release[i] + days_in[i]*
Example: date_release[i] = 700; days_in[i] = 150; days_in[j] = 50

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Table 1. Descriptive Statistics

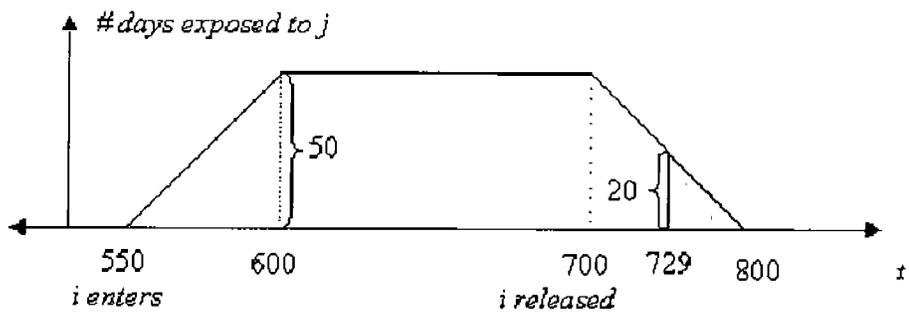| Variable	N	Mean	Standard Deviation Overall	Standard Deviation Within	Definition
Recidivism					
Recidivism	8216	.67	.47	.45	1 if client recidivated within one year of release, 0 otherwise
R_Felony Drug	8216	.093	.29	.28	1 if client committed felony drug offense within one year of release, 0 otherwise
R_Misd. Drug	8216	.090	.29	.28	1 if client committed misd. drug offense within one year of release, 0 otherwise
R_Felony Weapon	8216	.14	.34	.34	1 if client committed felony weapon offense within one year of release, 0 otherwise
R_Felony Sex	8216	.013	.11	.11	1 if client committed felony sex offense within one year of release, 0 otherwise
R_Auto Theft	8216	.093	.29	.28	1 if client committed auto theft offense within one year of release, 0 otherwise
R_Burglary	8216	.14	.34	.33	1 if client committed burglary offense within one year of release, 0 otherwise
R_Grand Larceny	8216	.094	.29	.29	1 if client committed grand larceny offense within one year of release, 0 otherwise
R_Petty Larceny	8216	.12	.32	.32	1 if client committed petty larceny offense within one year of release, 0 otherwise
R_Robbery	8216	.045	.21	.20	1 if client committed robbery offense within one year of release, 0 otherwise
Facility Characteristics					
# Individuals in Facility per day	14421	48.7	73.5	0	Calculated as number of individuals released multiplied by avg. sentence length in the facility, divided by 729 (total number of sample days)
# Released	14421	196.5	240.5	0	# of individuals released from each facility
Min Risk	14421	.15	.36	0	1 if facility to which client is assigned is designated minimum risk, 0 otherwise
Low Risk	14421	.17	.38	0	1 if facility to which client is assigned is designated low risk, 0 otherwise
Mod Risk	14421	.49	.50	0	1 if facility to which client is assigned is designated moderate risk, 0 otherwise
High Risk	14421	.17	.38	0	1 if facility to which client is assigned is designated high risk, 0 otherwise
Max Risk	14421	.010	.099	0	1 if facility to which client is assigned is designated maximum risk, 0 otherwise
Nonprofit Mgt	14421	.54	.50	0	1 if facility to which client is assigned is managed by a private nonprofit organization, 0 otherwise
For-profit Mgt	14421	.15	.36	0	1 if facility to which client is assigned is managed by a private for-profit organization, 0 otherwise
County Mgt	14421	.091	.29	0	1 if facility to which client is assigned is publicly managed by the county, 0 otherwise
State Mgt	14421	.22	.41	0	1 if facility to which client is assigned is publicly managed by the state, 0 otherwise
Individual Characteristics					
Female	8216	.14	.35	.19	1 if client is female, 0 otherwise
Black	8216	.48	.50	.48	1 if client is black, 0 otherwise
Age First Offense	8216	12.7	2.0	1.8	Client's age in years at first adjudicated criminal offense
Age Exit	8216	15.7	1.0	.87	Client's age in years at exit from facility
Days In	8216	168.5	106.4	64.0	Number of days an individual is in facility
Individual Criminal History Characteristics					
Felonies	8216	4.7	4.6	4.1	Number of felony charges on client's record
Fel Drug	8216	.13	.33	.32	1 if any felony drug charges on client's record, 0 otherwise
Mis Drug	8216	.16	.37	.36	1 if any misd. drug charges on client's record, 0 otherwise
Fel Sex	8216	.067	.25	.24	1 if any felony sex offense charges on client's record, 0 otherwise
Mis Sex	8216	.0095	.097	.096	1 if any misd. sex offense charges on client's record, 0 otherwise
Fel Weap	8216	.37	.48	.47	1 if any felony weapon offense charges on client's record, 0 otherwise
Mis Weap	8216	.042	.20	.20	1 if any misd. weapon offense charges on client's record, 0 otherwise
Auto Theft	8216	.26	.44	.16	1 if any auto theft charges on client's record, 0 otherwise
Grlrcn	8216	.35	.48	.46	1 if any grand larceny charges on client's record, 0 otherwise
Plrcn	8216	.61	.49	.48	1 if any petty larceny charges on client's record, 0 otherwise
Burglary	8216	.58	.49	.47	1 if any burglary charges on client's record, 0 otherwise
Robbery	8216	.13	.33	.32	1 if any robbery charges on client's record, 0 otherwise
Escape	8216	.077	.27	.25	1 if any escape charges on client's record, 0 otherwise
Vandalism	8216	.31	.46	.45	1 if any vandalism charges on client's record, 0 otherwise
Disorder	8216	.093	.29	.29	1 if any disorderly conduct charges on client's record, 0 otherwise
Other	8216	.92	.27	.26	1 if any other charges on client's record, 0 otherwise
Individual Neighborhood Characteristics					
Youth Crime Rate in Zip	8216	358	260	247	Total number of juvenile referrals in client's home zip code, FY 2000-01
% Own Race in Zip	8216	.60	.33	.32	% of inhabitants in client's home zip code of same racial group as client, 1990
Per-Cap Inc Race	8216	10710	4331	4180	Median per-capita income of client's racial group in client's home zip code, 1990
Unemployment Rate	8216	.068	.028	.027	% unemployment rate in client's home zip code, 1990

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Incarcerated in Zip	8216	109	307	301	Number of people incarcerated in client's home zip code, 1990
Per-Cap Income	8216	12316	3661	3533	Median per-capita income in home zip code, 1990

Peer Demographic Characteristics

Peer_male	8216	.86	.29	.038	Weighted average of whether or not an individual's peers are male
Peer_age_exit	8216	16.4	.88	.22	Weighted average of the age at exit of an individual's peers
Peer_age1st	8216	13.1	.81	.32	Weighted average of the age at first offense of an individual's peers

Peer Criminal History Characteristics

Peer_fel	8216	4.7	2.1	.63	Weighted average of the number of felony charges of an individual's peers
Peer_fel_drg	8216	.16	.10	.053	Weighted average of whether an individual's peers have a record of any felony drug offenses
Peer_mis_drg	8216	.19	.11	.065	Weighted average of whether an individual's peers have a record of any misd. drug offenses
Peer_fel_sex	8216	.069	.097	.038	Weighted average of whether an individual's peers have a record of any felony sex offenses
Peer_mis_sex	8216	.010	.023	.016	Weighted average of whether an individual's peers have a record of any misd. sex offenses
Peer_fel_wpn	8216	.37	.14	.075	Weighted average of whether an individual's peers have a record of any felony weapon offenses
Peer_mis_wpn	8216	.042	.038	.028	Weighted average of whether an individual's peers have a record of any misd. weapon offenses
Peer_auto	8216	.27	.14	.066	Weighted average of whether an individual's peers have a record of auto theft
Peer_glrcn	8216	.35	.13	.077	Weighted average of whether an individual's peers have a record of grand larceny
Peer_plrcn	8216	.61	.12	.081	Weighted average of whether an individual's peers have a record of petty larceny
Peer_burg	8216	.57	.16	.079	Weighted average of whether an individual's peers have a record of burglary
Peer_rob	8216	.13	.11	.051	Weighted average of whether an individual's peers have a record of robbery
Peer_vand	8216	.30	.11	.070	Weighted average of whether an individual's peers have a record of vandalism
Peer_dsord	8216	.090	.069	.048	Weighted average of whether an individual's peers have a record of disorderly conduct
Peer_escp	8216	.077	.093	.039	Weighted average of whether an individual's peers have a record of escape
Peer_other	8216	.92	.074	.048	Weighted average of whether an individual's peers have a record of other offenses

Peer Neighborhood Characteristics

Peer_percapi	8216	10754	1988	810	Weighted average of the per-capita income in an individual's peers' zip codes
Peer_percorin	8216	93	65	42	Weighted average of the number of incarcerated people in an individual's peers' zip codes

NOTE.—Neighborhood characteristics are constructed for Florida zip codes only. Individuals with zip codes from other states are assigned a zero for all neighborhood characteristics, and a dummy variable denoting that an individual has an out-of-state zip code of residence is included in all regressions. This allows us to maintain the full sample for the regressions, and it controls for the potential problem that out-of-state youths are less likely to recidivate in Florida.

Table 2a. Correlations between Peer Variables and Individual Variables

	Black	Female	AgeExit	Age 1st	# Fel.	Fel Sex	Mis Sex	Fel Drug	Mis Drug	Auto Thef	Burglary	Grlrcn	Plrcn	Robbery	Escape	Vandal	Disorder	Fel Weap	Mis Weap
Peer_male	.0329*	-.8356*	.0597*	-.0571*	.1585*	.0869*	.0048	.1157*	.1019*	.0552*	.1906*	.1001*	.0332*	.0943*	-.0574*	.0965*	-.0079	.124	.0253*
Peer_age_exit	.0065	-.0794*	.5055*	.1479*	.1771*	.0322*	.0015	.1012*	.0789*	.1078*	.0388*	.0599*	.0186*	.0906*	.0662*	.0099	.0084	.0460*	.0231*
Peer_percapi	.0407*	.0066	.0510*	.0238*	-.0010	-.0230*	.0060	.0501*	.0421*	.0293*	-.0169*	-.0250*	-.0159	.0421*	.0093	-.0107	.0415*	.0034	.0014
Peer_percorin	.0463*	-.0369*	.0784*	-.0071	.0774*	.0230*	-.0001	.0508*	.0218*	.0404*	.0144	.0405*	.0240*	.474*	.0500*	.0438*	.0266*	.0333*	.0039
Peer_age1st	-.0771*	.1459*	.2273*	.2399*	-.1830*	-.0627*	-.0232*	-.0204*	.0350*	-.0739*	-.1049*	-.0658*	-.0522*	-.0979*	-.0926*	-.0798*	-.0270*	-.1165*	-.0226*
Peer_fel	.1077*	-.2844*	.2162*	-.1294*	.4176*	.0881*	.0215*	.1273*	.0428*	.2060*	.1874*	.1627*	.0780*	.2353*	.1842*	.1148*	.0442*	.1873*	.0441*
Peer_fel_sex	.0133	-.2031*	.0515*	-.0657*	.1273*	.3030*	.0304*	.0084	-.0153	.0182*	.0308*	.0231*	-.0151	.0435*	.0425*	.0248*	-.0116	.0366*	.0051
Peer_mis_sex	.0222*	-.0451*	-.0218*	-.0384*	.0641*	.0565*	.0063	.0083	-.0283*	.0377*	.0171*	.0156	.0013	.0556*	.0372*	.0208*	.0191*	.0306*	.0033
Peer_fel_drg	.0776*	-.3310*	.2007*	-.0177*	.1994*	-.0042	.0020	.1670*	.1178*	.1304*	.1286*	.0919*	.0525*	.1232*	.0652*	.0697*	.0400*	.0769*	.0246*
Peer_mis_drg	.0021	-.3123*	.1739*	.0504*	.0645*	-.0248*	-.0174*	.1239*	.1320*	.0436*	.0731*	.0490*	.0373*	.0344*	-.0317*	.0247*	.0013	-.0009	.0145*
Peer_fel_wpn	.1033*	-.0242*	.0949*	-.1232*	.2868*	.0364*	.0131	.0722*	.0032	.1590*	.1056*	.0878*	.0551*	.1710*	.1703*	.0700*	.0446*	.1855*	.0308*
Peer_mis_wpn	.0282*	-.0989*	.0702*	-.0318*	.1062*	.0013	-.0045	.0418*	.0212*	.0660*	.0503*	.0419*	.0234*	.0654*	.0384*	.0430*	.0358*	.0430*	.0053*
Peer_auto	.0821*	-.1374*	.2053*	-.0702*	.3019*	.0062	.0178*	.1194*	.0425*	.2056*	.1409*	.1174*	.0441*	.2034*	.1478*	.0687*	.0389*	.1503*	.0416*
Peer_burg	.0552*	-.4934*	.0716*	-.1135*	.2709*	.0209*	.0062	.1180*	.0669*	.1407*	.2078*	.1366*	.0746*	.1651*	.0733*	.1026*	.0230*	.1062*	.0326*
Peer_glrcn	.0415*	-.3021*	.1303*	-.0805*	.2732*	.0189*	.0114	.0965*	.0531*	.1377*	.1595*	.1506*	.0854*	.1202*	.0729*	.0936*	.0258*	.0992*	.0315*
Peer_plrcn	.0343*	-.1056*	.0381*	-.0854*	.1529*	-.0300*	.0028	.0683*	.0453*	.0601*	.1042*	.0959*	.0891*	.0701*	.0721*	.0662*	.0234*	.0753*	.0183*
Peer_rob	.1265*	-.2387*	.1442*	-.0942*	.3187*	.0371*	.0257*	.1030*	.0290*	.1879*	.1536*	.0987*	.0452*	.2435*	.1422*	.0820*	.0477*	.1549*	.0379*
Peer_escp	.0914*	.1319*	.1192*	-.0887*	.2559*	.0384*	.0226*	.0636*	-.0174*	.1407*	.0694*	.0675*	.0465*	.1486*	.2764*	.0491*	.0405*	.1484*	.0225*
Peer_vand	.0381*	-.3335*	.0251*	-.1135*	.2117*	.0382*	.0104	.0806*	.0380*	.0825*	.1317*	.1071*	.0680*	.1084*	.0648*	.0941*	.0262*	.0777*	.0390*
Peer_dsord	.0416*	.0433*	.0225*	-.0335*	.0903*	-.0331*	.0169*	.0493*	.0087	.0513*	.0246*	.0348*	.0192*	.0685*	.0529*	.0284*	.0737*	.0607*	.0312*
Peer_other	.0310*	-.0122	.0587*	-.0393*	.1166*	-.0828*	-.0008	.0685*	.0318*	.0873*	.0677*	.0583*	.0657*	.0730*	.0857*	.0605*	.0405*	.0728*	.0184*

NOTE.—* indicates that the correlation coefficient is significant at the 5% level or better.

Table 2b. Correlations between Fixed Effects-Transformed Peer Variables and Individual Variables

	Black	Female	AgeExit	Age 1st	# Fel.	Fel Sex	Mis Sex	Fel Drug	Mis Drug	Auto Thef	Burglary	Grlrcn	Plrcn	Robbery	Escape	Vandal	Disorder	Fel Weap	Mis Weap
Peer_male	.0148	-.0542*	.0004	-.0033	-.0001	.0057	-.0016	-.0025	.0094	.0093	-.0061	-.0045	.0002	-.0018	-.0008	.0028	-.0128	.0110	.0011
Peer_age_exit	-.0042	.0012	-.0137	-.0191*	-.0006	.0037	-.0010	.0081	-.0051	-.0076	.0030	-.0101	.0011	-.0041	.0057	.0009	.0020	.0013	.0000
Peer_percapi	-.0055	.0009	-.0075	.0050	-.0032	-.0048	.0047	-.0036	.0079	-.0046	.0019	.0032	-.0190*	-.0012	.0002	.0027	-.0054	-.0077	-.0042
Peer_percorin	.0030	.0055	.0100	-.0028	.0085	.0067	-.0110	.0082	.0109	-.0000	-.0033	.0066	.0150	.0043	.0231*	.0093	.0041	.0010	-.0037
Peer_age1st	.0002	.0034	-.0150	-.0677*	.0066	.0164	-.0029	-.0069	.0042	.0026	.0154	.0087	.0074	.0069	.0117	.0101	.0049	.0111	-.0091
Peer_fel	.0187*	-.0012	.0052	.0107	-.0305*	.0107	.0002	-.039	.0039	-.0101	-.0177*	-.0020	.0014	.0105	.0279*	-.0189*	.0014	.0096	-.0098
Peer_fel_sex	-.0001	-.0045	.0047	.0187*	.0081	-.0492*	-.0057	.0020	.0074	-.0015	.0074	.0037	.0107	.0010	-.0029	.0017	-.0094	.0018	.0070
Peer_mis_sex	.0028	.0018	-.0007	.0069	.0067	-.0050	-.0945*	.0050	.0074	.0017	-.0061	.0056	.0041	.0036	.0006	.0063	.0097	.0018	.0070
Peer_fel_drg	-.0166*	.0007	.0065	-.0051	.0031	.0048	.0034	-.0818*	-.0097	-.0103	.0103	.0148	.0148	-.0094	.0079	-.0002	.0088	.0066	-.0043
Peer_mis_drg	-.0099	-.0050	.0049	.0110	-.0005	.0074	-.0171*	-.0066	-.0488*	-.0104	.0004	.0032	-.0003	-.0038	-.0107	-.0047	-.0005	-.0036	-.0072
Peer_fel_wpn	-.0045	-.0082	.0034	.0119	.0098	.0006	.0000	.0010	-.0034	.0131	.0103	.0103	.0136	-.0088	.0226*	-.0063	.0119	-.0652*	.0003
Peer_mis_wpn	.0089	.0015	-.0029	-.0105	-.0071	.0066	-.0043	-.0047	-.0048	.0031	-.0122	.0026	.0068	-.0070	-.0115	.0078	.0096	-.0132	-.0092
Peer_auto	-.0107	-.0048	-.0024	.0025	-.0109	.0031	.0011	-.0111	-.0111	-.0674*	-.0067	.0120	-.0048	.0141	.0197*	.0074	-.0069	.0010	-.0913*
Peer_burg	.0055	.0033	.0038	.0122	-.0197*	.0047	.0003	-.0107	.0079	-.0083	-.0638*	-.0333*	-.0006	.0065	.0222*	-.0200*	-.0050	.0089	.0018
Peer_glrcn	.0101	.0055	-.0073	.0023	-.0058	.0041	.0039	.0083	.0032	.0103	-.0323*	-.0602*	-.0019	-.0034	.0036	-.0075	-.0006	.0095	-.0127
Peer_plrcn	.0169*	.0012	.0018	.0050	-.0041	.0085	.0022	.0160*	.0014	-.0083	.0051	-.0065	-.0613*	.0113	-.0115	.0010	-.0002	.0109	.0031
Peer_rob	-.0106	-.0010	.0032	.0092	.0150	.0005	.0018	-.0055	.0022	.0202*	.0053	.0028	.0127	-.0658*	.0197*	.0034	-.0007	-.0063	.0049
Peer_escp	.0044	-.0030	.0100	.0139	.0144	.0008	-.0044	.0023	-.0090	.0127	.0230*	.0098	.0116	.0268*	-.0240*	.0027	-.0006	.0095	-.0036
Peer_vand	.0060	-.0039	.0022	.0080	-.0187*	.0071	.0021	.0010	.0023	.0091	-.0190*	-.0035	.0074	.0032	.0036	-.0867*	-.0131	.0131	-.0114
Peer_dsord	.0035	.0035	.0006	.0066	.0048	-.0072	.0157	.0047	.0032	-.0030	-.0059	.0028	-.0077	-.0028	-.0114	-.0034	-.0589*	-.0150	.0116
Peer_other	.0079	.0024	.0057	.0147	-.0091	-.0053	-.0057	-.0015	-.0095	.0118	-.0011	-.0157	.0049	.0163	-.0023	.0080	-.0103	.0105	.0092

NOTE.—Peer variables have undergone fixed effect transformations (that is, facility averages have been subtracted out). * indicates that the correlation coefficient is significant at the 5% level or better.

Table 3. Individual Characteristic Determinants of Overall Recidivism

Dependent Var. =	Recidivism	
	(1)	(2)
Female	-.11**	-.11**
	4.12	3.93
Black	.13**	.13**
	7.20	7.22
Age Exit	-.045**	-.045**
	7.07	7.11
Age First Offense	-.0067**	-.0064*
	2.02	1.94
Days In	.000073	.000071
	0.92	0.89
Felonies	.0015	.0015
	1.01	1.03
Fel Sex	-.050**	-.053**
	2.32	2.44
Mis Sex	.058	.060
	1.27	1.32
Fel Drug	.057**	.056**
	3.80	3.79
Mis Drug	.031**	.031**
	2.24	2.29
Fel Weap	.023**	.024**
	2.06	2.17
Mis Weap	-.036	-.034
	1.43	1.39
Auto Theft	.055**	.054**
	4.54	4.49
Grlrcn	-.0049	-.0049
	0.41	0.41
Plrcn	.033**	.034**
	3.00	3.05
Burglary	.013	.014
	1.06	1.11
Robbery	.028*	.028*
	1.91	1.91
Escape	.030*	.029
	1.66	1.62
Vandalism	.017	.017
	1.45	1.53
Disorder	.043**	.041**
	2.62	2.51
Other	.14**	.14**
	6.58	6.53
Youth Crime Rate in Zip	.0054**	.0055**
	2.42	2.49
% Own Race in Zip	-.017	-.017
	0.65	0.66
Per-Cap Inc Race	.0038*	.0038*
	1.89	1.89
Unemployment Rate	.10	.086
	0.41	0.35
Incarcerated in Zip	.0011	.0011
	0.64	0.65
Constant	1.5**	1.1**
	3.31	11.11
# observations	8216	8216
Detailed peer list	YES	NO
R^2	.1263	.1252

NOTE.—The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. Both specifications above include facility fixed effects. The specification represented in Column (1) includes a set of peer demographic and criminal history variables while the specification presented in Column (2) does not.

Table 4. Peer Effects and Specialization

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	.021	.16**	.023	.15**	.093	.55**	.17	.11*	-.0079
	0.33	*3.80*	*0.41*	*2.80*	*1.23*	*4.00*	*1.60*	*1.79*	*0.10*
Peer_offense	.049	-.024	-.044	-.078	-.095*	.0024	-.020	.0041	.059*
	1.01	*0.42*	*0.94*	*1.45*	*1.90*	*0.04*	*0.40*	*0.08*	*1.76*
Offense	.080**	.065**	.043**	.045**	.042**	.19**	.11**	.078**	.052**
	8.70	*7.30*	*4.94*	*5.91*	*3.93*	*12.88*	*9.39*	*8.72*	*4.56*
# who recidivate with offense	760	1116	770	954	369	762	738	1119	108
% who recidivate with offense	9.3%	13.6%	9.4%	11.6%	4.5%	9.3%	9.0%	13.6%	1.3%
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216
R²	.0739	.0817	.0542	.0396	.0657	.1658	.0709	.0773	.0383

NOTE.—Each column represents a different specification; Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels.

Table 5. Specialization: Recent Criminal History versus Total Criminal History

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	.018	.16**	.024	.16**	.086	.54**	.17*	.11*	.0013
	0.28	*3.75*	*0.43*	*2.84*	*1.13*	*3.95*	*1.64*	*1.78*	*0.02*
Peer_offense	.045	-.020	-.046	-.078	-.093*	.0049	-.020	.00065	.056*
	0.92	*0.35*	*0.99*	*1.44*	*1.87*	*0.08*	*0.41*	*0.01*	*1.69*
Offense	.070**	.061**	.045**	.042**	.050**	.18**	.12**	.078**	.059**
	6.75	*6.39*	*4.61*	*5.33*	*4.01*	*10.66*	*9.14*	*7.81*	*4.45*
Last Offense	.030	.0061	-.0037	.014	-.036*	.021	-.052**	-.013	-.030
	1.56	*0.42*	*0.23*	*0.99*	*1.77*	*0.67*	*2.07*	*0.75*	*1.58*
# who recidivate with offense	760	1116	770	954	369	762	738	1119	108
% who recidivate with offense	9.3%	13.6%	9.4%	11.6%	4.5%	9.3%	9.0%	13.6%	1.3%
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216
R²	.0766	.0838	.0552	.0402	.0680	.1677	.0750	.0807	.0399

NOTE.—Each column represents a different specification; Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels.

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Table 6. Age and the Influence of Older Peers

Dependent Var. =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Age Exit*Peer_age_exit	-.010**	-.015**	-.0068*	-.011**	-.0015	-.00061	-.0018	-.0064	-.00075
	2.40	*2.84*	*1.67*	*2.35*	*0.48*	*0.19*	*0.52*	*1.22*	*0.34*
Peer_age_exit	.17**	.25**	.15**	.19**	.036	.019	.035	.10	.013
	2.52	*2.99*	*2.25*	*2.52*	*0.71*	*0.37*	*0.62*	*1.18*	*0.37*
Age_exit	.15**	.23**	.10	.16**	.021	.020	.034	.090	.011
	2.18	*2.65*	*1.58*	*2.11*	*0.40*	*0.40*	*0.60*	*1.05*	*0.31*
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216
R^2	.0734	.0814	.0540	.0381	.0620	.1593	.0691	.0752	.0351

NOTE.—The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. A complete set of individual criminal history variables are included in each specification. All specifications include facility fixed effects.

Table 7. Age, Specialization, and Peer Effects

Dependent Var. =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Age_exit* Offense*Peer_offense	-.12* *1.72*	-.037 *0.90*	.043 *0.87*	-.027 *0.49*	-.072 *0.86*	-.27* *1.69*	-.060 *0.50*	-.011 *0.19*	.025 *0.78*
Age_exit*Peer_offense	-.058** *2.23*	-.024 *0.96*	-.0059 *0.23*	.050 *1.27*	-.040* *1.66*	.027 *0.87*	-.0015 *0.05*	.0091 *0.29*	-.016 *0.67*
Age_exit* Offense	-.029** *3.10*	-.023** *3.23*	-.0084 *1.10*	-.0098 *1.43*	-.023** *2.16*	-.034** *2.08*	-.020 *1.56*	-.012 *1.53*	.0067 *0.71*
Offense*Peer_offense	2.0* *1.75*	.74 *1.15*	-.65 *0.82*	.58 *0.65*	1.2 *0.93*	4.8* *1.93*	1.2 *0.60*	.27 *0.32*	-.41 *0.80*
Peer_offense	.95** *2.29*	.33 *0.87*	.050 *0.13*	-.86 *1.37*	.51 *1.36*	-.42 *0.87*	-.0026 *0.01*	-.14 *0.28*	.31 *0.84*
Offense	.54** *3.59*	.42** *3.78*	.17 *1.45*	.20* *1.82*	.40** *2.39*	.74** *2.82*	.43** *2.10*	.27** *2.13*	-.051 *0.35*
Age_exit	-.0099 *2.35*	-.0029 *0.52*	-.0037 *0.88*	-.012** *2.11*	-.0019 *0.67*	.015** *4.01*	.0068* *1.75*	-.0096* *1.92*	-.0016 *0.89*
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216
R²	.0779	.0834	.0544	.0400	.0685	.1677	.0714	.0776	.0387

NOTE.—Each column represents a different specification, where the dependent variable is recidivism with a particular type of offense. Thus, in the first column, the dependent variable is recidivism with a felony drug offense. Peer_Offense varies across these specifications; it is exposure to peers with a history of the crime that is the dependent variable. Thus, in the first column, Peer_Offense is really Peer_auto. The sample mean was subtracted from each Peer_Offense variable. All specifications include facility fixed effects. In addition, they include individual demographic and criminal history variables as well as peer demographic and criminal history variables. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level.

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Table 8. Peer Effects When the Peer Group Is Defined According to Race

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	.030	.070**	-.013	.14**	.062	.47**	.16**	.10**	-.067
	0.62	1.97	0.31	3.55	1.04	5.97	1.98	2.33	0.92
Peer_offense	-.015	-.0085	-.00051	-.050	-.0044	.022	.030	.0077	.0053
	0.55	0.26	0.02	1.48	0.17	0.67	0.92	0.25	0.21
Offense	.080**	.063**	.044**	.044**	.043**	.17**	.11**	.078**	.054**
	8.66	7.07	5.03	5.85	4.05	11.11	9.39	8.75	4.57
# who recidivate with offense	756	1109	763	949	368	759	732	1112	108
# observations	8147	8147	8147	8147	8147	8147	8147	8147	8147
R^2	.0748	.0819	.0529	.0418	.0677	.1719	.0710	.0794	.0385

NOTE.—These specifications are identical to those presented in Table 4, except the only difference is how the peer group is defined. In this table, the peer group is defined as all individuals of the same race who are in the facility at the same time. Each column represents a different specification; Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels.

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Table 9. Peer Effects in Relatively Small Facilities

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	-.013	.25**	.12*	.15**	.18*	.62**	.19	.081	.079
	0.15	*4.81*	*1.84*	*2.19*	*1.81*	*3.39*	*1.49*	*1.10*	*0.67*
Peer_offense	.00027	-.092	-.066	-.084	-.065	.029	-.056	.028	.079*
	0.00	*1.39*	*1.16*	*1.34*	*1.17*	*0.41*	*1.08*	*0.46*	*1.78*
Offense	.080**	.075**	.037**	.046**	.056**	.18**	.11**	.072**	.057**
	6.34	*6.08*	*3.02*	*4.34*	*3.67*	*8.89*	*6.74*	*5.85*	*3.32*
# who recidivate with offense	365	570	398	483	165	315	362	550	60
# observations	4266	4266	4266	4266	4266	4266	4266	4266	4266
R²	.0835	.1079	.0639	.0567	.0869	.1677	.0849	.0868	.0514

NOTE.—Since we cannot measure facility size directly, we approximate facility size by creating an index equal to the number of individuals released from a facility multiplied by the average number of days individuals stay in that facility. The sample used in the above specifications includes those individuals in facilities where the average daily population is less than 20. This eliminates approximately half of the sample. Each column represents a different specification; Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels.

Table 10. Peer Effects in Residential Facilities

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	.0045	.21**	-.0016	.22**	.092	.50**	.21*	.098	-.023
	0.06	4.38	0.03	3.43	1.11	3.41	1.87	1.51	0.28
Peer_offense	.053	-.079	-.011	-.16**	-.11**	.0093	-.064	.0097	.076**
	0.99	1.26	0.20	2.56	2.03	0.13	1.11	0.17	2.07
Offense	.081**	.060**	.042**	.043**	.041**	.20**	.11**	.079**	.056**
	8.08	6.25	4.35	5.12	3.59	12.20	8.84	8.12	4.50
# who recidivate with offense	681	984	676	825	336	689	637	985	94
# observations	6992	6992	6992	6992	6992	6992	6992	6992	6992
R^2	.0731	.0783	.0509	.0399	.0643	.1708	.0705	.0801	.0422

NOTE.—Each column represents a different specification; Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels. Note that these specifications only include individuals from residential facilities.

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Table 11. Peer Effects for Individuals with Sentence Length of At Least 155 Days

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	-.00045	.15**	-.074	.26**	-.0033	.57**	.12	.16*	.00066
	0.00	*2.29*	*0.85*	*3.11*	*0.03*	*2.99*	*0.70*	*1.76*	*0.01*
Peer_offense	.20**	-.074	.0069	-.11	-.29**	-.18	.11	.046	.053
	2.37	*0.68*	*0.09*	*1.02*	*2.92*	*1.39*	*1.11*	*0.44*	*0.73*
Offense	.087**	.048**	.057**	.044**	.045**	.18**	.11**	.077**	.050**
	6.30	*3.71*	*4.44*	*3.92*	*2.78*	*8.04*	*6.32*	*5.86*	*3.45*
# who recidivate with offense	407	580	392	502	202	443	381	588	51
# observations	4130	4130	4130	4130	4130	4130	4130	4130	4130
R²	.0930	.0994	.0799	.0636	.0820	.1934	.0934	.0992	.0581

NOTE.—Each column represents a different specification. Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels.

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Table 12. Robustness: Individuals Released during the Middle Year of the Sample

Dependent Variable =	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex
Offense*Peer_offense	.062	.24**	-.019	.14*	.13	.34*	.33**	.13	-.0047
	0.67	*3.99*	*0.22*	*1.86*	*1.08*	*1.76*	*2.21*	*1.54*	*0.05*
Peer_offense	-.035	-.070	.0054	-.080	-.16**	.065	-.049	-.074	.14**
	0.47	*0.76*	*0.07*	*1.05*	*2.06*	*0.62*	*0.70*	*0.86*	*2.00*
Offense	.084**	.070**	.033**	.043**	.047**	.21**	.13**	.063**	.061**
	6.39	*5.64*	*2.60*	*4.05*	*2.92*	*9.75*	*7.66*	*4.97*	*3.66*
# who recidivate with offense	354	523	381	443	174	386	369	549	60
# observations	4057	4057	4057	4057	4057	4057	4057	4057	4057
R^2	.0951	.1097	.0824	.0639	.0944	.1939	.1056	.1043	.0613

NOTE.—The regressions above use just those 4,057 individuals who were released between December 30, 1997 and December 30, 1998 and who were younger than 17 at the time. Each column represents a different specification; Offense and Peer_offense vary across specifications. Thus, in the first column, Offense is "Auto Theft" (individuals with a history of auto theft) while Peer_offense in this specification is Peer_auto (exposure to peers with a history of auto theft). Note that the peer_offense measures are constructed such that they have a mean of zero. The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls at both the individual and peer levels.

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Table 13. Determinants of Peer Quality

Dep. Var.=	R_Hat Fdrg	R_Hat Mdrg	R_Hat Fwpn	R_Hat Fsex	R_Hat Auto	R_Hat Burg	R_Hat Grlrcn	R_Hat Plrcn	R_Hat Rob	R_Hat Tot. Cr. Index
Female	-.013**	.031**	-.013**	-.019**	.058**	.044**	.047**	.0050*	.011**	.014**
	3.58	7.79	3.96	8.37	9.05	8.06	7.60	1.71	5.83	7.49
Black	-.000041	-.0012	-.0017**	1.8e-06	-.00012	-.0017	-.0016	.00095	-.00043	-.00063
	0.04	1.07	2.34	0.00	0.14	1.36	0.96	0.81	0.64	1.39
Age_exit	.0017**	-.0016**	.0014**	-.00052	.0064**	.0080**	.014**	.0024**	.00022	.0033**
	2.79	2.21	2.71	1.37	4.79	4.60	5.30	3.05	0.52	5.47
Age_1st	1.1e-06	-.00055**	.00023*	-.000029	-.000028	-.00019	.000030	-.000078	-.00020**	-.000080
	0.01	4.38	1.89	0.52	0.17	0.89	0.13	0.55	2.54	1.15
Felonies	.00014	-.000033	.000018	.000069**	-.000026	1.5e-06	-.000042	.00013	.000012	.000031
	1.62	0.50	0.28	1.98	0.29	0.01	0.30	1.35	0.20	0.75
Fel Sex	-.0076**	.00053	.0068**	.0035**	.0015	.012**	.0045	-.011**	.0044**	.0022**
	2.05	0.38	2.58	3.79	1.08	2.12	1.25	2.58	2.17	2.33
Mis Sex	.0015	-.0025	-.0035*	-.0031**	-.0028	-.00045	.0044	.0063**	.0052**	.00031
	0.60	1.63	1.78	3.94	1.12	0.16	1.26	2.39	3.53	0.32
Fel Drug	.0047**	-.00090	.0019**	.00015	-.00060	-.0019*	.000022	.0026**	-.00067*	.00050
	4.23	1.55	2.66	0.50	0.88	1.94	0.02	3.31	1.74	1.41
Mis Drug	.0017**	.00011	.00025	.00053**	-.00070	-.0031**	-.00084	.00054	.00036	-.00011
	2.39	0.23	0.56	2.75	1.21	3.89	1.00	1.07	1.13	0.50
Fel Weap	-.00013	.0010**	.0016**	.00068**	.00031	-.0014*	-.0014	.00031	-.000073	.00013
	0.25	2.23	3.47	3.54	0.54	1.67	1.35	0.53	0.22	0.50
Mis Weap	-.0010	-.00023	.0020**	.00037	-.00012	-.000019	.00020	-.0015	.00034	.000089
	0.85	0.26	2.45	0.97	0.11	0.01	0.10	1.52	0.58	0.17
Auto	.000034	.00055	.000025	-.0012**	.00075	.00056	.0013	.00080	-.00045	.00016
	0.05	1.10	0.05	3.62	1.12	0.66	1.42	1.33	1.26	0.62
Grlrcn	.00017	.00086**	.00067	-.000087	-.0014**	-.0017**	-.0022**	-.00021	-.00063*	-.00049**
	0.30	2.16	1.55	0.42	2.53	2.48	2.46	0.41	1.91	2.09
Plrcn	.0010*	-.00031	.00034	.00035*	-.00095*	-.0030**	-.0017*	.0027**	-.00028	-.00021
	1.76	0.68	0.94	1.75	1.73	3.65	1.83	5.26	1.09	0.93
Burglary	.0012*	.00030	.00039	-.00027	.000045	.0013	-.0014	.0010*	-.00055*	.00018
	1.88	0.71	0.74	1.27	0.07	1.48	1.37	1.71	1.82	0.65
Robbery	.0031**	-.00036	-.00065	-.000011	-.00052	-.0014	-.0017	.0023**	-.00051	-.000036
	3.04	0.67	1.08	0.03	0.64	1.35	1.30	2.29	1.00	0.10
Escape	.0040**	.0029**	-.0048**	.00018	.0053**	-.000046	.0018	.0053**	.0029**	.0017**
	2.79	3.25	3.70	0.36	3.96	0.03	1.19	4.36	3.42	3.34
Vandalism	-.00066	-.0013**	.00065*	.00010	.00020	-.00035	-.00026	.0011**	.00029	4.8e-06
	1.13	3.09	1.68	0.60	0.38	0.55	0.35	2.01	1.01	0.02
Disorder	.0012	.00083	.000064	.000051	-.00087	-.00097	-.000068	.00030	.000010	.000026
	1.40	1.24	0.12	0.14	0.99	0.94	0.05	0.41	0.03	0.07
Other	.0022	.0014*	-.00086	.00065	-.0017*	-.0035*	-.0041**	.0027*	-.00056	-.00045
	1.47	1.82	0.94	1.59	1.83	1.79	2.27	1.76	0.80	0.99
Youth Crime in Zip	.00014	.000097	.00012	-.000046	-.000096	-.000056	-.00012	-.000062	-.000074	-.000015
	0.98	0.86	1.35	0.92	0.78	0.39	0.59	0.48	1.06	0.29
% Own Race in Zip	.000087	-.0017	-.0011	-.00029	.00092	-.00031	.00096	.0034**	.00066	.00024
	0.06	1.47	1.23	0.52	0.77	0.23	0.46	2.48	0.89	0.44
Per-Cap Inc Race	-.00030**	-.00011	-.00012	4.1e-06	.000052	.00019	.000094	-.00027**	.000015	-.000038
	2.58	1.26	1.52	0.10	0.56	1.51	0.58	2.65	0.25	0.89

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Unemployment Rate	.021	.021**	-.020**	-.0078	.013	.0046	-.021	-.018	-.0056	-.0023
	1.38	*2.24*	*2.19*	*1.65*	*1.09*	*0.30*	*1.02*	*1.28*	*0.69*	*0.39*
Incarcerated in Zip	.00020**	.000031	.00025**	.000078**	-.00017**	.000055	.000010	-.000017	.00012**	.000066
	2.49	*0.53*	*3.27*	*2.34*	*2.03*	*0.46*	*0.08*	*0.24*	*2.72*	*1.59*
Low Risk	.0057	.0039	-.0030	.0025	-.012**	-.010*	-.027**	.0055	.00050	-.0036**
	1.10	*0.91*	*0.92*	*1.61*	*3.07*	*1.86*	*3.36*	*1.41*	*0.23*	*2.16*
Mod Risk	.026**	.018**	.0070**	.0074**	.00010	-.0081	-.012*	.023**	.0069**	.0071**
	5.28	*4.77*	*2.43*	*4.46*	*0.03*	*1.62*	*1.76*	*5.84*	*2.94*	*4.48*
High Risk	.044**	.033**	.018**	.014**	.027**	.033**	.030**	.040**	.022**	.027**
	5.98	*7.65*	*3.80*	*6.40*	*5.10*	*4.00*	*3.96*	*5.65*	*5.99*	*11.24*
Max Risk	.047**	.035**	.025**	.016**	.036**	.052**	.035**	.042**	.024**	.033**
	4.40	*6.35*	*4.42*	*4.14*	*7.78*	*4.14*	*4.22*	*2.97*	*5.68*	*15.08*
Nonprofit Mgt	.00074	.00069	.00075	-.0033*	-.0032	-.0051	-.012**	-.0020	-.0032	-.0030*
	0.20	*0.25*	*0.25*	*1.97*	*0.90*	*1.14*	*2.10*	*0.52*	*1.61*	*1.83*
For-profit Mgt	.019**	.0047	-.0013	-.00035	.0081	-.0062	.0017	.016**	-.0020	.0036
	2.05	*1.07*	*0.30*	*0.13*	*1.62*	*1.22*	*0.28*	*2.52*	*0.65*	*1.17*
County Mgt	.021**	.0027	-.0012	-.0054**	.0059	-.012*	-.0076	.010	-.015**	-.0011
	3.41	*0.43*	*0.27*	*2.40*	*1.45*	*1.77*	*0.90*	*1.12*	*2.98*	*0.43*
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216	8216
R^2	.5542	.5168	.3953	.5778	.5940	.4587	.4817	.5189	.4251	.6674

NOTE.—The absolute values of t-statistics are in italics. The standard errors used to calculate the t-statistics are corrected for clustering within facilities. ** represents significance at 5% level and * represents significance at 10% level. All specifications also include a set of judicial circuit dummies. Minimum Risk (facilities) is the omitted risk level variable; State Mgt (facilities) is the omitted management type variable.

Appendix Table 1. Peer Effects and Specialization

Dependent Variable =	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery
Offense*Peer_offense	.55**	.17	.11*	-.0079	.021	.16**	.023	.15**	.093
	4.00	1.60	1.79	0.10	0.33	3.80	0.41	2.80	1.23
Peer_fel_drg	.0024	.0046	.096	-.018	-.014	-.090	-.019	.12*	-.035
	0.04	0.07	1.31	0.74	0.23	1.21	0.30	1.72	0.81
Peer_mis_drg	.022	-.020	-.012	.036**	-.028	-.092	-.012	-.031	.061*
	0.44	0.40	0.21	1.96	0.59	1.57	0.24	0.55	1.81
Peer_fel_wpn	-.060	.0065	.0041	.032*	.035	-.055	-.00024	-.018	.0063
	1.49	0.16	0.08	1.71	0.85	1.06	0.01	0.37	0.21
Peer_fel_sex	-.011	.061	.12	.059*	.060	.15	.063	-.067	.040
	0.14	0.72	1.31	1.76	0.68	1.37	0.69	0.72	0.67
Peer_auto	.032	.035	.016	-.039**	.049	-.011	.039	.038	-.032
	0.71	0.72	0.29	2.10	1.01	0.18	0.75	0.72	1.01
Peer_burg	-.0097	-.017	.056	-.0094	.0020	-.024	.035	-.017	.018
	0.23	0.39	1.05	0.58	0.04	0.42	0.80	0.35	0.57
Peer_glrcn	.044	.038	.042	.031*	-.044	-.016	-.044	-.013	-.023
	1.13	0.90	0.81	1.95	1.04	0.32	0.94	0.26	0.71
Peer_plrcn	.0040	.021	-.0051	.0017	.020	-.071	-.0049	-.078	.0085
	0.11	0.52	0.10	0.10	0.46	1.43	0.11	1.45	0.30
Peer_rob	.091	.0040	-.086	-.025	.022	-.036	-.11*	-.014	-.095*
	1.40	0.06	1.12	1.17	0.34	0.47	1.75	0.19	1.90
Peer_mis_wpn	-.20*	.0021	.056	.0038	-.049	-.095	-.14	-.25**	.053
	1.83	0.02	0.43	0.07	0.45	0.70	1.23	1.98	0.66
Peer_mis_sex	-.19	-.25	.23	-.12*	-.31*	-.079	.15	.20	.37**
	1.01	1.20	0.93	1.70	1.71	0.33	0.73	0.85	2.05
Peer_vand	-.022	-.098**	.047	.0068	.030	-.040	-.017	.099*	.029
	0.50	1.99	0.86	0.41	0.65	0.69	0.34	1.87	0.85
Peer_dsord	.15**	.097	.018	.017	-.037	-.040	.062	.010	-.020
	2.42	1.39	0.24	0.89	0.61	0.56	0.96	0.15	0.48
Peer_escp	.12	.029	-.12	.034	.12	.049	.089	.12	.063
	1.59	0.38	1.21	0.87	1.52	0.53	1.00	1.31	1.12
Peer_other	.036	.088	-.026	.041*	-.043	-.020	-.10	.026	-.016
	0.64	1.37	0.34	1.69	0.67	0.25	1.42	0.35	0.41
Peer_male	.0078	-.043	-.023	.028	-.067	-.079	-.058	-.013	-.026
	0.10	0.54	0.24	0.65	0.93	0.99	0.89	0.13	0.73
Peer_age_exit	.0033	.0041	-.0066	.000027	.013	.033*	.047**	.012	.010
	0.23	0.27	0.38	0.00	0.91	1.88	2.91	0.69	1.01
Peer_Percapi	-9.2e-06**	-6.5e-06*	2.5e-06	1.4e-06	-4.0e-06	5.7e-06	5.8e-06	-2.6e-07	3.0e-06
	2.55	1.68	0.55	1.00	1.11	1.20	1.47	0.06	1.07
Peer_Percorin	.000074	.000037	.00010	.000011	-.00010	.000067	-.000023	-.000031	.000073
	1.05	0.50	1.19	0.41	1.53	0.77	0.28	0.38	1.32
Peer_age1st	-.0038	-.016	.015	-.00011	.012	-.0042	-.0062	-.0063	-.010
	0.35	1.38	1.18	0.03	1.14	0.29	0.55	0.51	1.33
# who recidivate with offense	762	738	1119	108	760	1116	770	954	369
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216
R^2	.1658	.0709	.0773	.0383	.0739	.0817	.0542	.0396	.0657

NOTE.—The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls.

Appendix Table 1 (Continued)

Dependent Variable = Recidivate with:	R_Felony Drug	R_Misd. Drug	R_Felony Weapon	R_Felony Sex	R_Auto Theft	R_Burglary	R_Grand Larceny	R_Petty Larceny	R_Robbery
Fel drug	.19**	.039**	.0041	.00069	-.022**	-.041**	-.031**	-.028**	.0032
	12.88	3.08	0.31	0.17	2.16	3.56	3.37	2.59	0.37
Mis drug	.0099	.11**	.012	-.0016	-.0039	-.0082	-.011	-.023**	.0067
	1.00	9.39	1.12	0.48	0.45	0.78	1.27	2.45	0.99
Fel weap	-.0073	-.0064	.078**	-.00052	-.0015	.0039	.0021	.0040	.0096*
	1.03	0.89	8.72	0.20	0.20	0.45	0.27	0.51	1.80
Fel sex	-.033**	-.026**	-.011	.052**	.0024	-.025	-.031**	-.012	-.0031
	2.80	2.09	0.68	4.56	0.16	1.56	2.41	0.77	0.31
Auto theft	.019**	.020**	.0082	.0013	.080**	.020**	.0063	.010	.023**
	2.25	2.36	0.86	0.44	8.70	1.98	0.74	1.13	3.66
Burglary	.0069	.0018	-.0099	.0030	.014*	.065**	.023**	.018**	.0025
	0.92	0.23	1.09	0.92	1.77	7.30	2.98	2.16	0.46
Grlrcn	-.0075	-.0047	-.0034	-.0018	.0041	.018*	.043**	.0054	.0039
	1.05	0.61	0.38	0.57	0.50	1.85	4.94	0.60	0.66
Plrcn	-.0017	.0081	-.0065	-.00015	.012*	.022**	.025**	.045**	.0035
	0.25	1.18	0.81	0.06	1.76	2.74	3.74	5.91	0.73
Robbery	.022*	.0058	.025*	-.0053	-.0013	-.0075	-.029**	-.00086	.042**
	1.84	0.53	1.80	1.48	0.12	0.59	3.03	0.07	3.93
Mis weap	-.018	-.0060	.011	.0015	.022	-.0090	-.018	-.022	.0020
	1.16	0.38	0.50	0.22	1.21	0.48	1.24	1.28	0.17
Mis sex	.039	-.018	-.0012	-.022**	.013	.053	.029	.074*	.040
	1.07	0.61	0.03	4.64	0.34	1.15	0.74	1.66	1.17
Escape	.019	.0039	.029*	-.000053	.029**	.0039	.00053	.0037	-.0016
	1.43	0.30	1.76	0.01	1.97	0.24	0.04	0.25	0.15
Vandalism	-.020**	-.0076	.010	-.0047*	.0017	.0065	.014*	.0097	.0054
	2.84	1.02	1.14	1.74	0.22	0.71	1.70	1.14	0.99
Disorder	.0034	.0031	.028*	.00069	-.0046	.0025	.0068	.0055	.019**
	0.29	0.27	1.89	0.16	0.40	0.19	0.60	0.42	1.96
Other	.026**	.014	.048**	.0029	.013	.020	.013	.028**	.0074
	3.11	1.35	4.35	0.56	1.24	1.51	1.09	2.29	1.08
# who recidivate with offense:	762	738	1119	108	760	1116	770	954	369
# observations	8216	8216	8216	8216	8216	8216	8216	8216	8216
R^2	.1658	.0709	.0773	.0383	.0739	.0817	.0542	.0396	.0657

NOTE.—The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All specifications include facility fixed effects. In addition, these specifications include a detailed set of demographic and criminal history controls.

Appendix Table 2. Determinants of Sentence Length

Dependent Variable =	Days In
Female	-1.1
	0.34
Black	3.9*
	1.81
Age Exit	20.4**
	25.29
Age First Offense	-9.5**
	16.00
Last Felony Sex	133.8**
	17.61
Last Misd. Sex	-5.4
	0.24
Last Felony Drug	-3.9
	0.82
Last Misd. Drug	-17.5**
	3.58
Last Auto Theft	16.0**
	3.81
Last Burglary	24.0**
	6.94
Last Grand Larceny	2.3
	0.59
Last Petty Larceny	-11.0**
	2.92
Last Robbery	47.5**
	8.29
Last Escape	31.7**
	5.28
Last Vandalism	5.6
	1.14
Last Disorder	-18.0*
	1.95
Last Felony Weapon	33.3**
	9.12
Last Misd. Weapon	-3.7
	0.28
Last Other	2.4
	0.55
Past Felony Sex	41.9**
	9.07
Past Misd. Sex	14.9
	1.30
Past Felony Drug	-5.4*
	1.66
Past Misd. Drug	-15.2**
	5.44
Past Auto Theft	12.6**
	5.08
Past Burglary	5.0**
	2.06
Past Grand Larceny	8.6**
	3.50
Past Petty Larceny	-2.7
	1.20
Past Robbery	25.6**
	7.60
Past Escape	46.0**
	10.45
Past Vandalism	1.2
	0.49
Past Disorder	.66
	0.18

Past Felony Weapon	6.5**
	2.76
Past Misd. Weapon	6.0
	1.17
Past Other	-4.1
	0.98
Constant	181.9**
	185.11
# observations	14127
R²	.1212

NOTE.—The absolute values of t-statistics are in italics. ** represents significance at 5% level and * represents significance at 10% level. All variables are constructed such that they have mean zero. This regression uses the entire sample of individuals released from these 169 facilities.