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## The Severity, Frequency, and Variety of Crime in Heroin-Dependent Prisoners Enrolled in a Buprenorphine Clinical Trial

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### Abstract

Data were obtained on four dimensions of criminal activity (frequency, variety, severity, and income) from male and female prisoners ( $N = 200$ ) with preincarceration heroin dependence who participated in a randomized clinical trial of buprenorphine treatment. The article examines the above-mentioned dimensions of crime and their relationships with demographic characteristics, substance use, legitimate employment, drug treatment episodes, and psychological problems. Results largely show several important similarities to results on previous prison inmate cohorts with histories of heroin addiction, although the present sample may have more of a tendency toward violent crime than earlier cohorts of heroin-dependent offenders. This study's findings may have implications for the design of appropriate treatment interventions for prisoners with preincarceration heroin dependence that address not only substance use but also criminal activity.

### Keywords

criminal activity; buprenorphine; opioid dependence; prerelease prisoners

The United States has by far the highest number of prisoners and the highest rate of incarceration in the world, with more than 2.2 million individuals incarcerated accounting for 756 per 100,000 of the national population (Walmsley, 2009). An estimated 95% to 97% of prisoners will eventually be released into the community (Colgan, 2006). In the United States, there are more than 1.4 million state prisoners, of whom 12% to 15% have histories of opioid dependence (Mumola & Karberg, 2006). Furthermore, because heroin addiction

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can accelerate and prolong an offending career (J. M. Chaiken & Chaiken, 1990; Darke, Torok, Kaye, Ross, & McKetin, 2010; Gottfredson, Kearley, & Bushway, 2008; Hussong, Curran, Moffitt, Caspi, & Carrig, 2004; Inciardi, 2008), and heroin addicts vary considerably in terms of criminality (Gottfredson et al., 2008; Inciardi, 2008; Kinlock, O'Grady, & Hanlon, 2003; Nurco, 1998; Prendergast, Huang, & Hser, 2008), as emphasized by J. M. Chaiken and Chaiken (1982), a compelling case can still be made almost 30 years later for the usefulness of examining severity, variety, and frequency of criminal activity. Such data can be used in helping the *criminal* justice system to distinguish among, and develop appropriate interventions for, different types of offenders with histories of heroin addiction. Finally, as DeLisi and Piquero (2011), Farrington (2005), and Piquero, Farrington, and Blunstein (2003) have emphasized with regard to offenders in general, and Kinlock et al. (2003) and Nurco (1998) have stressed with regard to heroin-dependent individuals, it is also important to obtain variables associated with these different patterns of offending as these data could be valuable for the formulation of various crime reduction strategies.

Results of many empirical studies on the relationship between heroin addiction and crime conducted since the late 1970s have been remarkably consistent with regard to three major points: (a) Heroin addicts commit a great deal of crime by any absolute standard; (b) generally, the greater the frequency of heroin use, the greater the frequency of crime tends to be (Anglin & Speckart, 1988; Inciardi, 2008); and (c) there is considerable individual diversity regarding the criminality of heroin addicts (Anglin & Speckart, 1986, 1988; Inciardi, 2008; Kinlock & Gordon, 2006; Nurco, 1998; Prendergast et al., 2008). With respect to individual diversity, among drug-involved offenders, the earlier the age of onset of criminal activity, the greater the variety, frequency, and severity of crime they commit (J. M. Chaiken & Chaiken, 1990; Hser, Huang, Teruya, & Anglin, 2004; Inciardi, 2008; Kinlock et al., 2003). Unlike most heroin-dependent individuals, whose crime rates decline substantially during periods of nonaddiction to heroin, other heroin-dependent persons, particularly those with early onsets of criminal activity that precedes their initiation to heroin addiction, tend to be involved in frequent, serious crime regardless of addiction status (Hanlon, Nurco, Bateman, & O'Grady, 1998; Kinlock, Battjes, & Schwartz, 2005; Speckart & Anglin, 1986).

However, the vast majority of studies on the heroin–crime relationship are not recent. Many were conducted in the 1980s and 1990s, with a few conducted in the early 2000s. Because of this observation and because there is evidence that the current cohort of newly released prisoners, including those with preincarceration heroin addiction, face considerably more challenges to successful reentry than in previous years (Lurigio, 2009; Schmalleger, 2010), there is a need for data on the differential crime-related characteristics of these offenders. The present cohort of returning inmates are significantly more likely to be unemployed with little or no education and/or job skills compared with previous cohorts (Lurigio, 2009). A disproportionately high number of inmates released to the community return to poor urban areas in which legitimate opportunities for work, education, and stable housing are diminishing and where heroin and other drug use, criminal activities, drug trafficking, and the influence of gangs proliferate (Lurigio, 2009; Petersilia, 2003). In addition, the size of

parole and probation caseloads have escalated dramatically in the United States, making it increasingly difficult for parole and probation officers to effectively monitor and sanction their clients' behavior (Kinlock, Gordon, & Schwartz, 2011; Schmalleger, 2010). All of these circumstances prompt new questions about public safety, specifically a concern with regard to the characteristics of newly released inmates likely to pose the greatest risk to society.

In addition to the lack of current data on the frequency, variety, and severity of criminal activity committed by heroin-dependent individuals, there is a similar lack of information on estimates of illegal income obtained by such individuals. Such data are especially important in view of the above circumstances. In particular, given scarce prison capacity, law enforcement interventions regarding illicit drug distribution would be more effective if the individuals who caused the greatest harm to society, in terms of illegal income and the capacity and willingness to use violence, were targeted (Boyum, Caulkins, & Kleiman, 2011). However, there is little systematic knowledge of such information (Boyum et al., 2011), prompting the urgency of additional study to obtain such data. It has long been known that the main crime committed by male and female heroin-dependent individuals has been drug sales (Inciardi, 1986, 2008; Johnson et al., 1985; Kinlock et al., 2003), but recent studies on the amount of income obtained by such individuals and their distinguishing characteristics are lacking (Boyum et al., 2011).

A number of studies have consistently shown that gender, age, and onset of first crime are related to the frequency, severity, and variety of criminal activities among heroin-dependent offenders (M. R. Chaiken & Johnson, 1998; Inciardi, 2008; Kinlock et al., 2003), with male gender, younger age, and an earlier age at first crime associated with the greater frequency, severity, and variety of crime. Previous research has indicated that having a legitimate job is negatively related to crime frequency (Horney, Osgood, & Marshall, 1995; Kinlock et al., 2003) and crime variety (Kinlock et al., 2003). A range of psychological problems has also indicated an association with the increased frequency of criminal activity (Keene, 2005). However, similar to the lack of data on the extent of crime committed by heroin-dependent offenders, most studies on the variables associated with the above crime dimensions are not recent, prompting the need for updated information.

The criminal career paradigm, with its emphasis on the correlates of dimensions such as the frequency, variety, and, particularly, the severity of crime, has generated a substantial body of research (DeLisi & Piquero, 2011; Farrington, 2003). Appropriately, because they clearly cause the most harm to individuals and society, the focus has increasingly been on the most serious offenders (DeLisi & Piquero, 2011; Soothill, Fitzpatrick, & Francis, 2009). Aside from the relationship between being male and having an earlier onset and greater variety, frequency, and severity of crime, the predictor variables said to characterize the most severe offenders, known as career criminals, and include no successful marriages, low self-control, deviant behavior among family members, poor physical health, poor mental health, problems in relationships, school, and work, and association with deviant peers. However, despite these observations, and the application of the criminal career paradigm to many populations of offenders, its application to the criminality of heroin addicts has been infrequently studied, especially in recent years.

In conclusion, the major questions that warrant further investigation are as follows: “Do these variables found to be related to career criminals and relate to samples of heroin addicts as well?”

## Overview of Parent Study

This is an analysis of baseline characteristics of participants enrolling in an ongoing randomized clinical trial of prison-initiated buprenorphine treatment. In the parent study, imprisoned males and females with preincarceration heroin dependence who were nearing release and met criteria for opioid agonist treatment were randomly assigned to receive buprenorphine in prison 3 months prior to release or receive buprenorphine upon release at an opioid treatment program or community health center. This study has been described in detail elsewhere (Kinlock, Gordon, Schwartz, & Fitzgerald, 2010). The primary focus of the present article is to examine the frequency, severity, and variety of crime, and also of illegal income and predictors of each of these four behaviors.

## Method

### Participants

Males and females incarcerated in two Maryland prerelease facilities that met study eligibility criteria (see below) and provided their written informed consent to participate were participants in the present study. From September 2008 through May 2011, 200 prison inmates provided consent and completed a baseline assessment. This study was approved by the Institute’s Institutional Review Board, whose membership included a prisoner advocate/representative. The current analysis included data from 200 inmates who provided informed consent and completed a baseline assessment regardless if they were eligible for randomization to receive buprenorphine in prison or upon release.

### Eligibility/Exclusion Criteria

Data for the present analyses were obtained from inmates who met the following criteria: (1) 3 to 6 months remaining to serve before release from prison; (b) history of heroin dependence (meeting *Diagnostic and Statistical Manual of Mental Disorders* [4th ed.; *DSM-IV*]; American Psychiatric Association, 1994; criteria of dependence at time of incarceration) and being physiologically dependent during the year prior to incarceration determined at baseline physically by a study physician; and (c) residing in Baltimore following release. Data on inmates with pending charges and/or pending parole hearings were excluded because of the possibility of them receiving longer sentences. We were unable to collect baseline data on individuals who did not meet eligibility criteria, therefore direct comparison of these individuals was not made with the current sample of 200 participants.

### Participant Screening and Recruitment

Participants were recruited between 2008 and 2011, inclusive, from male and female prisoners in Baltimore City, and Jessup, Maryland, prerelease facilities with preincarceration histories of heroin addiction. Participants were recruited by group orientation sessions and

word of mouth. Inmates willing to enroll were individually screened for participation by study personnel. Eligible inmates then met with research staff for informed consent. There was an informed consent to participate in the study that was obtained immediately prior to the baseline assessment. This consent document provided prospective participants with specific information about the potential risks and benefits of study participation.

## Assessments

Assessments included demographic information and histories of drug abuse, drug abuse treatment, criminal activity, and criminal justice system involvement. Measures included the following:

**Addiction Severity Index (ASI)**—The ASI is a standardized 40- to 60-min clinical research instrument widely used in addiction research to quantify problem areas of alcohol/drug user populations (McLellan, Luborsky, Woody, & O'Brien, 1980). The following areas of functioning during the prior 30 days are measured: medical condition, employment, drug use, alcohol use, illegal activities, family functioning, and psychiatric condition. The major foci within each functional area are the number of days a problem was experienced in the past month, how troubled the individual was by that problem, and how important it was to get treatment for that problem. This instrument has excellent interrater and test-retest reliability, as well as discriminant and concurrent validity (Hendricks, Kaplan, van Limbeek, & Geerlings, 1989; Kosten, Rounsaville, & Kleber, 1983; McLellan et al, 1992).

**Self-report questionnaire**—A structured interview, in use in our previous and current research (Gordon, Kinlock, Schwartz, & O'Grady, 2008; Kinlock et al., 2007), was utilized at baseline to obtain more detailed historical—and, in some cases, current—information than obtained with the ASI regarding drug and alcohol use, psychological problems, criminality, criminal justice system, supervision and sanctions, legitimate employment, and substance abuse treatment. For the baseline version of this instrument, which elicits personal historical data and for which accuracy of recall covering extended time periods is critical, interviewers were trained to structure the interview around significant life events, with temporal reference points to facilitate recall, in keeping with procedures used successfully by the authors and their colleagues at Friends Research Institute (FRI) in previous research studies (e.g., Nurco, Balter, & Kinlock, 1994; Nurco, Hanlon, O'Grady, & Kinlock, 1997). The crime data, which are the focus of the present analyses, were obtained from this questionnaire.

A total of 17 different crimes were inquired about at baseline: (a) homicide, (b) attempted homicide, (c) using a weapon to harm someone, (d) robbery, (e) assault, (f) rape, (g) carjacking, (h) hurt/torture animals, (i) vandalism, (j) forgery, (k) prostitution, (l) theft, (m) larceny, (n) burglary, (o) arson, (p) sell drugs, and (q) drug distribution.

## Interview Procedures

Male and female inmates were identified by Maryland Department of Public Safety and Correctional Services' (DPSCS) management information and case management staff as meeting study eligibility criteria, discussed above. A project manager (PM) subsequently conducted group orientations at each prison in a private room where the PM explained the

requirements for participation in the study. Interested inmates then met privately with the PM to be screened for eligibility criteria. If an inmate met study eligibility, the PM scheduled an individual session conducted in a private room in which the PM and inmate reviewed, and the inmate signed, the informed consent document. Immediately following consent, the participant was administered the ASI and self-report questionnaire, which took approximately 2 to 3 hr. The PM emphasized to the participant the importance of confidentiality of information reported by the participant and the study investigators obtained a federal Certificate of Confidentiality to protect the research team from being subpoenaed to release sensitive information.

### Criterion Variables

The four criterion variables are (a) crime frequency, (b) crime severity, (c) crime variety, and (d) income from crime. To encompass not only lifetime criminality but also the immediate time in the community (past 30 days prior to the most recent incarceration), a combination of past 30-day variables and lifetime variables were examined for the criterion and predictor variables. In addition, some questionnaires used for data collection only asked about past 30 days and not a longer time period, which is addressed in the “Limitations” section.

**Crime frequency (crime days)**—The frequency of criminal activity was the number of days participants reported committing each type of crime within the category of 17 crimes reported above during the 30 days prior to the index incarceration. Total crime, which was the criterion variable in the first regression analysis, was the number of days summed over all subtypes including the 17 different crime types mentioned above.

**Crime severity**—Crime severity was determined on the basis of a 2-point scale, distinguishing nonviolent crimes (prostitution, sell drugs, other drug distribution, larceny, theft, vandalism, forgery, burglary) from violent crimes (robbery, assault, carjacking, rape, arson, using a weapon to harm someone, hurt/torture animals, homicide, attempted homicide). Participants were classified according to the most serious level of criminal activity that they have ever engaged in during their lifetime prior to the index incarceration (O’Grady, Kinlock, & Hanlon, 2007).

**Crime variety**—Each participant was given 1 point for every crime he or she committed each of the above crimes, with a total score ranging from 1 to 17, representing the variety of crimes the participant reported committing in his or her lifetime prior to the current incarceration.

**Illegal income**—Illegal income was determined by asking how much money the participants made from illegal activity in the 30 days prior to the most recent incarceration.

### Predictor Variables

Based on the criminal justice and substance abuse literature, as summarized above, six personal domains were identified as potentially impacting crime activity: (a) demographic



characteristics, (b) substance use, (c) other criminal behavior, (d) legitimate employment, (e) drug treatment episodes, and (f) psychological problems.

**Demographic characteristics**—Gender, age (in years), and race coded as African American versus Other.

**Substance use severity**—There were three separate variables chosen to measure substance use severity: (a) days used heroin during the 30 days in the community prior to the most recent incarceration; (b) days used cocaine during the 30 days in the community prior to the most recent incarceration; and (c) days used heroin (yes vs. no) in prison during the most recent incarceration.

**Age of onset of criminal activity**—Onset of criminal activity (in years) recorded as the earliest age reported being involved in any of the 17 above-mentioned criminal activities.

**Legitimate employment**—Number of days employed at a legitimate job during the past 30 days prior to the most recent incarceration from the ASI.

**Drug treatment**—Number of times treated for drug abuse in lifetime prior to the current incarceration from the ASI.

**Psychological problems**—Number of days experienced any psychological problems 30 days prior to the most recent incarceration from the ASI.

## Statistical Analyses

Four sets of separate analyses were conducted with the four criterion variables listed above with the predictor variables included in each of the specific analyses. Logistic regression analysis (Agresti, 1990; Hosmer & Lemeshow, 1989) was used to predict that dichotomous variable involving the severity of crime because the severity variable was categorized nonviolent versus violent. The odds ratio (OR), 95% confidence level, and significance level are presented. Poisson regression (McCullagh & Nelder, 1989) was used in the prediction of the variety and frequency of criminal activity because these variables represented counts; it was also used for the analysis of illegal income, because our previous research has suggested that this variable is Poisson distributed. The Wald  $\chi^2$  statistic, 95% confidence level, and significance level are presented.

## Results

### Baseline Characteristics

Table 1 presents descriptive results for the 200 participants for the predictor and criterion measures examined in the regression analyses. Ranging in age from 19 to 64, the sample had a mean age of 41.80 for the males ( $SD = 7.86$ ) and 39.27 for females ( $SD = 6.60$ ). Three quarters of the participants were male. Nearly three fourths of the participants were African American. In the 30 days prior to their current incarceration, participants reported, on average, using heroin nearly every day, and using cocaine on about half of the days; 73 (36.5%) reported using heroin in prison during the most recent incarceration.

Approximately, 81% of the participants reported being involved in one of the above-mentioned 17 crimes by the age of 16 years ( $M = 13.07$ ,  $SD = 5.37$ ). More than 80% also had lifetime experience with some form of drug treatment ( $M = 3.24$ ,  $SD = 4.26$ ). Participants, on average, experienced slightly more than 5 days of psychological problems during the past 30 days prior to incarceration. Furthermore, there were baseline mean significant differences by gender on the following variables: onset of criminal activity ( $p = .0001$ ; males = 12.23 vs. females = 15.60), days working at a legitimate job ( $p = .042$ ; males = 8.21 vs. females = 4.78), days used heroin ( $p = .013$ ; males = 26.07 vs. females = 22.18), and number of drug treatment episodes ( $p = .001$ ; males = 2.64 vs. females = 4.98). In addition, male participants statistically differed from female participants in two of the criterion variables, crime variety ( $p = .0001$ ) and crime severity ( $p = .0001$ ). In terms of crime variety, male participants ( $M = 5.65$ ,  $SD = 2.52$ ) were engaged in more types of crimes compared with female participants ( $M = 3.94$ ,  $SD = 2.08$ ). Male participants were more likely than female participants to be involved in violent crimes (males = 18.2% vs. females = 10.2%).

Table 2 shows the percentage of participants, by gender, who reported committing each of the 17 offenses discussed above. In every category, a higher percentage of males than females reported involvement. The offense in which the highest percentage of male and female participants were involved in was drug sales; more than 90% of the males and 80% of the females reported having committed this crime. While not reported in the table, in the 30 days prior to the most recent incarceration, drug sales were also the most frequent crime committed (males:  $M = 16.9$ ,  $SD = 13.7$  vs. females:  $M = 14.3$ ,  $SD = 14.2$ ). Most members of this sample had engaged in violent crime as more than 80% of the males and nearly 60% of the females reported committing assault; of the men, nearly 17% reported committing attempted homicide and more than 7% reported committing homicide at some point in their lives prior to the current incarceration. Assault ranked second among the males and third among the females in terms of the percentage of participants who reported to have committed it. A majority of males (more than 77%) and females (nearly 63%) reported having committed theft prior to their index incarceration.

## Regression Results

**Crime severity**—Table 3 presents the results predicting the categorical variable crime severity using multinomial logistic regression analysis. Gender (OR = .19, 95% confidence interval [CI] = [0.07, 0.52],  $p = .001$ ) and onset of criminal activity (OR = .90, 95% CI = [0.84, 0.98],  $p = .009$ ) were the only significant variables. In the case of gender, male offenders (84.4%) were more likely than female offenders (61.2%) to participate in violent offenses. When we examined the violent data by the most severe violence, male offenders (18.2%) were almost twice as likely compared with female offenders (10.2%) to commit homicide or attempted homicide (data not shown in the table). The younger the age at which they began their criminal careers, the more likely were the participants to be involved in more serious criminal activity in their lifetime (nonviolent:  $M = 16.5$ ,  $SD = 5.9$  vs. violent:  $M = 12.4$ ,  $SD = 4.9$ ).



**Crime frequency**—Cocaine use was the only significant predictor variable (Wald = 9.32, 95% CI = [0.01, 0.02],  $p = .002$ ). Those offenders who used cocaine more frequently during the 30 days in the community prior to their most recent incarceration were involved in more criminal activity during the past 30 days prior to the most recent incarceration.

**Crime variety**—Crime variety was related to three predictor variables, namely, gender (Wald = 20.81, 95% CI = [-5.10, -0.16],  $AQp < .001$ ), onset of criminal activity (Wald = 24.29, 95% CI = [-0.05, -0.02],  $AQp < .001$ ), and psychological problems during the past 30 days (Wald = 9.95, 95% CI = [0.00, 0.02],  $p = .002$ ). Male offenders ( $M = 5.64$ ,  $SD = 2.52$ ) were involved in more types (variety) of criminal activity compared with female offenders ( $M = 3.94$ ,  $SD = 2.07$ ). Participants who began their criminal careers at a younger age were more likely to be involved in a wider variety of criminal activities. Furthermore, those offenders reporting more days in the past 30 days that they had experienced psychological problems were also more likely to be involved in a wider variety of criminal activities.

**Illegal income**—Two variables were found to be significantly related to illegal income. First, age of respondent was inversely related to illegal income, indicating that younger offenders reported more illegal income activity compared with older offenders (Wald = 6.53, 95% CI = [-0.07, -0.01],  $p = .011$ ). Second, White participants reported generating more income from illegal means compared with Black participants (Wald = 4.13, 95% CI = [-0.39, 0.62],  $p = .042$ ).

Table 4 presents the results for crime frequency, crime variety, and illegal income from crime using Poisson regression. Wald  $\chi^2$ , CIs, and significance levels are presented.

## Discussion

The results of this study suggest that there are a number of variables that lead further to the understanding of the criminal career paradigm and illustrate the importance of addressing not only the substance abuse but also the criminal activity of offenders. The findings of the present study on 200 primarily male African American prisoners from Baltimore with preincarceration histories of heroin dependence show several important similarities to results on previous cohorts of prison inmates (J. M. Chaiken & Chaiken, 1982, 1990). Before their most recent index incarceration, a higher proportion of males (84.4%) compared with females (15.6%) were involved in violent crime. Male gender was significantly associated with the commission of a greater variety of *crime*. Both younger age and male gender were associated with the commission of more severe *criminal activity* as found by others (J. M. Chaiken & Chaiken, 1982; Kinlock et al. 2003). In addition, consistent with previous samples of heroin-dependent individuals (Inciardi, 1979, 1986; Kinlock et al., 2003), drug sales or dealing is the most frequent crime. A particularly disturbing feature of this current sample is its apparently high tendency toward violent crime. Although a direct comparison is not possible because the time frames in which crimes are captured are different, in Inciardi's (1986) sample of heroin-dependent individuals, assault ranked 17th highest in percentage of sample committing it among 22 offenses in the year prior to interview,

compared with assault ranking second among male and third among female in terms of percentage of participants involved out of 17 offenses.

Second, the long-standing result, observed in previous samples of prison inmates (J. M. Chaiken & Chaiken, 1990; Kinlock et al., 2003; O'Grady et al., 2007), heroin-dependent individuals (Inciardi, 2008; Nurco, 1998), and the general population (Elliott, Huizinga, & Ageton, 1985; Farrington, 2005; Moffitt, 1993; Piquero et al., 2003; Wright, Tibbets, & Daigle, 2008), that the earlier the onset of criminal activity, the greater the frequency, variety, and severity of subsequent crime, is generally consistent with the present findings. The only exception was the relationship between the age of onset of crime and crime frequency in the past 30 days prior to the index incarceration. This result was in the predicted direction and approached statistical significance. Regarding the frequency of crime, the result that the greater number of days used cocaine was significantly associated with the greater number of crime days was consistent with previous research on heroin-dependent (Ball, Rosen, Flueck, & Nurco, 1981; Kosten, Rounsaville, & Kleber, 1988) and cocaine-dependent (Inciardi, 2008) individuals. However, the current finding regarding the relationship between frequency of heroin use and frequency of crime days, found in previous studies (Anglin & Hser, 1987; Anglin & Speckart, 1986; Ball et al., 1981; Kinlock et al., 2003) although in the predicted direction, was not observed in the present study. The relatively short window of time and the observation that heroin and crime were committed on a near-daily basis by most of the participants may have contributed to this result. It is likely that the result for crime income would have reached statistical significance on a larger sample as the  $p$  value was .057. Furthermore, the significant positive relationship between crime severity and the frequency of heroin use (number of crime days) reported in a prior study (Kinlock, 1995) was not observed in the present study.

In addition, regarding crime variety, the number of days participants experienced psychological problems emerged as a significant predictor of the variety of crime. Psychological problems were not significantly related to crime frequency, as previously reported by Keene (2005), or any of the other dimensions of crime. In view of the few studies on the relationship between crime and psychological problems in heroin-addicted individuals, and the lack of information with respect to the nature and severity, as well as the frequency of psychological problems and their relationship with crime in this population, further study is warranted.

Moreover, in terms of crime income, a positive relationship with frequency of heroin use has been frequently established in prior research, most of which was conducted in the 1980s and 1990s summarized by Boyum et al. (2011) and Inciardi (2008). Age was also positively associated with a greater income from crime; perhaps this reflects younger individuals being more physically active and doing more crimes per day. It is not completely clear why age was significantly related to crime income but not the other crime dimensions. Race was also significantly associated with illegal income. Heroin use and income generating from criminal activity have been verified by a number of studies (Collins, Hubbard, & Rachal, 1985). Finally, there was no significant relationship between legitimate employment and crime, a finding reported in previous research (Horney et al., 1995; Kinlock et al., 2003).

## Limitations

There are several limitations to the present study that should be mentioned. First, the population was primarily African American males from a mid-sized U.S. city so the results may not be generalizable to other locations in the country. Second, criminal activity, variety, severity, and income from crime were all based on self-report, which may be subject to underreporting, over-reporting, and/or problems with recall. Furthermore, it was not always possible to establish the temporal sequence of predictor and criterion variables as it could not be determined whether predictor variables were antecedents, correlates, or consequences for all variables except age and gender. Moreover, the data on crime, drug use, legitimate employment, and psychological problems were obtained for the 30 days prior to the most recent incarceration that may not be a typical or representative period of an individual's heroin use and/or crime career. Furthermore, there were no data collected on any psychopathy rating. Future research on the criminality of incarcerated individuals with histories of heroin addiction encompassing a wider time frame is encouraged. More importantly, findings from this study may have implications on designing the appropriate treatment interventions for prisoners that address not only substance use but also criminal activity. Therefore, prison-initiated treatment should focus not only on substance abuse but also on criminality.

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## Biographies

**Michael S. Gordon** is a research scientist at Friends Research Institute (FRI). His research focuses on developing, implementing, and evaluating innovative drug abuse and HIV treatment interventions for criminal justice populations with opioid addiction histories.

**Timothy W. Kinlock**, a research scientist at FRI, has considerable expertise and experience in developing, implementing, and evaluating innovative drug abuse treatment interventions for prison inmates with histories of heroin addiction.

**Robert P. Schwartz** is a psychiatrist and the medical director of FRI. He has served as principal investigator of six National Institute on Drug Abuse (NIDA)–funded studies and is the coprincipal investigator of the Mid-Atlantic Node of the NIDA Clinical Trials Network. Many of his over 80 peer-reviewed articles address opioid and other drug dependence.

**Kathryn A. Couvillion** is a project manager at FRI. Her research focuses on criminal justice population drug abuse treatment, including opioid maintenance treatment for prisoners with heroin addiction histories.

**Kevin E. O'Grady** is president of QuantAid LLC and affiliate faculty member in the Department of Psychology, University of Maryland. His expertise is the design and analysis of research in substance use, with a focus on randomized controlled trials and quasiexperimental designs. He is the author or coauthor of more than 185 published articles.



**Table 1**Descriptive Statistics for Predictor and Criterion Variables ( $N = 200$ ).

Variables	<i>n</i> (%)	<i>M</i> ( <i>SD</i> )
Predictor variables		
Age		40.61 (9.03)
Gender		
Male	149 (25.5)	
Female	51 (74.5)	
Race		
Black	146 (73.0)	
Other	54 (27.0)	
Days used heroin <sup>a</sup>		25.08 (9.70)
Days used cocaine <sup>a</sup>		14.24 (13.27)
Prison heroin use		
Yes	73 (36.5)	
No	126 (63.0)	
Age of onset of crime		13.8 (6.8)
Days employed <sup>a</sup>		7.34 (10.30)
Drug treatment		3.24 (4.26)
episodes <sup>b</sup>		
Any	161 (80.5)	
None	39 (19.5)	
Psych problems <sup>a</sup>		5.43 (9.96)
Any	62 (30.5)	
None	136 (74.5)	
Criterion variables		
Crime frequency <sup>a</sup>		21.29 (13.28)
Crime severity <sup>b</sup>		
Violent	162 (72.20)	
Nonviolent	35 (17.8)	
Crime variety (number of crimes: 1–17) <sup>b</sup>		5.22 (2.52)
Illegal Income (dollars) <sup>a</sup>		4,830.78 (7,523.85)

<sup>a</sup>Past 30 days prior to the most recent incarceration.<sup>b</sup>Lifetime.

**Table 2**

Frequency Distribution of Lifetime Criminal Activity for Males and Females.

<b>Criminal activity</b>	<b>Male(<i>n</i>= 149)</b>	<b>Female (<i>n</i> = 51)</b>
	<b><i>n</i> (%)</b>	<b><i>n</i> (%)</b>
Homicide	11 (7.43)	3 (6.12)
Attempted homicide	25 (16.89)	2 (4.08)
Using a weapon to harm someone	64 (43.24)	7 (14.29)
Robbery	77 (52.02)	7 (14.29)
Assault	123 (83.11)	28 (57.14).
Rape	3 (2.02)	0
Carjacking	4 (2.70)	0
Hurt/torture animals	8 (5.41)	0
Vandalism	41 (27.52)	11 (21.57)
Forgery	25 (16.89)	15 (30.61)
Prostitution	41 (27.70)	26 (53.06)
Theft	115 (77.18)	32 (62.75)
Larceny	24 (16.22)	5 (10.20)
Burglary	72 (48.65)	9 (18.36)
Arson	13 (8.78)	1 (2.04)
Sell drugs	137 (92.56)	40 (81.63)
Drug distribution	56 (37.84)	8 (16.33)

*Note.* Criminal activity is lifetime (ever reported any of the above criminal activities).

**Table 3**Results of Logistic Regression for Severity of Crime ( $N = 200$ ).

Crime severity (nonviolent vs. violent) <sup>a</sup>	OR	95% CI	<i>p</i>
Age	1.024	[0.953, 1.100]	.525
Race	1.225	[0.391, 3.834]	.727
Gender	0.197	[0.074, 0.522]	.001
Employed <sup>b</sup>	0.995	[0.954, 1.038]	.818
Heroin use <sup>b</sup>	1.013	[0.973, 1.056]	.521
Cocaine use <sup>b</sup>	1.026	[0.990, 1.062]	.154
Heroin use in prison	1.147	[0.432, 3.045]	.782
Age of onset of crime	0.903	[0.837, 0.975]	.009
Drug treatment episodes <sup>c</sup>	1.038	[0.914, 1.179]	.562
Psychological problems <sup>b</sup>	1.041	[0.990, 1.095]	.120

Note. OR = odds ratio; CI = confidence interval.

<sup>a</sup>Overall model:  $\chi^2 = 29.77$ ,  $df = 10$ ,  $p = .001$ .

<sup>b</sup>Past 30 days prior to the most recent incarceration.

<sup>c</sup>Lifetime.

**Table 4**Poisson Regression Results for Crime Frequency, Crime Variety, and Illegal Income ( $N = 200$ ).

	Wald $\chi^2$	95% CI	<i>p</i>
Crime frequency <sup>a</sup>			
Age	2.748	[-0.043, 0.002]	.097
Race	0.482	[-0.265, 0.302]	.488
Gender	0.002	[-0.323, 0.227]	.965
Employed <sup>b</sup>	2.271	[-0.019, 0.003]	.132
Heroin use <sup>b</sup>	1.536	[-0.008, 0.019]	.215
Cocaine use <sup>b</sup>	9.315	[0.005, 0.022]	<b>.002</b>
Heroin use in prison	0.050	[-0.241, 0.227]	.823
Age of onset of crime	3.621	[-0.041, 0.006]	.057
Number of drug treatment episodes <sup>c</sup>	0.029	[-0.031, 0.027]	.864
Psychological problems <sup>b</sup>	0.754	[-0.006, 0.016]	.385
Crime variety <sup>a</sup>			
Age	0.543	[-0.015, 0.005]	.461
Race	3.512	[-0.116, 0.222]	.061
Gender	20.811	[-0.507, -0.157]	<b>&lt;.001</b>
Employed <sup>b</sup>	0.327	[-0.006, 0.006]	.568
Heroin use <sup>b</sup>	0.004	[-0.007, 0.008]	.950
Cocaine use <sup>b</sup>	1.361	[-0.001, 0.009]	.243
Heroin use in prison	1.280	[-0.161, 0.222]	.258
Age of onset of crime	24.296	[-0.050, -0.021]	<b>&lt;.001</b>
Number of drug treatment episodes <sup>c</sup>	3.492	[-0.001, 0.031]	.062
Psychological problems <sup>b</sup>	9.946	[0.004, 0.016]	<b>.002</b>
Illegal income <sup>a</sup>			
Age	6.742	[-0.073, -0.010]	<b>.009</b>
Race	4.125	[-0.394, 0.615]	<b>.042</b>
Gender	1.648	[-0.995, 0.033]	.199
Employed <sup>b</sup>	1.363	[-0.031, 0.008]	.243
Heroin use <sup>b</sup>	3.629	[-0.001, 0.055]	.057
Cocaine use <sup>b</sup>	3.268	[-0.001, 0.028]	.071
Heroin use in prison	0.426	[-0.263, 0.558]	.514
Age of onset of crime	0.117	[-0.051, 0.036]	.733
Number of drug treatment episodes <sup>c</sup>	0.338	[-0.074, 0.040]	.561
Psychological problems <sup>b</sup>	0.190	[-0.015, 0.024]	.190

Note. CI = confidence interval.

<sup>a</sup>Overall model:  $\chi^2 = 29.77$ ,  $df = 10$ ,  $p = .001$ ; crime frequency:  $\chi^2 = 22.06$ ,  $df = 10$ ,  $p = .015$ ; crime variety:  $\chi^2 = 71.476$ ,  $df = 10$ ,  $p = .0001$ ; and illegal income:  $\chi^2 = 24.257$ ,  $df = 10$ ,  $p = .007$ .

<sup>b</sup> Past 30 days prior to the most recent incarceration.

<sup>c</sup> Lifetime.