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The Specific Deterrent Effects of Sentences for Robbery: Does Type of Punishment Influence Recidivism?

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ABSTRACT

Offender recidivism can be measured using official records in many ways ranging from re-arrest and reconviction to the length of time before recidivism is observed. In the present paper we compare twelve measures of recidivism in their ability to detect any specific deterrent effects of four types of sentences (e.g., probation, county jail, young adult correction center, and state prison). The sample is comprised of 870 individuals sentenced for robbery before a New Jersey State Court between 1976 and 1977. Subject to several major qualifications, we find that independent of the indicator of recidivism, time sentenced has no main effect upon recidivism, while type of sentence has consistent effects. For re-arrest based measures of recidivism, a "time by where" interaction emerges supporting the deterrent effects of sentencing to a state prison.

Research into the specific deterrent effects of sentencing is characterized by considerable evidence that "nothing works." While some studies have yielded limited evidence of reduced recidivism rates, overall the literature is comprised of negative findings. Across a wide variety of treatment and correctional settings, there is the persistent conclusion that the nature of the sentence does not influence "recidivism."

Comprehensive reviews of the sentencing literature support this conclusion. Bailey (1966) examined 100 studies classified in terms of their methodological rigor. The result of the review was not encouraging to those postulating effects for sentencing. Bailey concluded that "evidence supporting the efficacy of correctional treatment is slight, inconsistent, and of questionable reliabilty." In his comprehensive review, Martinson (1974) examined studies encompassing the time period of 1945 to 1967. A total of 231 studies were analyzed. The results of this exhaustive endeavor were also somewhat disappointing. Martinson concluded that for the most part "the rehabilitative efforts that have been reported so far have had no appreciable effect on recidivism" (Martinson, 1974).

These findings may seem discouraging, but as Wilson (1983) notes, it is not that anyone has proved that "nothing works," but only that no one has proved that "something works." As Wilson suggests, it could be the case that some offenders may be more amenable to treatment than others. Mixing the amenable and nonamenable offenders in a treatment program may cancel out the effects of treatment, thereby resulting in a conclusion of "no effect." What is needed is research to distinguish the amenables from the nonamenables (Wilson, 1983). The need to focus on characteristics of the offender

emphasizes Martinson's (1974) point that deterrent effects vary widely according to the type of offender.

Another possible explanation for the negative results in previous studies is the variety of measurements of recidivism that have been utilized. Even a cursory glance at the literature shows that what is called "recidivism" has been broadly defined. The most common use of the term considers "failure" after treatment or sentencing either through rearrest or the commission of new offenses (e.g. Jesness, 1965). Other measures of recidivism are based upon behavior during parole: recidivists are those who fail during parole (e.g. Kassebaum et al., 1971) or have their parole revoked (e.g. Freeman, 1956). Some early measures of recidivism had a temporal component. For example, Traux (1966) used time reincarcerated to signify recidivism while Levinson (1962-1964) used length of time in the community. At least one study (Stuerup, 1960) differentiated between failure defined by commission of a similar offense and failure defined by commission of a different type of crime. Other studies employ measures such as the time to first arrest after release (Barton and Turnbull, 1981), the time until first conviction (Witte and Schmidt, 1977), or the number or rate of arrests or convictions in a specified time frame (Murray and Cox, 1979).

As Blumstein and Larson (1971) have shown, observed <u>levels</u> of recidivism can be expected to be quite sensitive to the indicator used. It may be the case that the conclusions of a study are equally sensitive to the measure of recidivism. Studies that use a specified time frame for a follow-up period may generate different results if the length of time is shortened or lengthened. Similarly, studies that take into account the total time actually "at risk" may produce different results than those which do not account for street time. Measuring recidivism in terms of the number of post-release

arrests or convictions or the time until the first failure make recidivism an all or nothing proposition. That is, only post-release behavior is examined and pre-intervention behavior is ignored. Studies that compare behavior after incarceration to behavior before incarceration may shed a different light on recidivism.

Murray and Cox (1979) took a new approach in that they used the preintervention state as their reference point for evaluating recidivism. Their study compared behavior before intervention with behavior after intervention using three different samples to ascertain the effectiveness of various treatments. All samples were comprised of youths with the harshness of the sentence varying across samples. The results that Murray and Cox obtained contradict the great majority of studies dealing with recidivism. They found a suppression effect, or drop in arrest rates, for every group and every treatment studied. More surprisingly, the greatest suppression effects were associated with the harshest treatments. These results not only suggest that "everything works", but also that the more restrictive the treatment, the lower the recidivism rate.

However, several criticisms have been raised regarding Murray and Cox's study. The first is that the suppression effects observed by Murray and Cox may not be an actual decline in criminality, but rather an increasing ability on the part of the offenders to avoid detection by the police. A second criticism is that the decrease in arrest rates is merely a maturation effect. That is, the offenders naturally grew out of crime during the period that coincided with their treatment. Finally, an argument can be made that the youths were arrested at the point where their crime rates were highest, i.e., they were incarcerated just after a spurt of criminal activity and had reached a peak in criminality. Therefore, the period after incarceration represented

a natural decline in their normal rate of arrests (Maltz and Pollack, 1980). While these criticisms should be kept in mind when considering Murray and Cox's study, the fact remains that the Murray and Cox results differ vastly from most studies of recidivism.

Finally the Murray-Cox study indicates that the way in which recidivism is measured has a strong impact on the outcome of the study. Using a before and after comparison of arrest rates produced vastly different results than found in previous studies. As a recent study by Petersilia and others at the Rand Corporation has uncovered, it is not only important to use different measures of recidivism, but also to make provisions for the different types of offenders being studied. In their research, they discovered that recidivists show a strong tendency to be reconvicted for the same kind of crime and also that the different types of offenders have different times to failure. For example, the median time to failure was 15 months for drug offenders, 8 months for violent offenders and 5 months for property offenders (Petersilia et al, 1985).

The wide range of measures of recidivism that have been used to date, and Murray and Cox's (1979) finding of deterrent effects after reconceptualizing the measure of recidivism, suggest to us that greater attention needs to be paid to the dependent variable of recidivism. That is, to what extent is the conclusion "nothing works" due to the way in which recidivism is operationalized? Do particular measures of recidivism help or hinder the ability to detect deterrent effects of treatments and sentences? Thus, the approach of this paper is to compare several measures of recidivism both among themselves and in the extent to which they evidence deterrent effects of sentences.

DATA AND METHODS

The data for the present analysis come from a study that originated during 1976-1977. At that time the State of New Jersey Administrative Office of the Courts collected information on all offenders sentenced before a State Court for any indictable offense. Presentence investigation reports were coded, as were characteristics of the offense, offender, victim, and prior criminal involvement. Detailed measures on the number of charges, counts, and dispositions were also obtained. Judgment of conviction sheets were coded to yield data on the sentence given to each offender.

This base sentencing data file was subsequently supplemented with information from several sources. The State of New Jersey Department of Law and Public Safety, Division of Systems and Communications (SAC) keeps arrest-court-conviction cycles for all arrests in the state that are reported to their office. This file provides a comprehensive record of arrests and convictions with particularly accurate records dating from 1972 and less extensive arrest histories prior to that time. Thus this file allows for identification of official criminal activity both before and after the sentence studied in the base data file.

The State of New Jersey Department of Corrections (DOC) has kept systematic computerized records of incarcerations dating back to 1964. These records contain dates of incarceration, parole and probation dates and, if the offender was transferred into a state facility from a county jail, date of entry into the jail. As such, these records allow for the computation of time at risk, or street time, for offenders in custody at a state facility.

One additional source of data was used to supplement the base sentencing data file. For two of New Jersey's 21 counties, dates of entry and exit into and from the counties' jails were collected for the period from 1976 to mid

1986. While the majority of these jail times are short, they provide further checks on the time at risk for this subsample of offenders.

Offenders in the base sentencing data file were identified and the SAC, DOC, and jail records were searched to see if an offender had records in any or all of the supplemental data sources. Whenever possible cases in the sentencing file were matched to the other files on the basis of name, date of arrest, county of arrest and date of birth. When exact matches could not be obtained, matches on three of the four matching variables was deemed acceptable. When date of birth and county of arrest matched exactly, slight differences in names were considered a good match. For cases where a perfect match on all four characteristics was not effected, records were checked by hand before concluding that the correct individual had been identified.

Given the merging of files from the four sources of data, we are able to determine official criminal activity and incarceration subsequent to the sentence studied in 1976-1977. The exact time frame considered varies by individual, depending upon the date of the sentence: the observation period starts on the date the sentence is given. However, for all cases the end of the observation is the same -- September 1, 1986. That is, right censoring occurs at the same point for all individuals.

Our offender-specific window for the observations was computed in the metric of days between the sentencing date and the right censoring time point. Any incarceration period or jail time was also computed in days. Adjustments for time at risk were simple subtractions of the total of days "off the street" from the window period. For the analysis below, times have been converted from daily rates to yearly rates. Offical arrests and convictions

were obtained as counts of these events in the SAC records. Totals were obtained both before the arrest leading to the sentence in the base data file and after the sentence itself.

Several important restrictions have been placed on the sample analyzed below. In addition to the fact that the conviction had to be for the presenting offense of robbery, only individuals who appeared before a State Court once during the 1976-1977 study are considered here. Offenders with multiple appearances and convictions at more than one point in time have been dropped from the analysis. Further, only those cases where the dates of arrest and sentence, and the crime sentenced for, match exactly between the base data file and the SAC records are presently available for analysis. Thus, the defining characteristic of the cases we are studying here is one of "tidy" record keeping: the sample analyzed cannot necessarily be considered as representative of all those convicted of robbery before a New Jersey State Court between 1976 and 1977.

Finally, we have limited the analysis to those who were at risk for at least one year during the window period. Offenders who are arrested while at risk for short time periods will have inflated rates which may or may not be representative of their criminal behavior. In addition, short street times may have resulted from data errors in the files from which these estimates were obtained. Rather than introduce these potential distortions into the present analysis, we have elected to impose the restriction of a risk time of one year or more upon the cases studied. However, the compromise is that the present results must be interpreted cautiously. The imposed restrictions result in a sample of 870 convicted robbers.

Dependent Variables: The breadth of the data available allow for the operationalization of many forms of recidivism. Overall, six measures common to the criminological literature are used. For each, we are able to derive the measure using either rearrest or reconviction, thus yielding twelve measures of recidivism that can be compared. All conviction-based measures use convictions for arrests that occured after the individual was sentenced. The twelve measures are:

1) The total number of subsequent arrests for robbery. This allows for the detection of any possible specific deterrent effects on offense specialization.

2) The total number of subsequent convictions for robbery. Again a measure of specialized recidivism, but one that is more stringent.

3) The total number of subsequent arrests for any offense. Here the specific deterrent effects on official criminal activity can be measured.

4) The total number of convictions for any offense.

5) The yearly arrest rate as determined by the total subsequent arrests divided by the window period in years. This operaticnalizes recidivism in terms of the mu parameter (Chaiken and Chaiken, 1982; Panel on Research on Criminal Careers, 1986) for arrests.

6) The yearly conviction rate -- total subsequent convictions divided by the window period in years. This is a mu parameter for convictions.

7) The yearly arrest rate adjusted for time at risk as computed by adjusting measure 5 for street time.

8) The yearly conviction rate adjusted for time at risk: measure 6 adjusted for street time.

9) The probability of rearrest. This is one of the early measures of recidivism, more recently called the probability of failure in hazard models of recidivism.

10) The probability of failure through conviction for a new offense.

11) Number of days to failure through rearrest. For those individuals who are rearrested, one important consideration is how long it takes before the rearrest occurs. Deterrent effects may be observed by differential times to failure.

12) Number of days to failure through reconviction.

Two important additional measures of recidivism are presently unavailable for analysis. These are failure times adjusted for time at risk. While we are able to determine how many days each offender was "off the streets" for the entire window period, it is not yet possible to determine days at risk until the first rearrest or reconviction. Thus recidivism measures 11 and 12 are confounded by any time served for the robbery sentence in the base data set.

Sentence Variables: The three major components of any sentence are whether the offender is incarcerated or not, if incarcerated, to what kind of facility, and the amount of time the sentence is to be served. These components are often confounded, leading researchers to model the in/out decision separately from the length of time decision. (See, for example, Wheeler et al., 1982). If any specific deterrent effects of sentences are to be found, however, the three dimensions of the sentence should be considered simultaneously.

The in or out dimension can be combined with the type of facility component by considering "probation" as one of the "places" to which an offender is sentenced. Here we make use of four categories of placements -- probation, county jail, correctional facility, and state prison. The time sentenced to each place can be left in continous form or categorized. Our analytic strategy leads us to prefer a categoric representation of time sentenced.

However, the exact categories to be used proves problematic. If time sentenced is dichtomized at the median, independent of where the sentence is to be served, the two variables become highly collinear for sentences to correctional facilities and state prisons are typically longer than those of probation and county jail. Indeed, when this is tried for the present sample,

the two variables of "where" and "time" produce a gamma of .75. This inherent multicollinearity of the two main sentencing variables prohibits attributing any deterrence observed to either component separately.

To avoid confounding the effects of the dimensions of sentencing we have dichotomized time sentenced at the median for each of the places sentenced, thus making the time measure relative to offenders sentenced to a similar "facility." The resulting independent variables and place specific median times are shown in Table One. As can be seen in Table One, making the measure of time sentenced contingent upon where one is sentenced reduces the collinearity between the two measures considerably. The conditional distributions are approximately equal, as they should be under our procedure. The added advantage of making time sentenced place-specific is one of intrepretation -- for now the time component can be viewed relative to other offenders sentenced to a similar facility.

Table One about here

The values for where the offender was sentenced and for how long were determined through the coding of judgment of conviction sheets during the original sentencing study. For those cases where the term of probation was missing, the median value of 2.5 years was assigned.

Statistical Controls: Four variables are used to control for the characteristics of the offender and the offense for which he/she was sentenced. The measure of the nature of the robbery crime itself comes from coder estimates of the information describing the incident on the presentence investigations forms. Coders were asked to rate the severity of the offense on a scale from 1 to 100 with 100 being the most "severe" robbery. This control variable is more likely to be related to the magnitude of the sentence

itself than it is to any subsequent recidivism. It does, however, provide some expectation of the type of act the individual is capable of committing and by using it as a control variable, we partially compensate for the effects of "just desserts" sentencing on any observed recidivism.

It is well known that types and rates of criminal involvement vary considerably by age. (See Hirschi and Gottfredson, 1983; Panel on Research on Criminal Careers, 1986.) Thus younger offenders may be more likely to recidivate independent of any effects of the sentence per se. Age (in years) at the time in sentencing is therefore used as a control variable to compensate for differential criminal activity during the life cycle.

Levels of prior criminal involvement are operationalized by the total number of arrests prior to the arrest leading to entry into the sentencing study data base. This control variable was determined through a count of arrests in the SAC data base. As such, it has the often cited limitations of being an indicator of only criminal involvement detected by law enforcement officials, as well as being subject to recording biases. Total number of prior arrests is used as a control for all measures of recidivism. As Murray and Cox (1979) suggest, it may be more desirable to use a measure of prior criminal activity that is more comparable to the specific measure of recidivism (e.g., prior yearly arrest rate for the arrest rate measure of recidivism; prior convictions for conviction based measures of recidivism). This is not done below, though our results provide some indication of the extent to which different measures of criminal activity will be correlated.

One final control variable is used to capture the characteristics of the offender in a parsimonious fashion. The eight-point Greenwood scale (Greenwood, 1982) is based on seven items the presence or absence of which is noted and then summed. The components of the scale are convicted previously

for the same charge (in this case a robbery), incarcerated more than 50% of the preceding two years, conviction before age 16, served time in a state juvenile facility, drug use in the preceding two years, drug use as a juvenile, and employed less than 50% of the preceding two years. Following the procedures used by Greenwood (1982) we coded the presence of each item as '1' and the absence -- either because of missing data or because the item was in fact not present -- as '0'. The items were then summed to yield the eight-point scale which is entered directly into the analysis.

It is not our intent here to enter the debate surrounding the reliability and validity of this scale or the ethical debates surrounding its use. Such issues are summarized and expanded upon in Visher (1986). Our primary purpose in employing this scale is to parsimoniously summarize characteristics of the offender, characteristics that might be related to recidivism -- however operationalized. As Wilson (1983) and Martinson (1974) suggest, such characteristics must be controlled before attempting to detect any possible specific deterrent effects of sentencing practices. However, those interested in the debate surrounding this scale should note two things. First, the scale is derived from official record data -- the information taken from the presentencing investigation forms that were coded for the base data file -- and not from self-reports as was the case for Greenwood's analysis and Visher's reanalysis. Second, because the scale is being used as a statistical control in a study of recidivism, values on the scale are being related to criminal activity prospectively and not retrospectively as was done in the Rand Inmate Survey Analyses.

Our analytic strategy is to use analysis of covariance to detect any specific deterrent effects of sentences on each of the measures of recidivism. The control variables (covariates) are entered first, followed by the two

sentencing variables and finally the interaction between time sentenced and place sentenced. This approach estimates the effects of sentences after consideration of any potential impact of the control variables on recidivism. It is well known that variables such as arrest rates are highly skewed. Therefore, following Winer (1962), counts and rates were transformed to a log scale after adding one to the value. Proportions were transformed with the arcsine square root transformation. These transformations reduce the impact of heteroscedastic error terms on the signficance tests underlying the analysis.

RESULTS

Table Two shows the descriptive statistics for the twelve measures of recidivism. As expected, means are lower for all conviction-based measures than they are for the corresponding arrest-based measure. The only exception is with failure times where it (reasonably) takes longer to fail via conviction than to fail via arrest. On average, these convicted offenders are rearrested for .425 robberies, 38% of which result in another robbery conviction. The average levels of official criminal activity are much higher than are suggested by recidivism through the commission of another robbery offense: the mean for all post-sentence arrests is 5.217, with, 39% resulting, on average, in an additional conviction. In terms of rates (mu parameters), this sample is recidivating, on average, at a rate of .557 arrests per year, leading to .216 convictions per year. When these rates are adjusted for time at risk, the re-arrest rate increases to .813 arrests per year, the re-conviction rate to .330. It is instructive to note that the

effect of the time-at-risk adjustment is not uniform across arrests and convictions. The adjustment increases the arrest rate by 46%, the conviction rate by 52.8%.

Table Two about here

In general, high levels of recidivism are observed for this sample. 75.3% fail (recidivate) through rearrest for some additional crime. Nearly 60% (58.4%) fail if the more stringent criterion of a subsequent conviction is used. Focusing on those who do eventually fail it takes, on average, 3.08 years for the first re-arrest to occur; an average of 3.3 years for this arrest to result in the first conviction after the sentence that defines the window period.

The distributions of the first eight measures of recidivism are highly skewed to the right and peaked as evidenced by both the skewness and kurtosis coefficients and the fact that the standard deviation is greater than the mean. Recidivism measures suggested by the failure literature (9-12) are more evenly distributed around mean values. However, for all measures presented in Table Two, the distributions deviate significantly from normality, thus necessitating the transformations described earlier.

The results in Table Two provide some indication of the extent to which the level of recidivism observed is dependent upon how recidivism is defined. Further evidence of this is given in Table Three where the twelve measures are intercorrelated. Note that the correlation between probability of failure and the number of days until failure is not defined. Thus, the correlation matrix is not full.

Table Three about here

Several patterns emerge in Table Three. Rearrest and reconviction for robbery are in general weakly correlated with the other recidivism measures, suggesting that defining recidivism in terms of repeating the presenting offense is not desirable. The two measures that use days to failure (11 and 12) are negatively correlated with the other measures -- as one would expect. Yet the magnitude of these correlations is not high: levels of recidivism are indicative of something other than the timing of recidivism. Similarly, the probability that some form of recidivism occurs is only moderately correlated with the levels of recidivism as measured by the first eight variables in Table Three.

Conversely, large correlations are to be found in Table Three. An arrest-based measure is usually highly related to its corresponding conviction-based measure (e.g. yearly arrest rate and yearly conviction rate). Two pairs of recidivism measures (total arrests and yearly arrest rate; total convictions and yearly conviction rate) are virtually linear combinations of one another, correlating .999. To a lesser extent, the same can be said for pairs of total arrests and adjusted yearly arrest rate and total convictions and adjusted yearly conviction rate. These high correlations are, in part, due to our decision to restrict the sample to those at risk for at least one year. One consequence of this decision was to make the window period almost identical for the cases studied, thus increasing the linear dependence between these variables. In other analysis (not shown) where offenders with shorter risk times were included, this linear dependence is not predetermined and these particular correlations, while still high, are reduced considerably.

Despite the presence of some large correlations in Table Three, we are struck by the relatively low magnitude of the interrelationships between the various indicators of recidivism. When considered from the perspective of the

variance shared between any two measures (i.e., squaring the correlations), the average level of common variance between indicators is well below 50%. These measures do indeed appear to be tapping different aspects of recidivism, despite the fact that they are all derived from the common source of official records.

In Table Four the two sentence variables are related to three of the measures of recidivism. The time marginal of Table 4a shows that the probability of rearrest is the same whether or not one is sentenced to more or less time relative to offenders sentenced to a similar institution. Differences emerge when the probabilities of failures for the four places are compared. Those sentenced to probation or state prison are less likely to be rearrested, those sent to county jail or a correctional facility are more likely to be rearrested. Failure rates do differ when both the sentence variables are considered together. The most "effective" sentence is being sent to a state prison to serve more than average time relative to others sent to prison. (It will be remembered that time at risk is <u>not</u> considered in Table 4a.) Offenders with short times on probation also have lower failure rates. Conversely, almost 90% of those sent to county jail and 85% of those sent to a correctional facility for longer than average times are rearrested sometime after release. Note that the difference between high and low time failure rates is not constant across the places sentenced.

Table Four about here

Yearly arrest rates are similarly analyzed in Table 4b. While the marginals of Table 4b tell essentially the same story as those of Table 4a, some discrepancies are found in the cells. Those sentenced to a correctional facility for longer than average sentences have lower subsequent arrest rates,

those sentenced to serve shorter than average sentences, a higher arrest rate. The highest arrest rates are observed for those sent to county jails to serve "long" sentences, while the lowest are for a "long" sentence to state prison. Again we also find that differences between the rates for high and low times within place sentenced are not constant.

When yearly arrest rates adjusted for time at risk are considered (Table 4c), patterns similar to those for the unadjusted rates are seen. However, a comparison between the rates of Tables 4b and 4c illustrates the importance of the adjustment for street time, for the effect of the adjustment is not constant, either in the marginals or the cells of the table. For example, when the recidivism rate for offenders sent to county jail for a short period is adjusted for time at risk, the rate increases by half a crime a year. When the same adjustment is made for sentences to county jail for longer terms, the increase is two thirds of a crime per year. The adjustment affects recidivism rates for short and long term sentences to prison by increasing them 44% and 67% respectively.

As a set, these tables suggest that the extent to which any specific deterrent effects of sentences will be observed is in part a function of how recidivism is defined (e.g., failure, mu, adjusted mu, and so forth). However, these tables also suggest that differences exist in the type of offender sentenced to these four places. It appears that "small time losers" -- high rate offenders committing nuisance crimes -- may be more likely to be sentenced to county jail, while the more serious, predatory offenders may be more likely to be sentenced to state prisons. This is a reasonable expectation for sentencing practices and one that dictates the use of control variables before attempting to ascertain the deterrent effects of sentences.

An example of such a use of controls is given in Table Five. The control variables of the estimated severity of the presenting offense, offender age, number of prior arrests and the Greenwood scale were entered before determining the main effects of the two sentence variables. After entry of the sentence variables, a test was made for any interaction between where one was sentenced and for how long.

Table Five about here

In many respects the results for Table Five mirror those found when the other eleven recidivism measures are used. The sum of squares for the covariates as a whole is slightly greater than the total attributed to each control variable individually. This indicates a small collinearity between the four covariates. The sum of squares for the main effects combined is slighty less than that found when the effects of the two sentence variables are summed: A (very) small suppressor effect is found for the two components of the sentence.

Some conclusions can be made from the analysis of adjusted yearly arrest rates presented in Table 5. The severity of the presenting robbery is unrelated to subsequent recidivism -- the nature of the one crime is not indicative of future official criminal activity. Conversely, all other control variables significantly influence this recidivism rate. Older offenders are likely to have lower arrest rates after serving the sentence, those with higher numbers of arrest prior to the sentence are likely to continue to have higher arrest rates in the future, and the higher the value on the Greenwood scale, the higher the arrest rate after serving the sentence. (These statements are based on information provided in the next table.)

In the presence of these effects, length of time sentenced has no direct effect upon subsequent yearly arrest rates adjusted for street time. That is, being given more or less time to serve than those sentenced to a similar institution does not influence the rate at which one continues to commit crimes that are detected by the authorities. However, where one is sentenced has a significant influence upon future arrest rates. Being sentenced to probation or a state prison reduces future arrest rates, even after adjusting for time at risk; a sentence to county jail or a correctional facility leads to an increase in future arrest rates. (Again, see the next table for the direction of these effects.) Caution must be observed when interpreting these direct effects as the time sentenced by where sentenced interaction proves significant. The interaction hinted at in Table 4c emerges. Therefore, we find that when the measure of recidivism is the adjusted yearly arrest rate, the specific deterrent effects of sentence are contingent upon the combination of where one is sentenced to and how long one must serve there relative to others sent to the same place.

Table Six summarizes the bulk of our analyses. Here the results for the analyses of covariance for all twelve measures of recidivism are summarized. (The results for Table Five are reproduced on page 2, column 1 of Table Six. Through a comparison of Table Five with this column, the reader may get a better understanding of the content of Table Six.) Consider first the measure-specific findings.

Table Six about here

The covariates affect the two measures of time to failure differently than for the other measures. Prior arrests and the characteristics of the offender captured by the Greenwood scale have no significant effect on failure

times, while the severity of the presenting robbery does. This latter finding is a direct artifact of not adjusting failure times for time at risk. Those committing more heinous robberies are more likely to be given longer sentences, thus increasing the time before any recidivism can be observed. Clearly, adjusted time to failure is the preferred realization of this kind of recidivism measure. Another measure-specific result pertains to the effect of the number of prior arrests upon the two recidivism variables that use only subsequent robberies. There is no effect and it appears that, for convicted robbers, prior levels of official criminal activity are unrelated to rearrest or reconviction for another robbery. Finally, the specific deterrent effects for a sentence of probation vary by measure of recidivism. Sometimes probation increases the value of a measure (e.g., total convictions, proability of failure), sometimes probation decreases the likelihood of recidivism (e.g., total arrests, adjusted arrest rates) and for the adjusted conviction rate, a sentence of probation has no effect.

Yet, with the exception of the findings just noted, several consistent, and unexpected, patterns are found across the measures of recidivism in Table 4.1. The severity of the presenting robbery has no impact on recidivism -- the particulars of the one case are not useful in assessing chances for recidivism. Consistent with what is known about the variability of criminal activity by age, younger offenders are more likely to recidivate, older offenders less likely. Similarly, prior criminal activity is related to recidivism rates. Those with a high level of prior arrests are likely to continue high levels after the sentence is served. The values of the Greenwood scale are also significantly related to recidivism. Controlling for the other covariates, the greater the number of factors evident in the scale, the greater the likelihood of recidivism, however defined.

Consistent deterrent effects, or lack thereof, are also observed across the twelve measures of recidivism. The relative time sentenced has no independent effect on the likelihood of subsequent official criminal activity. In not one of the twelve analyses summarized in Table Six is there a significant main effect for the time component of the sentence. Significant main effects for where one is sentenced do emerge across the measures of recidivism. With the exception of the two failure time measures, a sentence to a county jail or a correctional facility is unlikely to deter future criminal activity: offenders sentenced to one of these places show increased post sentence recidivism and higher subsequent rates of crime after serving their sentence. Given the nature of the control variables used in this analysis, it is unlikely that these effects can be accounted for solely on the basis of the type of offender sentenced to a county jail or a correctional facility. The most surprising consistency in Table Six is the deterrent main effect of a sentence to a state prison. No matter how one defines recidivism, serving time in a state prison lowers levels of recidivism. (In the case of time to failure, this means that offenders coming from a state prison take longer to fail.)

However, the interpretation of the effects of the two sentence variables must be placed in the context of the interaction between them. Here the results in Table Six are quite clear. If the measure of recidivism is based upon subsequent convictions, there is no interactive effect of the sentence variables. The effects of where one is sentenced (identified above), and the lack of any effect for the relative length of time sentenced, may be interpreted in a straightforward fashion. Conversely, for all arrest-based

measures of recidivism, the time sentenced by where sentenced interaction is significant and thus any deterrent effects of one component of the sentence is contingent upon values of the other component.

DISCUSSION AND CONCLUSION

The present analysis has focused upon the two issues of how to define recidivism and, given the definition, the deterrent effects of sentences upon recidivism. Much has been covered that relates to these issues and the results that emerged have implications for both basic research and policy decisions. It is because of this that the major caveats about our analyses must be reiterated.

It will be remembered that the present sample is one of convenience and is not necessarily representative of either those convicted of robbery before a New Jersey State Court between 1976-1977 or the general population of robbery offenders. Cases were selected solely on the basis of the nature of the records themselves -- if the dates of arrest and sentence and the charge matched exactly with the corresponding records kept by the state police, then the case was included in the analysis. Cases excluded because of the lack of a perfect match are recoverable and we are in the process of doing so. In addition, the sample was further limited through the exclusion of those who were at risk for less than one year during the window period. We did so because we are not yet sure that these low risk time are not the artifact of some error in one of the three supplemental data files. These cases will ultimately be available for study as well. The extent to which our findings will change when the sample becomes more representative of the population from which it was drawn remains to be seen. As was mentioned earlier, at least

some change is likely because the intercorrelations of some of the measures of recidivism are reduced when the sample is not restricted to those at risk for more than one year.

The qualifications needed to interpret our findings go beyond simply how the sample was defined. The analysis presented must be viewed as preliminary, for relatively few covariates were employed before attempting to identify deterrent effects of sentences. Those covariates used attempt to control for the most important variables that might account for levels of recidivism, but more controls are available and should be added to the analysis before the certainty of the results is increased. Even with the addition of more controls, it must be recognized that the analysis has all the limitations inherent in the use of official records as contrasted with self-reports of criminal behavior (See, for example, Elliot and Ageton, 1980; Gould, 1969). Despite the ability to operationalize recidivism in a variety of ways, self-reports offer the opportunity to broaden how recidivism is defined and may ultimately yield measures of deterrent effects that differ substantially from the kinds found here.

Given these major qualifications, several conclusions are suggested by our results. Perhaps the most important of these is that the process of recidivism -- the variables linked to the likelihood of recidivating and the specific deterrent effects of sentences -- is not tied to one particular operational definition of recidivism. The consistencies summarized in Table Six are striking in this regard. When the time component of the sentence is defined relative to others sentenced to the same institution, time sentence has no effect on subsequent recidivism, independent of the measure used. Controlling for variables known to influence levels of criminal activity in general, a sentence to a state prison lowers recidivism, however defined from

official records. Younger offenders are more likely to recidivate regardless of the measure of recidivism used. Offenders scoring higher on the Greenwood diagnostic scale are more likely to recidivate regardless of the measure. If the indicator of recidivism is tied to reconviction, the sentence variables have only main effects upon the level of recidivism. If an arrest-based measure of recidivism is employed, the deterrent effect of the sentence variables interact. Seldom do such consistent findings emerge across different measures of the same concept.

While it is possible to stress the similarities in these results as was done above, the differences must also be noted. Some indication of these differences has been provided by the present analysis. First, the intercorrelations of the twelve measures of recidivism are not as high as one might expect, especially since they operationalize the same underlying concept. This points to the fact that while the analyses of covariance have yielded the same general understanding of the process of recidivism, the specific measures yield different indications of the levels of recidivism. Conviction-based measures, of course, suggest that recidivism is occuring at a lower level than arrest-based measures. Individuals who are arrested at a high rate after serving the sentence are not necessarily failing sooner than offenders with a low value for mu.

The analyses in Table Six presents the direction of the effects of the covariates and the sentence variables upon recidivism. Overall these effects are in the same direction for all measures of recidivism. What differs is the magnitude of these effects. It is in the estimation of how strongly a control variable or a component of the sentence impacts recidivism that the undertaking becomes specific to the dependent variable used. The deterrent main effect of a sentence to a state prison, for example, is consistently

negative, but how great that effect is varies according to the measure used. Futhermore, the existence of an interaction effect for the two components of the sentence means that for one level of time, sentence to a state prison will have a deterrent effect, for the other level the effect will be the opposite. These effects must be estimated. However, the differing metrics for the measures of recidivism, the necessity of transforming the measures before doing the analysis, and the existence of the time sentenced by where sentenced interaction makes computing estimates that can be compared across measures of recidivism difficult. We are in the process of parameterizing the necessary equations with the hope that it will lead to a better understanding of how conclusions about the deterrent effects of sentencing are dependent upon the measure of recidivism used in the analysis.

Finally, our results are generally supportive of the use of the seven items in the Greenwood scale in the identification of high-risk offenders. The present version of the scale, constructed using only information derived from available records, was consistently and significantly related to levels of recidivism. Controlling for the age of the offender at time of sentencing and the number of prior arrests, as the number of scale items present increased, so did the number of official arrests, the rate of arrest adjusted for time at risk, the probability of failure and so forth. Thus we suggest the possibility that this scale can be related to criminal behavior in a prospective fashion.

To summarize, our preliminary analyses of the extent to which different measures of recidivism might influence the ability to detect any specific deterrent effects of sentences has raised, perhaps, more questions than it has answered. Many of the questions surrounding these findings can be answered by addressing the qualifications that must be used in the interpretation of the

present results. Adding the remaining cases, checking values for short times at risk, obtaining failure times adjusted for the actual time served on the sentence, and properly parameterizing the equations needed to estimate the exact deterrent effects of the components of the sentence should go a long way toward resolving these questions. And, if in doing so the present findings hold, we will be able to demonstrate consistent deterrent effects of sentencing to a state prison, no matter how recidivism is operationalized from official records.

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Table One

Crosstabulation of Measures
of Sentence

Time Sentenced

Where Sentenced	Less than Group Median	More than Group Median	Group Median
Probation	47.9% (92)	52.1% (100)	2,5 years
County Jail	56.0% (61)	44.0% (48)	1 year
Correctional Facility	56.3% (139)	43.7% (108)	5 years
State Prison	55.8% (173)	44.2% (137)	7 years

Table Two

Descriptive Statistics for Measures of Recidivism

Statistic

Variable	Mean	Std.Dev.	Skewness	Kurtosis	Min.-Max.	N
1) Robbery Arrests	.425	.985	4.880	45.791	0-14	870
2) Robbery Convictions	.162	.485	4.397	28.417	0-5	870
3) Total Arrests	5.217	6.221	2.103	6.435	0-44	870
4) Total Convictions	2.025	3.103	3.708	25.592	0-37	870
5) Yearly Arrest Rate	.557	.665	2.097	6.367	0-4.74	870
6) Yearly Conviction Rate	.216	.333	3.744	26.064	0-3.99	870
7) Yearly Arrest Rate Adjusted for Time at Risk	.813	1.237	5.191	50.827	0-17.72	870
8) Yearly Conviction Rate Adjusted for Time at Risk	.330	.672	6.535	63.909	0-9.05	870
9) Probability of Failure-Arrest	.753	.432	-.622	-1.175	0-1	870
10) Probability of Failure-Conviction	.584	.493	-.341	-1.888	0-1	870
11) Days to Failure -Arrest	1125.566	823.444	.783	-.149	3-3415.2	655
12) Days to Failure -Conviction	1206.556	815.588	.567	-.496	3-3415.20	508

Table Three

Correlations Between Measures of Recidivism

	Variable									
Variable	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)
1)	.458	.404	.211	.399	.207	.349	.192	.248	.244	-.186	-.145
2)		.225	.267	.222	.262	.200	.208	.192	.282	-.166	-.188
3)			.747	.999	.746	.822	.588	.481	.530	-.351	-.278
4)				.749	.999	.661	.831	.374	.551	-.357	-.356
5)					.749	.822	.591	.480	.529	-.349	-.277
6)						.660	.832	.373	.549	-.355	-.355
7)							.797	.377	.421	-.257	-.219
8)								.281	.414	-.262	-.258
9)									.679	-	-
10)										-	-
11)											-

Key

1) - Robbery Arrests
2) - Robbery Convictions
3) - Total Arrests
4) - Total Convictions
5) - Yearly Arrest Rate
6) - Yearly Conviction Rate
7) - Yearly Arrest Rate Adjusted for Time at Risk
8) - Yearly Conviction Rate Adjusted for Time at Risk
9) - Probability of Failure-Arrest
10) - Probability of Failure-Conviction
11) - Days to Failure-Arrest
12) - Days to Failure-Conviction

Table Four

Observed Means for Selected Measures of Recidivism
(N, standard deviation in parentheses)

a) Probability of Failure - Arrest

Where Sentenced

Time Sentenced	Probation	County Jail	Correctional	State Prison	Total
More than Median	.730 (100,.446)	.896 (48,.309)	.843 (108,.366)	.650 (137,.479)	.753 (393,.432)
Less than Median	.674 (92,.471)	.721 (61,.452)	.820 (139,.386)	.757 (173,.430)	.755 (465,.431)
Total	.703 (192,.458)	.798 (109,.403)	.830 (247,.376)	.710 (310,.455)	.754 (858,.431)

b) Yearly Arrest Rates

Where Sentenced

Time Sentenced	Probation	County Jail	Correctional	State Prison	Total
More than Median	.491 (100,.602)	.852 (48,.929)	.681 (108,.653)	.352 (137,.498)	.539 (393,.654)
Less than Median	.434 (92,.585)	.597 (61,.829)	.732 (139,.755)	.518 (173,.574)	.576 (465,.679)
Total	.464 (192,.593)	.709 (109,.879)	.709 (247,.712)	.445 (310,.547)	.559 (858,.667)

c) Yearly Arrest Rate Adjusted for Time at Risk

Where Sentenced

Time sentenced	Probation	County Jail	Correctional	State Prison	Total
More than Median	.631 (100,.844)	1.525 (48,2.277)	.888 (108,.944)	.588 (137,.829)	.796 (393,1.172)
Less than Median	.582 (92,.896)	1.099 (61,2.482)	.993 (139,1.158)	.748 (173,.914)	.834 (465,1.302)
Total	.608 (192,.8673)	1.2868 (109,2.392)	.947 (247,1.068)	.677 (310,.880)	.817 (858,1.243)

Table Five

Analysis of Covariance for
Yearly Arrest Rates
Adjusted for Time at Risk
(Log Adjusted Rate)

Source	Sum of Squares	d.f.	Mean Squares	F	P(F)
Covariates	27.596	4	6.899	39.32	.000
Offense Severity	.019	1	.019	.11	.740
Offender Age	9.561	1	9.561	54.49	.000
Prior Arrests	7.080	1	7.080	40.35	.000
Greenwood Scale	6.630	1	6.630	37.79	.000
Main Effects	6.552	4	1.638	9.34	.000
Where Sentenced	6.357	3	2.119	12.08	.000
Time Sentenced	.226	1	.226	1.29	.256
Interaction (Where x Time)	1.438	3	.479	2.73	.043
Residual	148.087	844	.175		
Total	183.673	855	.215		

Table Six

Summary of F-Statistics For Analyses of Covariance for Recidivism Measures (N in parentheses)

Source	d.f.	Robbery Arrests (856)	Robbery Convictions (856)	Total Arrests (856)	Total Convictions (856)	Arrest Rate (856)	Conviction Rate (856)
		Variable					
Covariates							
Offense Severity	1	1.56	.38	.01	.01	.14	.00
Offender Age	1	16.84**	4.17*	82.65**	49.27**	64.71**	43.23**
Prior Arrests	1	2.46	.22	48.44**	18.64**	38.18**	13.70**
Greenwood Scale	1	24.11**	22.03**	29.00**	25.61**	24.44**	20.33**
Main Effects							
Where Sentenced	3	4.34**	3.45*	13.75**	17.49**	14.46**	17.28**
Time Sentenced	1	.02	.04	1.99	2.10	2.18	2.08
Interaction							
Where by Time	3	4.38**	1.15	4.84**	1.72	4.13*	1.58
R2		.074	.048	.204	.162	.179	.145
Direction of Effects							
Offense Severity		0	0	0	0	0	0
Offender Age		-	-	-	-	-	-
Prior Arrests		0	0	+	+	+	+
Greenwood Scale		+	+	+	+	+	+
Probation		-	-	-	+	-	+
County Jail		+	+	+	+	+	+
Correctional Facility		+	+	+	+	+	+
State Prison		-	-	-	-	-	-
Less than median time		0	0	0	0	0	0
More than median time		0	0	0	0	0	0

**P<.005
*P<.05

Table Six (cont.)

Summary of F-Statistics For Analyses of Covariance for Recidivism Measures (N in parentheses)

		Variable					
Source	d.f.	Adjusted Arrest Rate (856)	Adjusted Conviction Rate (856)	Prob. of Failure Rate-Arrest (856)	Prob. of Failure Rate-Convict. (856)	Days to Failure Rate-Arrest (856)	Days to Failure Rate-Convict. (856)
Covariates							
Offense Severity	1	.11	.14	.28	.67	10.59**	6.69*
Offender Age	1	54.49**	34.35**	58.51**	30.47**	15.16**	3.86*
Prior Arrests	1	40.35**	14.29**	32.86**	13.43**	.63	.72
Greenwood Scale	1	37.79**	29.20**	21.33**	25.12**	.69	.10
Main Effects							
Where Sentenced	3	12.08**	14.98**	6.00**	13.04**	45.02*	28.65*
Time Sentenced	1	1.29	.74	.42	1.40	.01	.16
Interaction							
Where by Time	3	2.73*	1.31	3.69**	1.30	1.59	1.67
R2		.186	.142	.146	.131	.208	
Direction of Effects							
Offense Severity		0	0	0	0	+	+
Offender Age		-	-	-	-	+	+
Prior Arrests		+	+	+	+	0	0
Greenwood Scale		+	+	+	+	0	0
Probation		-	0	+	+	-	-
County Jail		+	+	+	+	-	-
Correctional Facility		+	+	+	+	0	+
State Prison		-	-	-	-	+	+
Less than median time		0	0	0	0	0	0
More than median time		0	0	0	0	0	0

**P<.005
*P<.05