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**CONVICTION OR DIVERSION?
AN ANALYSIS OF FIRST-TIME DUI OFFENDERS IN PENNSYLVANIA**

A Thesis in

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ABSTRACT

Arrests for driving under the influence constitute the most common type of arrest in the United States, but they are often excluded from criminological research. The present study uses hierarchical linear modeling to analyze the sentencing and recidivism of first-time DUI offenders across 60 judicial districts in the State of Pennsylvania.

The general theoretical question relates to factors that promote or inhibit deterrence. The study is concerned primarily with the severity of punishments, since arguments have been made both that severe punishments are necessary to reduce the likelihood of additional criminal behaviors (e.g., Beccaria 1764/1963), and that severe punishments are related to the persistence of offending behaviors (e.g., Sherman, 1993). Additionally, this thesis is concerned with the effects of a criminal label (e.g., Braithwaite, 1989; Laub and Sampson, 2003) by comparing the criminal behaviors of individuals who receive a permanent, and stigmatizing, criminal label to those who receive access to a rehabilitative and reintegrative disposition that does not carry a criminal label.

Two overarching research questions are considered. First, what offender, offense, and community characteristics influence whether an offender receives diversion or is sentenced for a guilty conviction? Second, what offender, offense, and community characteristics are related to the recidivism of first-time DUI offenders? Specifically, this thesis seeks to understand the processes of selection into diversion programs and the relationship between diversion, versus a criminal label, on future criminal behaviors.

These questions are analyzed using data from the Administrative Office of Pennsylvania Courts (AOPC), Pennsylvania Commission on Sentencing (PCS), Pennsylvania State Police (PSP), Pennsylvania Center for Crime and Delinquency, Pennsylvania Department of Health,

and the United States Census Bureau. Demographic and criminal history characteristics, offense and judicial proceeding characteristics, and community characteristics were included in two-level analyses of offenders nested within their respective Court of Common Pleas. Type of disposition - Accelerated Rehabilitative Disposition (ARD) or Guilty Conviction - and rearrest within 4 years of sentencing for a first-time DUI offense were analyzed as dependent variables.

Consistent with general sentencing research, racial minorities, males, and younger offenders were more likely than white, female, and older offenders to receive harsh sentences. Offenders with more serious criminal histories were more likely than offenders with no prior criminal history to receive a guilty conviction. Blood alcohol content (BAC) was not predictive of disposition outcomes, but drug-impaired offenders were more likely than alcohol-impaired offenders to receive a guilty conviction.

White, female, and older offenders were less likely than non-white, male, and younger offenders to recidivate. More serious offenders, characterized by the commission of a non-DUI offense that was more serious than their DUI offense, were more likely than less serious or DUI-only offenders to recidivate. Offenders with prior arrests were more likely than offenders with no prior arrests to recidivate. While BAC was not predictive of recidivism, drug-impaired offenders were more likely than alcohol-impaired offenders to recidivate.

The relationship between a guilty conviction and recidivism varied by gender and race. While the rate of recidivism of males was similar for those who received ARD and those sentenced for a guilty conviction, females sentenced for a guilty conviction were significantly more likely than females receiving diversion to recidivate. The difference in recidivism between minority offenders sentenced to a guilty conviction and those receiving ARD was also

significantly larger than the difference in recidivism for white offenders sentenced to a guilty conviction and those receiving ARD.

Finally, county and judicial district characteristics were not predictive of disposition outcomes or rearrest. While this study found variation in the size of the effects of offender and offense characteristics across judicial districts, no county or judicial district characteristics included in the study were able to account for this variation.

The results of this thesis suggest two implications for theory. First, arrest itself appears to be a strong deterrent for DUI offenders. The lack of significant differences in recidivism for those receiving a guilty conviction and those receiving diversion suggests that arrest itself may be a severe punishment for this group of offenders and that the severity of subsequent punishment is less important. Second, this thesis provides support for a contingent labeling effect. The findings provide some evidence of a racial or gendered effect of criminal labels and the associated propensity to recidivate.

Finally, the current study has an important implication for policy. The findings suggest that diversion programs are currently disproportionately awarded to offenders based on demographic characteristics, but the effects of sentencing on recidivism appear similar regardless of the disposition outcome. Consequently, an expansion of diversion programs for first-time DUI offenders could be considered in order to reduce state costs and to reduce any potential stigma that may result from a permanent criminal label.

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Introduction

Arrests for driving under the influence of drugs or alcohol are the most frequent type of arrest in the United States. In 2010, more than 1.4 million individuals were arrested for driving under the influence (Snyder, 2012). While other crimes have seen a steady decline in frequency in the United States, arrests for driving under the influence dropped by only 2 percent between 2005 and 2010 (Snyder, 2012) and may be rising again. The number of alcohol-impaired-driving crashes involving a fatality increased in 2012 by 4.6% from 2011 (NHTSA 2013). Alcohol-impaired-driving crashes killed 10,322 people in the United States in 2012 (NHTSA 2013), accounting for 31% of all motor vehicle traffic fatalities. The number of motor vehicle traffic fatalities involving an impaired driver consistently rival the number of individuals killed in firearm homicide deaths each year¹.

Driving under the influence is one of the most prevalent offenses in the United States. In some states, up to 14% of licensed drivers have a DUI conviction (Ross, 1992). Based on self-reported survey data, an estimated 4 million drivers drove under the influence of alcohol in 2010, for a total of around 112 million impaired driving incidents (Bergen, Shults, and Rudd, 2011). Despite these startling statistics and growing national attention, few studies have analyzed characteristics of impaired drivers and the effectiveness of sentencing policies for first time offenders.

Much of the prior research on DUI offenders in the criminology literature has revolved around preventative community policies (e.g., the restriction of liquor sales), police practices (e.g., DUI checkpoints), and alcohol addiction and treatment programs. Scant research has examined the sentencing practices applied to DUI offenders and the effectiveness of different

¹ According to the UCR, 8,855 persons were murdered by firearm in 2012.

criminal justice interventions. Those studies that do exist isolate only one or two sentencing options (e.g., jail or probation with ignition interlock) without analyzing what offender characteristics influence judicial decisions and how these sentencing options impact different groups of offenders.

A critical strength of criminological approaches to studying deviant behavior is the ability to evaluate individual offenders nested within different political jurisdictions. These methods allow researchers to study individual and contextual variables that may jointly contribute to criminal behavior, including the effectiveness of criminal sanctions. Many of the existing studies on DUI offenders assess a sample limited to a single jurisdiction. And, even those studies that do examine larger areas often do not assess cross-jurisdictional differences of an offender's experience with the criminal justice system.

Intervention may be more successful for some individuals than others. Life course literature identifies different types of offenders based on their persistence and desistance patterns. Moffitt's (1993) literature on "adolescent limited" and "life course persistent" offenders, as well as Blumstein, Cohen, Roth, and Visher's (1986) description of criminal careers, are two such examples. These theories argue that a small group of offenders are responsible for a disproportionate amount of criminal behavior (see also Wolfgang, Figlio, and Selin, 1972). DUI offenses follow a similar pattern, and some estimates indicate that nearly 80 percent of impaired driving episodes are committed by 3 percent of all drivers (Beirness, Simpson, & Desmond, 2002). These findings suggest the need to better identify criminal propensity and more adequately tailor interventions to support desistance patterns among the majority of offenders.

The current study analyzes first-time DUI offenders in the State of Pennsylvania and their assignment to either a guilty conviction or Accelerated Rehabilitative Disposition (ARD), which is a diversionary sentence that does not impose a guilty conviction on the offender. As long as offenders complete all terms of their sentence, offenders sentenced to ARD may have their DUI offenses expunged from their record. These offenders do not have to report that they were convicted of a DUI and the offense does not appear on a background check. The law affords prosecutors and judges discretion in determining who may be sentenced to a guilty conviction and who may be sentenced to a diversionary disposition, but in the absence of research, it is unclear what factors judges use to determine which offenders are sentenced to each type of disposition.

For both offenders sentenced to ARD and those sentenced to a guilty conviction, the standard treatment program includes mandatory educational classes, six months to one year of probation, and potential license suspension. If offenders sentenced to ARD commit a violation of any criminal offense, the diversion may be revoked and the offenders are subject to additional penalties as well as the permanent criminal conviction. In addition to investigating sentencing to ARD versus guilty convictions, the study also examines how effective the different treatment options are for reducing recidivism among first-time DUI offenders.

Importantly, Pennsylvania DUI statutes mandate drug and alcohol treatment for any offender meeting specified criteria using state evaluation instruments, regardless of their disposition at sentencing. Offenders must undergo an initial evaluation to determine the likelihood that they have a drug or alcohol addiction. Those offenders with a potential addiction problem must undergo additional drug and alcohol evaluations to determine their specific treatment needs. These treatments are mandated regardless of whether the offender receives a

guilty disposition and standard probation or an ARD. A judge's decision to impose an ARD sentence is not dictated by the results of these evaluations. Highly dependent offenders are still eligible for an ARD, and treatments as mandated by the drug and alcohol assessment can be provided even outside of a guilty conviction. Because participation in drug and alcohol treatment programs is not tied to a guilty conviction, the only difference between ARD and guilty conviction sentences is the ability for the offender to have a clean record following completion of their sentence. Thus, the question addressed in this thesis is not whether or not ARD is effective as an alternative form of treatment, but rather whether expunging the conviction record and erasing the criminal label has an independent effect on subsequent criminal behavior.

A Brief History of DUI Laws

In 1936, the National Safety Council established the Committee on Tests for Intoxication to review policies concerning DUI offenses. In 1959, the Committee was renamed the Committee on Alcohol and Other Drugs. The still-active Committee, which consists of policy makers and academics who have a minimum of 25 years of active service and national recognition in the field of alcohol, drugs, and traffic safety, continues to provide recommendations for impaired driving policy and programs. Members must also have a minimum of ten years of involvement with the National Safety Council. Nominations for membership are approved by a special division of the Committee on Alcohol and Other Drugs.

Since its inception, The Committee has been influential in the passage of state and federal policies. In 1939, The Committee released a comprehensive report encouraging states to adopt chemical tests for identifying individuals under the influence of alcohol. The Committee further supported recommendations by the American Medical Association's Committee to Study

Problems of Motor Vehicle Accidents. These recommendations included establishing a strict legal limit of .15 percent blood alcohol content (BAC) for determining whether individuals are “under the influence,” and relying on other physical examinations for individuals within the range of .05 to .15 to determine whether or not they also should be considered “under the influence” (JAMA 1940). These thresholds, modeled on an earlier law passed in Illinois, recognized that the acquisition and presentation of chemical evidence was necessary to corroborate police observations of impaired individuals. Through the use of scientific techniques, such as chemical evidence, policy makers sought to increase the number of guilty pleas and successful prosecutions at trial by eliminating the subjectivity of witness testimony (JAMA 1939).

By 1969, The Committee’s influence was clear: 45 states had adopted implied consent laws (making chemical tests compulsory for drivers suspected of being under the influence), and only two states lacked presumptive laws predicated on blood alcohol content. Despite this national wave of legislation, states were inconsistent in the standards for impairment; some states placed the presumptive BAC threshold at .08 and states maintained higher thresholds at .10. The inconsistencies between states led the federal government to intervene. In 1982, Congress passed the Highway Safety Act, which tied federal incentives, such as highway funds, to each state’s adoption of legal per se laws² based on a blood alcohol concentration threshold of .10 (Lerner, 2011). Using the same authority from the Highway Safety Act, Congress reduced the BAC criteria to .08 in order to be eligible for federal traffic-safety grants (23 U.S.C. 410).

Beyond this legislation, which focused on the illegality of driving under the influence, community organizations began to redefine drunk driving as a violation of moral norms and

² Per se laws are those for which the behavior is automatically illegal without having to prove any additional facts (Black & Nolan, 1993).

values. Pressure from community organizations such as Remove Intoxicated Drivers (RID) and Mothers Against Drunk Driving (MADD) caused states to overhaul drunk driving statutes. RID, established in 1978, was the first citizen activist group to target drunk driving. Two years later, Candy Lightner's 13 year old daughter was killed by a drunk driver while walking in California. Lightner, along with several family friends, founded MADD and began to change the public's opinion of drunk drivers (Fell and Voas, 2006). With the support of other victims and relatives of victims of drunk-driving accidents, RID and MADD began lobbying state legislatures to pass more stringent policies against drunk driving. The emotional appeal of victim tragedies mobilized media and public support for policies protecting against the "killer drunk driver" (Fell and Voas, 2006:199). In response to the public outcry, 729 new state drunk driving laws were created between 1981 and 1986 (Lerner, 2011). This surge in new anti-drunk driving legislation also coincided with the Reagan administration's emphasis on the immorality of drunk driving (Reinarman, 1988).

In 1998, Congress took action to unify sentencing policies for drunk-drivers. The Transportation Equity Act for the 21st Century required states to adopt laws implementing a one year minimum license suspension for repeat offenders as well as a policy mandating either impoundment of vehicles or the installation of alcohol ignition interlock technologies. In 2000, partially due to continued support from community organizations, Congress passed new regulations conditioning federal highway funds on the adoption of .08 BAC laws by 2004 (Fell and Voas, 2006).

In 2014, members of Congress introduced a bill referred to as "Alisa's Act"³ which would condition federal-aid highway funds on the implementation of mandatory ignition

³ H.R. 5025: Alisa's Law of 2014 was named after the daughter of MADD National President Jan Withers who was killed by a drunk driver in 1993 at the age of 15.

interlock sentences for first-time DUI offenders. Support for this bill rests largely on a study released by the Centers for Disease Control and Prevention (CDC), which concludes that ignition interlocks have consistently been found to reduce recidivism rates among DUI offenders; however, the CDC admits that once the interlocks are removed, re-arrest rates largely revert back to levels that mirror comparison groups, indicating that no long term recidivism effects have been identified (Elder et al, 2011). Despite the lack of evidence for a sustained treatment effect, organizations such as MADD continue to push for policies that increase the severity of sanctions against individuals convicted of a DUI. Instead of advocating unproven programs, a more effective approach would be to conduct research comparing different strategies that have been shown to promote prolonged desistance from drunk-driving behaviors.

Previous DUI Research

Studies of DUI offenders have historically been published in the medical and psychological journals that focus on addiction, biological identifiers of impairment, and effectiveness of treatment programs (DeJong and Hingson, 1998; Nochajski, 2006; Schell, Chan, and Morral, 2006; Shaffer et al, 2007; Jewell, Hupp, and Segrist, 2008; Maenhout et al, 2014). Despite Ross's (1984) call for greater integration of the study of DUI offenses into criminological and sociological literature, there are only a few criminological studies examining DUI offenders. This section reviews criminological theories as they have previously been applied to DUI offenses. This thesis seeks to expand upon these theories and their application to the sentencing of first-time DUI offenders.

Within criminology and studies of sentencing, offenders have often been depicted as a unique type of offender who should not be classified or analyzed with other criminals (DeMichele and Payne, 2013). For example, research conducted by the Pennsylvania

Commission on Sentencing explicitly removes DUI offenders from the sample for risk assessment tools (Pennsylvania Commission on Sentencing, ND). The Commission believes the characteristics that predict the risk of recidivism for DUI and non-DUI offenders may be fundamentally different. Additionally, the unique sentencing policies governing DUI offenses (e.g., mandatory sentences) make it difficult to compare DUI cases to non-DUI cases in the judicial process. Similarly, Bowles (2011) excluded DUI offenders from her analysis of alternative sentencing decisions in Pennsylvania, because, she argued, there are differences between DUI offenders and non-DUI offenders that may influence a judge's decision of whether to sentence an individual to intermediate punishments. While attempting to understand factors related to alternative sentencing options, these studies wholly exclude a population of offenders that may benefit the most from intermediate punishments.

Studies examining DUI offenses come from one of two perspectives. The first posits that significant penalties are necessary to deter individuals from making the decision to drive under the influence of drugs or alcohol. This perspective focuses on the fact that DUI offenses put members of the public unknowingly at risk. These types of harsh deterrence policies have been strongly supported by activist organizations that believe strong punishments are necessary due to the large risk posed by DUI offenders to innocent others (i.e., the risk of getting into a serious accident). Organizational appeals to this risk can be seen through the use of victim anecdotes and the attachment of a victim's name to legislative policies (see the previous discussion of "Alisa's Law"). Other person crimes are more commonly associated with non-random criminal acts, such as assault, which may begin as a dispute between two parties. In contrast, victims of DUI offenders are generally innocent, unsuspecting drivers or pedestrians who could not have anticipated and prevented their victimization.

In contrast to this punishment perspective, the second perspective focuses on the distinct characteristics of DUI offenders, particularly their rehabilitative potential and the need to identify chronic DUI offenders. These studies posit that DUI offenders have different characteristics than the general offender population and need to be independently analyzed to understand patterns of offender characteristics as they relate to sentence effectiveness and recidivism (DeMichele and Payne, 2013).

This thesis attempts to integrate our criminological knowledge of sentencing practices, deterrence, and reintegrative shaming into the study of DUI offenders. This study focuses on the most critical point of intervention for DUI offenders in the criminal justice system – their first DUI arrest – and analyzes how different sentencing practices influence recidivism among this population. Rather than analyzing repeat DUI offenders based on their individual characteristics, this study analyzes how sentences for an offender’s first DUI arrest influences their likelihood of repeat offending.

Deterrence and DUI Policies

Deterrence theory rests on the assumption that individuals decide not to engage in crime because they fear punishment. This theory assumes that individuals make decisions based on a calculation of the costs and benefits of a potential act. Put simply, individuals will choose not to commit a crime because of the fear of punishment, but only if that punishment outweighs the potential gains from criminal behavior.

Three components make up an effective deterrence approach: celerity (swiftness of punishment), certainty (likelihood of apprehension and punishment), and severity (how harsh the punishment is). Deterrence theory posits that these three principles of punishment influence potential offenders’ decisions of whether or not to engage in criminal behavior. By increasing

the cost associated with criminal behavior, sanctions may deter offenders from committing additional crimes (specific deterrence), and may deter potential offenders in the general population from engaging in criminal behavior (general deterrence).

DUI crimes present a unique opportunity for testing deterrence policies. The immediacy of apprehension by law enforcement (if, of course, the person is identified) during the commission of a DUI crime minimizes the temporal gap between criminal behavior and criminal justice intervention. Additionally, the sanctions applied to DUI offenders as a result of mandatory minimums and per se statutes are distinct from other criminal punishments (e.g., license suspension and mandatory treatment program attendance). These characteristics of DUI offenses and case processing may provide conditions for sentencing policies that function as a deterrent to recidivism.

Celerity

The celerity component of deterrence theory necessitates that punishments be swift. Beccaria (1764/1963) notes that less time between a crime and punishment results in a stronger association between the two acts, making deterrence more likely in the future. Some crimes go undetected for hours, or days, before police are alerted. It may take time for police to gather evidence, identify a suspect, and make an arrest. Once a suspect is apprehended, there are likely to be additional delays between the arrest and the imposition of punishment. These delays can be even larger if the offender does not plead guilty but instead opts for a jury trial. In general, these processes may be divided into two parts: (1) time to apprehension and (2) time to punishment.

Once their criminal behavior has been identified, the time to apprehension for DUI offenders is almost immediate. Drunken offenders arrested by the police are not allowed to

continue driving and can be held in custody until they are sober. This immediate detention and interaction with police is different from other crimes such as burglary or assault. For these other crimes, delays often occur between the crime being reported and the offender being identified and arrested. Unlike these other crimes, DUI offenses are not typically reported by victims or bystanders, but rather, are identified by police observations.

Although unique in their initial experience with the criminal justice system, DUI offenders are processed through standard court proceedings. Despite their immediate involvement with criminal justice officials, the time to punishment is constrained by standard court case processing. Expedited court involvement is likely to occur only in jurisdictions that have separate DUI courts that process impaired driving offenses exclusively.

In general, past research on deterrence theory finds that the delay between apprehension and punishment undermines the swiftness necessary for strong associations between criminal behavior and sanctions that make deterrent policies effective (see Paternoster, 2010).

Only a few studies have focused on the celerity component of the arrest and punishment process for DUI offenses. A study analyzing the arrest-conviction time interval for 14,000 offenders randomly sampled from New York driver license databases attempted to isolate the effect of swift convictions (Yu, 1994). The length of time between arrest and conviction ranged from less than one week to 482 weeks. Ninety percent of the offenders in the sample were sentenced between 30 weeks and 45 weeks of their DUI offense. These data reveal some general inconsistency across conviction times, but the authors find no independent effect of this interval and the likelihood of committing another DUI in the future.

The New York study has four weaknesses. First, it measures recidivism only as the commission of a subsequent DUI, and it is possible that the offenders in the sample were

rearrested for other offenses. Thus, the study may overstate the deterrent effect. Second, the study does not include any prior criminal history covariates in its analysis. One would expect that offenders with longer criminal histories are less likely to be affected by an additional interaction with the courts.

Third, the study also does not include any variables to control for characteristics of the jurisdiction in which the offense occurred and the offender was sentenced. The lack of county or jurisdictional variables ignores the fact that these offenders are nested within courts that have different court processing routines. It is possible that time-to-punishment has different effects based on the characteristics of the county in which the offense occurs. Understanding how quickly or slowly cases are disposed of in relation to the average case disposition interval in a given court would be a better type of analysis. The lack of an effect in this study may be confounded by the concentration of cases in larger jurisdictions such as New York City, where case disposition intervals are generally longer than smaller, rural jurisdictions.

Fourth, the lack of an independent time-to-punishment effect for DUI offenses could also be due to the immediate interaction with criminal justice officials rather than the significant time interval between arrest and sentencing. The null finding from the New York study (Yu, 1994) for the arrest-conviction interval could be explained by the immediate processing of DUI crimes rather than as a lack of a celerity effect. That is, a majority of the celerity effects may be contained in the immediacy of the arrest leaving only small, if any, effects to be found from expedited court processing.

One attempt that has been made to increase celerity of punishment for DUI offenses is through immediate license revocation (Ross, 1992). States implementing administrative license revocation laws have generally found a positive effect on the reduction of DUI offenses and

recidivism (see review in Ross 1992). Administrative license revocation laws allow police officers to take licenses from drivers who fail breathalyzer tests. According to the Insurance Institute for Highway Safety (2014), 41 states and the District of Columbia currently have administrative license revocation laws. Most of these studies examine only a single jurisdiction or state, and have no generalizability to states that do not grant this authority to police; Pennsylvania is one such state. Absent an administrative license revocation law, police in Pennsylvania are empowered only to seize licenses if a driver refuses to submit to a breath test. All other license revocations depend on conviction of a DUI offense.

In sum, celerity of punishment for DUI offenses seems to have little influence on subsequent criminal behavior. The immediate interaction between DUI offenders and police create conditions where celerity of court-imposed punishment may have little effect. In some jurisdictions administrative license revocation laws may further moderate effects from the celerity of case dispositions. Subsequently, severity and certainty have repeatedly been identified as the key components for DUI and deterrence research.

Certainty

Certainty, or the likelihood of punishment, has been identified as the most important component of deterrence theories (Beccaria, 1764/1963). The swiftness and severity of punishment matter only if the offender is first apprehended for the crime, and if the offender is likely to be given a sanction for his or her criminal behavior. Certainty of punishment can undermine or strengthen the deterrent effects stemming from the severity or celerity of punishment.

There are two aspects of the certainty of punishment: the certainty of apprehension and the certainty of sanctions. First, the certainty of apprehension is based on the likelihood of a

person being detected while committing the offense or being identified after the offense has been committed. Second, the certainty of sanctions is based on the likelihood of an offender being convicted and sentenced to some form of punishment for committing a crime. As a per se law, the likelihood of being found guilty and subsequently punished for a DUI offense is generally high and invariant in DUI cases. Prosecutorial and judicial discretion do allow for some uncertainty as to the type of sanction that is imposed. Judges often have a choice between sanctions (e.g., jail versus probation), but all DUI offenders are likely to face some form of punishment. The use of scientific breath tests instead of clinical observation or witness reports maximizes the certainty of punishment for these offenses.

Given the nature of per se DUI laws, an offender's perception of the certainty of punishment should be informed primarily by the likelihood that he/she will be apprehended while driving under the influence of drugs or alcohol. Apprehension of DUI offenders depends on whether or not they are identified by a law enforcement officer while driving. Additionally, these certainty effects are a function of an offender's perception of his/her risk of apprehension rather than the actual, objective risk of apprehension.

Exact probabilities of an arrest for driving under the influence are not possible to obtain; however, self-report surveys have produced several estimates of the likelihood of arrest by comparing official arrest records to the number of reported impaired driving episodes. Results from these studies have been inconsistent. A self-report study of adults in Michigan estimated that the probability of arrest was 1 in 250 (Anda, Remington, and Williamson, 1986). This study used a random telephone survey of 1,492 adults to estimate the number of alcohol-impaired driving episodes in a given month and compared the results to official police data on arrests for DUI in the same month. A different study found that the probability of arrest is closer to 1 in 82

(Liu et al, 1997). Also a telephone self-report study, this second survey used a stratified sample in 49 states and the District of Columbia (Wyoming was excluded) to obtain representative estimates within each state. State estimates were then aggregated to provide national averages. This study found significant variation between states in the rates of driving under the influence. Michigan was found to have the fourth highest rate of alcohol-impaired driving episodes per 1000 persons, which may explain the inconsistency in the estimates of the probability for arrest between these two studies. The nationwide survey presents a more valid representation of the overall likelihood of arrest, but also indicates the need to consider differences in jurisdiction in the study of DUI offenses. Inherent jurisdictional differences undermine the generalizability of more localized research designs.

One might expect that DUI offenders are more certain to be identified if they are involved in an accident, merely because of the increased necessity for an interaction with the police; however, statistics indicate that this certainty is undermined by the frequent failure of officers to test for alcohol or drug impairment. Reports released from the National Transportation Safety Board (2013) indicate that roughly 72 percent of drivers in crashes reported to the police in 2011 were not tested for alcohol. Individuals driving under the influence may not be identified, apprehended, and punished, even if they are involved in a crash. It is clear from these statistics that the identification and apprehension of DUI offenders is not certain.

Prior research on the certainty component of deterrence for DUI offenses has focused on police practices such as sobriety checkpoints and enforcement crackdowns (see Ross, 1984); some of these studies find that such police practices can serve as a deterrent to DUI offenders by increasing the certainty of being identified. For example, following the implementation of the

British Road Safety Act of 1967, Ross (1977) found a significant reduction of crashes involving impaired drivers following the “breathalyzer blitz” – a campaign in which the Cheshire Constabulary eliminated police discretion and mandated breathalyzer tests for all moving offenses and accidents. Comparing the monthly crash rates over two years, the study showed a significant drop in accidents during “drinking hours” (10 p.m. to 4 a.m.) but an increase in crashes during non-drinking hours. The use of time-series data allowed the authors to conclude that the reduction in crashes was a result of the perceived increase in certainty of arrest for driving under the influence.

To understand how police practices might change the behavior of DUI offenders, Mercer (1985) analyzed changes in DUI arrest rates and impaired-driver involved crashes following the implementation of police road checks in British Columbia. This study used a time series analysis over 79 months to compare the number of alcohol related fatality accidents, the number of DUI charges in each month, the number of road checks operated by police each month, and the number of DUI-related newspaper and magazine articles published in the jurisdiction per month. The study compared increases in widely publicized police detection processes that occur every year at Christmas to a similar police campaign conducted in April and May for which media coverage was not widely available.

This study highlights the importance of public awareness and subsequent effects on individuals’ subjective perceptions of the risk of arrest, rather than objective changes in the probability of arrest. The study found that the actual number of road checks had an effect on DUI incidents only when media coverage of the policy changes simultaneously increased. While the Christmas blitz reduced rates of DUI-related fatality accidents to the lowest of the year, the mid-year blitz, which involved the exact same police techniques but no substantial media

coverage, did not have the same effect. The lack of media coverage undermined the perceptual shift in certainty by potential offenders. That is, awareness about the increased road checks was necessary for potential offenders to believe they were more likely to be identified on the road, even though their objective risk of identification increased under both campaigns. This study highlights the importance of perception, rather than the actual certainty of arrest.

Even when programs are found to be successful, research consistently indicates that the reductions in DUI offenses and DUI-related accidents tend to decrease following more extensive policing operations, but the decrease is almost always temporary (Ross, 1984). After a reviewing the studies available, Ross concluded that no long-term deterrent effect has ever been demonstrated for DUI laws. Studies of legal changes in countries such as England and Wales find that the deterrent effects generally last only a few months (Ross, 1977; 1984). Noted as one of the most successful overhauls of police practices concerning DUI offenses, the breathalyzer blitz effects were not sustained longer than one month after the experimental crackdown (Ross, 1977). Mercer's (1985) analysis of Christmas and mid-year crackdowns showed similar, temporary reductions in DUI related offenses. These studies call into question the effectiveness of general deterrence policies, and provide no explanation for why the effects that are found are only temporary.

Disconfirmations

A possible explanation for the lack of long-term deterrent effects from changes in police policies is individuals' continued exposure to disconfirmations. Even if changes in police practices increase a person's fear of being apprehended for a DUI offense, the fear decreases as the risk is disconfirmed through personal experiences. The perception of the risk of arrest decreases as offenders continuously get away with their criminal behavior undetected (Ross,

1984). As the previous statistics suggest, the objective probability of being detected while driving under the influence is relatively low. By some estimates, an individual may drive drunk 249 times before being identified and arrested. Even if an increase in police presence temporarily increases an individual's fear of arrest, repeated undetected violations of the law are likely to undermine the perceived certainty of arrest.

Inaccurate perceptions of the risks of arrest are exaggerated by the “not me” phenomenon. Psychologists have identified a general disconnect between one's perceived ability and his/her objective ability in a wide range of activities (see Zell and Krizan, 2014). More specifically, several studies assess the disassociation between perceived ability and actual ability for general driving skills. A study of male drivers in Canada compared participants' responses on a survey regarding their perception of risk and their confidence in their own driving ability, the driving abilities of other male drivers of a similar age, and the driving ability of male drivers older or younger than the respondent (Matthews and Moran, 1986). The study found that young drivers perceive lower accident risk for themselves compared to other young drivers, particularly in situations that necessitate quick reflexes or superior vehicle-handling skills. Although young drivers were found to have the greatest objective risk, they rated themselves as having significantly lower risk of accidents and greater driving abilities than their peers and older drivers. This study provided evidence that individuals may have accurate perceptions of risk for other persons in their peer group, but tend to overestimate their own capabilities and consider themselves to be an exception to the general trend. The study also found that older drivers have more accurate perceptions of driving risks than younger drivers. These patterns suggest that increases in driving experience result in better estimates of abilities and more accurate perceptions of objective risks.

Another study assessed female and male drivers in France (Delhomme, 1991). This study did not ask individuals to compare themselves to other drivers in their age group, but rather to the driving population in general. The study found that, in general, individuals believe that they are better drivers than the rest of the driving population. This study also asked specifically about respondents' conformity to driving regulations. Respondents, on average, believe that they commit fewer offenses than other drivers.

Overall, these studies find that drivers generally underestimate the effects of risky driving behaviors, such as speeding, and consider themselves to be immune from such risks. Young drivers are especially likely to overestimate their driving abilities. While these studies do not assess perceptions of the ability to safely drive under the influence, the same self-biases likely apply to impaired driving situations. While offenders may believe that driving under the influence is generally a risky behavior, they view themselves as "better than the rest" and immune from the potential negative outcomes, particularly if they have safely completed impaired-driving trips in the past.

Individuals' past performances with a given task are particularly important for the development of self-perceptions of their abilities (Zell and Krizan, 2014). The individuals who drive under the influence, without accident and undetected by police, are likely to overestimate their own ability to drive safely under the influence. Without an event to prove otherwise, individuals continuously affirm their self-bias with each successful (i.e. lack of identification by police and lack of vehicular accidents) DUI venture. Similarly, rational choice theorists discuss this distortion as an effect of "bounded rationality" (Kahneman, 2003). Bounded rationality theories assume that individuals are constrained in their perceptions of potential costs and benefits and make decisions based on their subjective perspective, rather than objective reality.

Associations of costs and benefits of a particular behavior are strongly shaped by individuals experiences. These experiences determine what offenders believe is a likely outcome that may result from their behaviors.

The previous theories suggest that for some offenders, an arrest may be the only successful type of deterrent. It is likely that offenders underestimate the likelihood of being arrested and overestimate their ability to drive under the influence, resulting in the belief that being arrested for a DUI is a mere chance event (Shanahan and Porfeli, 2007). Most law enforcement policies (such as random breathalyzer tests or increased penalties) do little to challenge the self-bias by individual offenders have. Alternatively, the act of being arrested disconfirms a person's distorted perception of his/her own abilities. Experiencing an arrest causes individuals to question previously established beliefs about immunity from detection, stimulating a reform in behaviors. Studies focusing on the differential effects of sentencing practices such as jail and probation do not test the deterrent effects that result from the initial arrest.

The underlying mechanism for why arrest might deter DUI offenders has not been tested directly. However, a study of male drunk drivers in Sweden from 1976 to 1979 used behavioral econometric models based on official records to analyze changes in objective and subjective probabilities of arrest for first time and repeat DUI offenders (Shapiro and Votey, 1984). These data suggest that most individuals who were arrested experienced an increase in their subjective probability of being arrested again in the future and did not recidivate. The behavioral models were based on the assumption of rationality, and the ability of the models to predict behavior for a majority of offenders suggests that DUI offenders are rational actors. A small group of offenders did not follow the patterns established by the econometric models and committed

additional DUI offenses following their arrest. These repeat offenders may have an underlying alcohol problem that causes them to behave irrationally when under the influence of drugs or alcohol. These findings suggest that arresting a DUI offender is the best way to deter future behavior. These deterrent effects appear to be independent of the severity of punishment, but it is possible that these arrest experiences are also necessary to bolster severity of punishment effects by exposing individuals to the penalties associated with the offense.

Severity

Severity of punishment focuses on the type of sanctions imposed, such as incarceration, community supervision, and fines. Beccaria (1764/1963) notes that punishment must be severe enough to overcome the potential benefits that may be achieved from engaging in illegal activity. The appropriateness of the severity of punishment depends on the particular crime. Deterrence theories generally rest on a proportionality assumption, that is, that the punishment is equal to the harm done. To meet this assumption, punishments must provide enough disincentives to prevent individuals from engaging in criminal activity, but must not be so severe that they are considered unjust, leading to defiance (Sherman, 1993).

Sanctions for criminal behavior are intended to serve two purposes: (1) to prevent individuals from committing additional crimes in society and (2) to prevent others from engaging in similar criminal behavior (Beccaria, 1764/1963). To achieve these goals, Beccaria notes, “Such punishments, therefore, and such a mode of inflicting them, ought to be chosen, as will make the strongest and most lasting impressions on the minds of others, with the least torment to the body of the criminal.” (p. 27). Thus, the severity of punishment must take into account the harm done to the victim and the incentives or rewards gained by the offender as a result of the illegal behavior.

While punishment (e.g., economic sanctions, incarceration, and license suspension) serves as a disincentive to an individual committing a crime, the uncertainty of being caught could undermine the effectiveness of severe sanctions in preventing behavior. Thus, deterrence theory rests on a balance between the three components of punishment in order to be an effective sentencing policy. In instances where punishment is less certain, the uncertainty must be balanced by severity in order to deter potential offenders (Akers & Seller, 2009). Considering the significant uncertainty of apprehension for DUI offenders, it follows that severe punishments would be desired. At the same time, punishments must not be so severe that they are viewed as unjust and foster defiance or resentment toward the criminal justice system (Sherman, 1993) introducing an interesting paradox for writing DUI sentencing laws.

DUI offenses generally fall into one of two extremes. They may either be victimless crimes that result in the safe arrival of the offender at the intended destination, or they may result in the injury or death of the impaired driver, drivers and passengers in other vehicles, or pedestrians. Proponents of harsher sentences for DUI offenses tend to focus on the latter group and the seemingly grave risk to those involved in DUI accidents; however, the overall fatality rate from DUI offenses is relatively low given the base rate of the miles of impaired driving in the United States (Bergen, Shults, and Rudd, 2011).

Studies also find that a majority of those killed in impaired driving accidents are the drivers, those who willingly enter the vehicle being driven by someone they know is impaired, or those who are at a higher risk because they themselves are drunk (Fell and Nash, 1989). These findings counter the argument that impaired drivers pose a significant risk to the general public, although they should not downplay the severity of a crime that claims the lives of roughly 10,000 individuals annually. These statistics do highlight the failure of retribution based approaches.

Since a majority of impaired driving incidents do not result in accidents or injury, severe punishments may not be as appropriate. The overuse of sanctions is obvious when DUI offenses are compared to similarly risk-increasing behaviors, such as speeding or failing to yield at a stop sign, which rarely result in more than a traffic citation.

Studies of DUI offenders and sentencing typically test the individual effect of one form of punishment compared to another. The types of punishment available for DUI offenders varies significantly from mandatory jail sentences at one end, to probation, license suspension, and economic sanctions at the other end (see Ross, 1984, and Nichols and Ross, 1989).

Jail Sentences

Despite the organizational pressure to increase the severity of sanctions for DUI offenders, the effectiveness of these sanctions is largely unfounded. Research on sanctions for DUI offenders has focused largely on the imposition of mandatory jail sentences. Studies have produced conflicting findings on the effects of incarceration; studies have found partial support for deterrence (Weinrath and Gartrell, 2001), null effects (Martin, Annan, and Forst, 1993; Wagenaar, et al, 2007), and counter-productive effects (Homel, 1981; Salzberg and Paulsrude, 1983). For first time offenders, studies have found little to no effect for jail sentences (Blumenthal & Ross, 1973).

Studies that find support for jail sentences generally limit their samples to populations of drunk drivers who were sentenced to incarceration. Additionally, the rarity of jail sentences for first time offenders limits analysis of incarceration largely to repeat offenders. For example, Weinrath and Gartrell (2001) analyzed 514 incarcerated DUI offenders in Alberta and found that incarceration sentences longer than 5 months resulted in less recidivism than sentences of 4 months or less. There was no control group of offenders not sentenced to jail, and the sample

consisted of older, chronic DUI offenders (the average number of prior DUI convictions was 3). In addition, more than half of the sample had prior criminal convictions for predatory offenses, suggesting that the sample is not generalizable to the entire DUI population.

Other studies have compared the effects of different sentencing options for DUI offenders, concluding that jail sentences are not more effective than alternatives. A study on alternatives to incarceration in Ohio found no statistically significant differences between the recidivism rate of offenders sentenced to a short jail sentence (2-3 days), placement in a residential, weekend intervention program, or a suspended sentence and fine (Siegal, 1985). The study did find statistically significant differences in the characteristics of the offenders sentenced to the three sentencing alternatives (e.g., prior criminal history and BAC at the time of the offense), and the lack of controls for selection effects on these characteristics may have distorted the findings. There was minimal support for the weekend intervention programs being a better deterrent than jail and suspended sentences.

Supporting the belief that sanctions for DUI offenders are too severe, multiple studies analyzing jail sentences have found that incarceration is counter-productive to rehabilitating DUI offenders. In a study of 1,000 DUI offenders in New South Wales, data showed that, after controlling for individual offender characteristics, severity of punishment had no effect on reconviction rates (Homel, 1981). Although not statistically significant, the study did find that offenders sentenced to three months or more of incarceration offended at almost three times the rate of offenders sentenced to less than three months (Homel, 1981). These offenders were all repeat offenders who were also involved in other criminal activity which may confound their high recidivism rates. In another study the imposition of mandatory jail sentences for first and subsequent DUI offenders in the state of Washington found that recidivism actually increased as

a result of severe punishments (Salzberg and Paulsrude, 1983). Finally, several studies have found that judges oppose mandatory jail sentences for DUI offenders and have refused to convict offenders in order to avoid the imposition of these mandatory sentences (Ross, 1984).

Overall, these studies suggest that there is only limited, if any, support for incarcerating DUI offenders. The support that does exist for jail sentences indicates that they may be as effective at deterrence as other sanctions, but are probably not better than other sanctions. Given the lack of a unique benefit from incarceration, other cost and resource effective types of punishment may be more beneficial for use with DUI offenders.

Probation

The most common form of punishment for DUI offenders is probation. Even offenders sentenced to mandatory jail sentences are likely to receive periods of probation following their incarceration. Studies have found probation to be as effective as, or more effective than, incarceration sentences in reducing future recidivism (Homel, 1981). However, due to the general lack of variance in sanctions imposed on DUI offenders (i.e., almost all offenders serve some probation as a part of their sentence), little is known about the effectiveness of probation as a sole sanction as compared to other sentences, such as license suspension or economic sanctions.

Economic Sanctions

The imposition of fines, fees, and restitution may be a more effective form of punishment for DUI offenders than for other types of offenders, because license suspension provides an added incentive for offenders to pay their economic sanctions. Generally, offenders are unable to reinstate their license if economic sanction payments are outstanding. Tentative support for a

deterrent effect of fines has been found among repeat DUI offenders, but not for first time DUI offenders (Homel, 1981).

In a study of DUI offenders in New York, Yu (1994) found that economic sanctions (specifically fines) had an independent, negative effect on the probability of committing another DUI offense. Similar effects were not found for license suspensions. The author posited that the economic sanctions effect is due to the inescapable financial burden caused by fines. Other forms of punishment, such as license revocation, can be evaded (e.g., offenders can drive without a valid license), but economic sanctions are less easily avoided. Additionally, the author suggests that these effects reflect inherent differences between *mandatory* license suspensions, which are not associated with offense severity (i.e., higher BACs are equal to low BACs), and *discretionary* increases in fines, which are often tied to DUI seriousness. Finally, many states require that payments of economic sanctions be completed before a person's license can be reinstated, meaning that nonpayment is less often an option for DUI offenses.

Licenses are needed for access to a variety of social services (e.g., applying for a library card, picking up medical prescriptions, opening a bank account, and, in some states, voting). Thus, even if individuals are able to evade the immediate consequences of license suspension by driving without a license, it is likely that they will eventually need a valid license for other purposes.

Economic sanctions should also be more likely to be paid when additional, non-ID related incentives are associated with payment, such as being able to expunge a criminal record. Research has not evaluated the effectiveness of these sanctions in the context of other forms of punishment.

License Suspension

Additional evidence for a specific deterrent effect has been found in studies focusing on the license suspension of convicted DUI offenders. However, like most studies on DUI offenders, the findings are inconclusive, although meta-analysis of studies conducted between 1972 and 1984 concludes that license suspensions are the most effective form of punishment for DUI offenders (Peck, Sadler, and Perrine, 1985).

Other research has found that the studies purporting to find support for license suspensions may be misleading. The largest question with license revocation is whether or not offenders actually stop driving. Using different dependent variables and different data sources, studies have found that license suspension may not actually deter individuals from driving. Ross and Gonzalez (1988) interviewed 71 offenders convicted of a DUI offense and found that a significant portion of offenders continued to drive after their license was suspended. Although the license suspension did not have an effect on future criminality (driving with a suspended license is itself a criminal offense), it did appear to have an effect on risky driving behaviors. The authors found that offenders drove less often and more cautiously than prior to their conviction, reducing the risk of accidents. The finding may be of potential value, but the study's results are limited by the small sample size and the failure to control for environmental factors like access to public transportation.

While some studies have found limited support for license suspension on driving behaviors, the effects are heterogeneous across samples and length of license revocation. Locations vary on the temporal length of license suspension, making it difficult to synthesize findings in the literature. For example, a study of 845 convicted DUI offenders in New South Wales found that the length of license suspension influences the relationship with recidivism

(Homel, 1981). Short periods of license disqualification (less than 2 months) were found to increase recidivism, particularly for non-DUI vehicle related offenses (such as speeding and reckless driving). There was no effect of license disqualification on offender recidivism when the period of disqualification was longer (up to five years), most likely because of the small sample size. These findings suggest the need for additional studies using different samples of DUI offenders and comparing different lengths of license suspensions.

Within a rational choice framework, the cost of losing one's license for a period of time, the financial burden of economic sanctions, and potential incarceration are almost certainly greater than the cost of a cab or the sacrifice of a drink or two when at a bar. The question then remains as to why increases in the severity of sanctions have failed to yield consistent decreases in DUI offenses. A potential explanation for the inconsistent findings is that the sanctions are actually *too* severe, which, combined with the lack of certainty of apprehension, undermine their effectiveness as deterrents. Alternative approaches to sentencing that seek to reintegrate offenders, rather than shame and exclude them, may provide a more balanced and effective deterrent response to DUI crimes.

Reintegrative Sanctions

Deterrence theory has been widely applied to justify changes in legal sanctions; however, costs associated with the commission of a crime are not always limited to formal legal sanctions. Shaming from peers and the exclusion from conventional roles due to the stigma associated with a criminal label are two examples of informal sanctions that can result from criminal behavior. Shame is not necessarily reliant on strict, formal, legal punishments. The theory of reintegrative shaming presents an alternative theoretical explanation for how the criminal justice system influences the likelihood of recidivism among DUI offenders.

Braithwaite (2001) distinguished two approaches to punishing criminals: stigmatizing shaming sanctions and reintegrative shaming sanctions. Stigmatizing shaming focuses on the individual and is associated with the labeling of an individual as a “bad person” (p. 4).

Alternatively, reintegrative shaming focuses on the act rather than the person. Additionally, reintegrative shaming emphasizes treating offenders with respect and working to reintegrate individuals into the community following their punishment.

Reintegrative shaming closely aligns with traditions in restorative justice. Restorative justice proposes that justice should be used to heal society from criminal wrongdoings.

Restorative justice is not meant to hurt the offender. This theory of justice stands in opposition to philosophies of just deserts. Similarly, reintegrative shaming focuses on ways to express disapproval for individual wrongdoings, but to then reconnect offenders to society rather than stigmatizing and excluding them.

In the initial development of the theory, Braithwaite (1989) posited that reintegrative shaming prevents crime while stigmatizing shaming causes crime. Reintegrative sanctions promote self-reform while stigmatizing shaming promotes the development of criminal subcultures. Criminal labels exclude individuals from society, blocking access to legitimate opportunities. This exclusion perpetuates individuals’ reliance on criminal subcultures, promoting criminal behaviors as an alternative to legitimate opportunities. Braithwaite (1989) makes a specific distinction between those types of shaming that allow individuals to reintegrate and strengthen social bonds, and those that knife-off opportunities and exclude individuals from society. Similarly, Laub and Sampson (2003) emphasize, “We need to take into account the potential negative effects of sanctioning in forestalling desistance, along with factors that facilitate offender reintegration” (p. 291).

Reintegrative shaming draws heavily from labeling theories. Reintegrative shaming seeks to identify a specific act as bad, rather than labeling a person holistically bad. Stigmatizing shaming includes labels that speak to a person's whole self as bad (e.g., criminal). This type of shaming leads to the development of a master status, overwhelming other identities.

Alternatively, reintegrative shaming emphasizes that offenders are, in general, good people who committed a bad act. These approaches highlight offenders' rehabilitative potential rather than categorizing them as permanent criminals. In addition, these approaches allow offenders to redefine their identity and sever themselves from their criminal past (Braithwaite, 2001).

Braithwaite (2001) emphasized the importance of these labels not only for how offenders identify themselves, but also for how they are defined and treated by members of society.

An important aspect of reintegrative shaming theories is the resolution or discharge of shame. Specifically, the theory calls for processes that "terminate disapproval with rituals of forgiveness or reconciliation" (Braithwaite, 2001:39). These rituals allow individuals to maintain relations with the greater community and serve as a form of community reentry. These rituals are absent with stigmatizing shaming. Erikson (1962) discussed this phenomenon in court systems. He argued that the traditional court system and sanctioning processes are destructive because they ceremoniously label individuals as deviant or criminals, but do not ceremoniously decertify individuals. This negative labeling, he argued, leads to marginalization of individuals who carry the court appointed label of criminal.

DUI offenders are unique in their post-conviction experience from other misdemeanor offenders. Not only are they faced with the standard criminal label, but they may be under additional scrutiny due to the type of offense committed. License suspensions limit employment opportunities due to restricted mobility, DUI convictions place limitations on the type of jobs

they are eligible for (i.e., they often cannot apply for jobs that include any driving responsibilities), and having a DUI conviction may signal to employers that the individuals have an underlying drinking problem that could interfere with employment responsibilities.

Absent ceremonies to discharge criminal labels, individuals are faced with unresolved shame, which leads to exclusion from legitimate community opportunities. Additionally, studies of restorative justice court alternatives for drunk-drivers and bullying among Australian school students have found that unresolved shame is correlated with higher levels of anger and hostility (Harris, 2001; Ahmed, 2001). These negative emotions may influence future criminal or deviant behaviors, although this possible effect has not been studied in the context of DUI offenders.

In addition to providing a criminal master status that results in numerous negative effects, stigmatizing sanctions can lead to persistence in criminal careers because they lead to defiance. Defiance theory (Sherman, 1993) posits that offenders will continue engaging in criminal behavior if they perceive sanctions or sanctioning authorities to be illegitimate. This defiant behavior is particularly common when offenders have weak ties to the community. Such offenders deny shame from their criminal justice involvement and choose not to engage in self-reform following their apprehension and punishment.

One of the factors that reduces defiance is the perceived legitimacy of authority, which, in turn, is based largely on perceptions of procedural justice. Two critical aspects of procedural justice are consistency and impartiality, which are undermined if the law treats similar individuals differently (Tyler, 1990). Perceptions of inconsistency and bias are particularly likely when drastically different sentencing options are imposed for the same crime. In the case of DUI offenders, individuals may be sentenced to a guilty conviction, resulting in a permanent criminal label, or they may be granted the ability to participate in diversionary programs and

thereby expunge any potential criminal record. Offenders sentenced to a guilty conviction may feel that they too deserve a second chance and that the system is biased against them.

Punishments that are perceived as fair and procedurally just produce shame (either reintegrative or stigmatizing), which operates through external and internal forces (Harris, 2001). Unlike deterrence theories, the success of reintegrative sanctions is not reliant on severe punishments, but rather, on the effective communication of disapproval of the offenders' actions (Braithwaite, 2001; Harris, 2001). Externally, offenders may feel shame due to fear of rejection by others. These others may criticize the individual who committed the crime, or they may or completely withdraw approval. Withdrawal is more likely when individuals are given an outcast identity such as criminal. Internally, individuals may feel shame or a decrease in self-respect as a result of violating their own expectations for their behavior. Reintegrative shaming allows for a resolution of a person's perception that he/she has violated some social or ethical norm, while stigmatization perpetuates these feelings of shame and failure.

Internal feelings of shame or norm violations facilitate a type of social control. In discussions of obedience to social standards, Mead (1937) proposed that shame might function as a form of internal social control without the need for active shaming (i.e., a permanent criminal label). In these instances, it is merely the *fear* of disapproval by others that is often enough to convince individuals to conform to social standards.

While criminal labels are widely linked to social exclusions, the frequency with which individuals drive under the influence suggests social disapproval for this specific behavior is not as certain. Individuals likely do not fear disapproval from others for driving after having a few drinks. Instead, individuals may fear disapproval from others only if they end up with a criminal record for their behavior. This logic suggests that an initial arrest for driving under the influence

will make the fear of disapproval from others more salient, leading to self-reform. Thus, the fear of a criminal label and subsequent implications on social ties may act as a deterrent to recidivism, regardless of the severity of punishment.

One study has directly analyzed the effectiveness of reintegrative shaming for DUI offenders. Using a sample from the Reintegrative Shaming Experiments in Australia, Harris (2001) studied DUI offenders sentenced either in a formal court (the standard procedure) or through an alternative conferencing process. Because the conference alternative included education material such as videos to express the dangers of driving drunk, it was much longer (around 90 minutes) than the standard court processing (around 10 minutes). Conference programs also involved a more active role for offenders in discussions about their behavior and ways to avoid similar behaviors in the future. The experiment included 900 offenders over 3 years who were randomly assigned either to court or conferencing at the time of arrest. Offenders were observed during their time in court or conference and interviewed two to six weeks after the treatment.

The study found that stigmatization was higher for court cases, while reintegration was stronger for conference cases. Although these differences were statistically significant, the effects identified were small. The author suggested that the difficulty in finding strong effects was due to limited differences between court and conference proceedings, other than the length and inclusion of educational materials. Effects might be stronger if there were more significant differences in the treatment of the two groups beyond the court or conferencing process (e.g., if one group had a permanent label, while the other did not).

An important caveat to the findings in this study is that, independent of the method of criminal processing, offenders' perceptions about whether or not the behavior itself was wrong

were an important predictor of the effectiveness of sanctions. This finding suggests that, for some offenders, sanctions are not enough to change their behaviors because they do not believe that the behavior is a severe violation of social or ethical norms. That some offenders do not believe that driving under the influence is a serious offense may explain why small groups of offenders in DUI studies account for large proportions of DUI offenses, despite all punishment efforts.

This study took place in a judicial system and societal context (Australia) that may not be generalizable to the United States. It is not clear whether criminal labels operate similarly in Australia and the United States, or if criminal labels from cases that proceed to court operate differently from cases that are processed through the conferencing alternative. Additionally, the types of punishments associated with court cases were not detailed in the study. There is also a lack of research to indicate how social norms concerning driving under the influence differ between the two countries. The presence of large anti-DUI community organizations in the United States have probably established stronger social norms against driving under the influence in the United States than exist in other countries.

The study of the effectiveness of conference alternatives also relied on dependent variables that measured attitudes rather than behavior. For this study, there was no analysis of how reintegrative alternatives to traditional court process affect criminal behavior (i.e., recidivism). Absent an analysis of recidivism, this study is unable to test the hypothesis that reintegrative sanctions result in less criminal behavior than stigmatizing sanctions. Additional studies are needed to assess the use of alternative forms of punishment that are better able to test the theory of reintegrative shaming sanctions.

Contingent labeling effects

The effects of reintegrative and stigmatizing shaming may vary across different populations of offenders. The effects may be contingent on many factors, including the offender's demographics. In addition, an individual's ties to the community serve as a moderator for the effects of reintegrative shaming sanctions (Braithwaite, 2001). Two general theories dominate perspectives on the interaction of labeling effects and different offender populations: the cumulative disadvantage hypothesis and the more-to-lose hypothesis.

Regarding cumulative disadvantage, Laub and Sampson (2003) found that criminal justice involvement facilitates processes of being cut off from access to prosocial community bonds (i.e., employment, education, and marriage) and of increasing criminal behaviors. Their theory of cumulative disadvantage also posited that these effects are larger for individuals who experience other forms of disadvantage, such as those associated with being black. For this theory, each additional form of disadvantage stacks upon other existing forms of disadvantage, furthering marginalizing certain populations. Individuals with greater social status and ties to the community are more likely to have protective factors that can insulate them from the negative effects of criminal labels (Laub and Sampson, 2003; Sampson and Laub, 1997).

An alternative perspective, the more-to-lose hypothesis, has proposed that individuals with higher social status are more likely to be affected by negative labels (Chiricos et al., 2007). This perspective would suggest that a criminal label will have little to no impact on the recidivism of already disadvantaged populations, but would reduce the recidivism of advantaged populations because, individuals with more social status in the community and stronger social bonds are more likely to experience strong negative effects from an outcast label such as 'criminal.' Disadvantaged populations, by contrast, are less likely to experience additional

negative consequences with a criminal label because there is probably a ceiling effect on multiple forms of disadvantage. This is not to say that advantaged populations will end up recidivating more than the disadvantaged populations, but that the effect on the likelihood of recidivism will be greater for advantaged rather than disadvantaged populations.

Consistent with the more-to-lose perspective, Weinrath (1997) and Weinrath and Gartrell (2001) posited that the unique characteristics of DUI offenders make them overall more likely than predatory offenders to have stakes in conformity. In support of the hypothesis that they have greater stakes in conformity, research on DUI offenders has found that they are more likely than other offenders to be employed and married at the time of the offense, (DeMichele, Payne, and Lowe, 2013).

Contingent labeling effects are most commonly studied in the context of demographic characteristics. For example, the effects of labeling for DUI offenders may be contingent on gender. Shore and McCoy (1987) suggested that a DUI conviction may have more significant negative effects on social status for female than for male offenders, because drinking, and drinking and driving, represent a greater role violation for females than males. Despite the greater norm violations, their study found that women recidivate at a much lower rate than males overall, suggesting that arrest is a greater deterrent for female than male offenders. However, no gender comparisons of individuals who were arrested and not convicted were conducted.

Larger samples with greater variation in the treatment options imposed are necessary to test for the moderation implied by contingent labeling hypotheses. While there is little discussion, in general, regarding the mechanism which may influence the gender differences in recidivism, the theoretical explanation of the finding in this study is supportive of a more-to-lose hypothesis.

Research on non-DUI offenders has found that the negative effects of a criminal label are more strongly felt for women than for men (Chiricos et al., 2007). Using a sample of adult felons in Florida, one study analyzed the differences in recidivism for offenders adjudicated for a felony, and those in which their adjudication was withheld.⁴ People who did not get a permanent felony label were significantly less likely to recidivate compared to people who did get a label, and the effect was stronger for female offenders than for male offenders. This finding provides support for the hypothesis that females have greater stakes in conformity and in the social ties that may be affected by a criminal label, support consistent with the more-to-lose perspective.

Aside from gender, the effects of labeling may be contingent on race and ethnicity. A study in California found that different sentencing programs for DUI offenders had varying effects on different ethnic groups (Cherpitel and Bond, 2003). This study examined Mexican American and White DUI offenders and compared the effects of three conditions: (1) DUI arrests with no conviction, (2) DUI convictions with no program referral, and (3) a DUI conviction with a program referral. When offenders were arrested, but not convicted, the authors found rates of recidivism were higher for Whites than for Mexican Americans. In contrast, when offenders were arrested and convicted, Mexican Americans were more likely to recidivate than whites. Referral to a treatment program was not predictive of recidivism for either ethnic group. The authors suggested that Whites may perceive that the courts are more lenient on them, and that a conviction is necessary to convince them that there are serious consequences for their behavior. These findings suggest that the fear of being labeled a criminal is not enough of a deterrent for white offenders, but these patterns may operate differently for non-white offenders.

Additionally, these findings suggest that minority offenders, who are already more likely to

⁴ In Florida, judges may withhold adjudication of guilt for individuals found guilty of a felony and subsequently sentence them to probation. This process is similar to the Accelerated Rehabilitative Disposition in Pennsylvania.

experience disadvantage, are more negatively affected by a criminal label, providing support for the cumulative disadvantage hypothesis.

In contrast to this research, other studies have found that criminal labels have greater negative effects for whites than for minorities. The study of convicted felons in Florida also analyzed the effect of criminal labels on different racial and ethnic groups, and found that the effect of a felony adjudication was stronger for Whites than for blacks or Hispanics (Chiricos et al., 2007). Black and Hispanic offenders still recidivated at a higher rate than White offenders, but formal adjudication increased the rate of recidivism for Whites compared to when offenders had adjudication for a felony withheld. These findings suggest that there is a leveling off of the effect of a label on already disadvantaged populations, providing support for the more-to-lose hypothesis.

Research generally finds support for the cumulative disadvantage hypothesis, with one exception (see Chiricos et al., 2007); however, most research also tends to focus on predatory crimes and typical offender profiles (i.e., young, minority, male offenders). It is unclear from the available literature how social status and individual characteristics moderate the effect of punishment for DUI offenders, who are quite different from the typical offender. Additional research that analyzes the interactions between gender, race, and punishment is needed to understand the effectiveness of sanctions for different groups of DUI offenders. Because DUI offenders are more likely to have greater stakes in conformity than predatory offenders, analyses may be more likely to find support for the more-to-lose hypothesis.

The DUI Offender

Following a resurgence of risk assessment research and the use of these assessments at sentencing, recent literature has focused on categorizations of “one-time” and “chronic” DUI

offenders. Based on addiction literature that categorizes individuals as “social drinkers” and “chronic drinkers,” DeMichele, Payne, and Lowe (2013) attempted to develop a typology of DUI offenders based on a sample of DUI offenders on probation or parole. They found that chronic DUI offenders are more likely to be white, male, between 30 and 44 years old, and employed, to have low education, to have previously attended outpatient and mental health treatments, and to be generally unwilling to change their poor attitude about punishment and criminal justice interventions. This typology may be useful for describing DUI offenders, but it leaves open whether these characteristics are related to the effectiveness of different criminal justice intervention approaches.

Research analyzing individuals who drive under the influence tends, like the DeMichele et al. study, to use samples of convicted offenders obtained from official state databases. Decisions made at various steps of the criminal justice system (e.g., arrest, prosecution, and sentencing) may bias the demographic composition of these official records (Black, 1970). Alternative sources of information on the demographics of individuals who drink and drive include self report surveys and convenience samples from treatment facilities. Analysis of different samples, different time periods, and different methods suggests that the typology developed by DeMichele et al (2013) may not be generalizable.

Race

Testing the hypothesis that whites are more likely than non-whites to commit DUI's, a nationwide self-report survey analyzed rates of driving under the influence by racial and ethnic categories (Liu et al., 1997). Table 1 reports the number of incidents of alcohol-impaired driving, as well as the rate of incidents per 1,000 individuals within each racial group. This survey showed that white, non-Hispanic respondents were most likely to report a DUI episode,

and were similar to respondents from other minority groups. Black, non-Hispanic respondents were least likely to report a DUI episode. While Blacks do commit fewer DUI offenses than Whites, the gap appears to be narrower between white offenders and other minority groups. As a caveat, the racial differences in driving under the influence found in this study may vary from statistics derived from official arrest or conviction datasets due to racial differences in the likelihood of being arrested and convicted.

Table 1. Episodes of Alcohol-Impaired Driving

	No. of Incidents	Rate per 1,000 Population
White, non-Hispanic	103,565,712	693
Hispanic	8,785,254	577
Black, non-Hispanic	6,747,058	399
Other	3,964,232	656

Source: Liu et al., 1997

Although Whites are more likely than minorities to commit DUI offenses, in general, patterns across racial groups may differ based on the racial composition of a particular sample or region in the country. For example, studies of California have found high rates of driving under the influence among Mexican American populations (Cherpitel and Bond, 2003), but these patterns may not be found in northern regions with smaller populations of Mexican Americans.

Gender

An additional source of information concerning DUI offenders comes from treatment facilities in which prior or current offenders may be receiving treatment for alcohol or drug dependence. A disadvantage of these samples is that they are limited to convenience samples,

and selection bias may undermine the generalizability of these results. However, because access to alcohol and substance dependency information for DUI offenders is limited, such convenience samples are necessary for understanding differences in levels of addiction. Analysis of data from offenders in treatment has allowed researchers to better unpack gender differences in DUI offenses.

Patterns of drug and alcohol use among DUI offenders varies, with research suggesting that females are more likely to be diagnosed with drug dependence (such as sedatives or opiates), while males are more likely to be diagnosed with alcohol and marijuana dependency (Maxwell, 2012). Additionally, female DUI offenders have been found to have higher rates of psychological disorders, such as anxiety, depression, and post-traumatic stress disorder, which may underlie their initial decision to drink or use drugs (Laplante et al., 2008).

Males commit more crime than females (Steffensmeier and Allan, 1996). DUI offenses are no exception to the gender gap in crime, although general trends in the gender gap among DUI offenders have changed over time. A study of arrests from 1984 to 2004 found that the gender gap narrowed for DUI offenders (Schwartz, 2008); however, the change in the gender gap most likely reflects an increasing overrepresentation of females in arrest statistics, rather than a true increase in DUI offending. Schwartz (2008) analyzed rates of DUI offending by males and females over a 20-year time frame using three different sources of data. Female arrest rates, according to the UCR, increased over the observed time period. However, the rates of females driving under the influence according to self-report surveys and the rates of females involved in fatal traffic accidents reported in the fatality analysis reporting system showed no change relative to males. The author suggests that these changes were a result of legal changes in the maximum BAC levels, which inadvertently increased the percent of females arrested for DUI, and not an

increase in the frequency of females driving under the influence (Schwartz, 2008). It is highly possible that changes in the legal definition of driving under the influence resulted in a net widening, creating the appearance of a demographic change in the population of DUI offenders.

Overall trends do suggest that males are more likely than females to be DUI offenders, but nuances in these patterns may exist. More analyses using diverse sources of data are necessary to confirm previously established patterns relating gender and DUI offending.

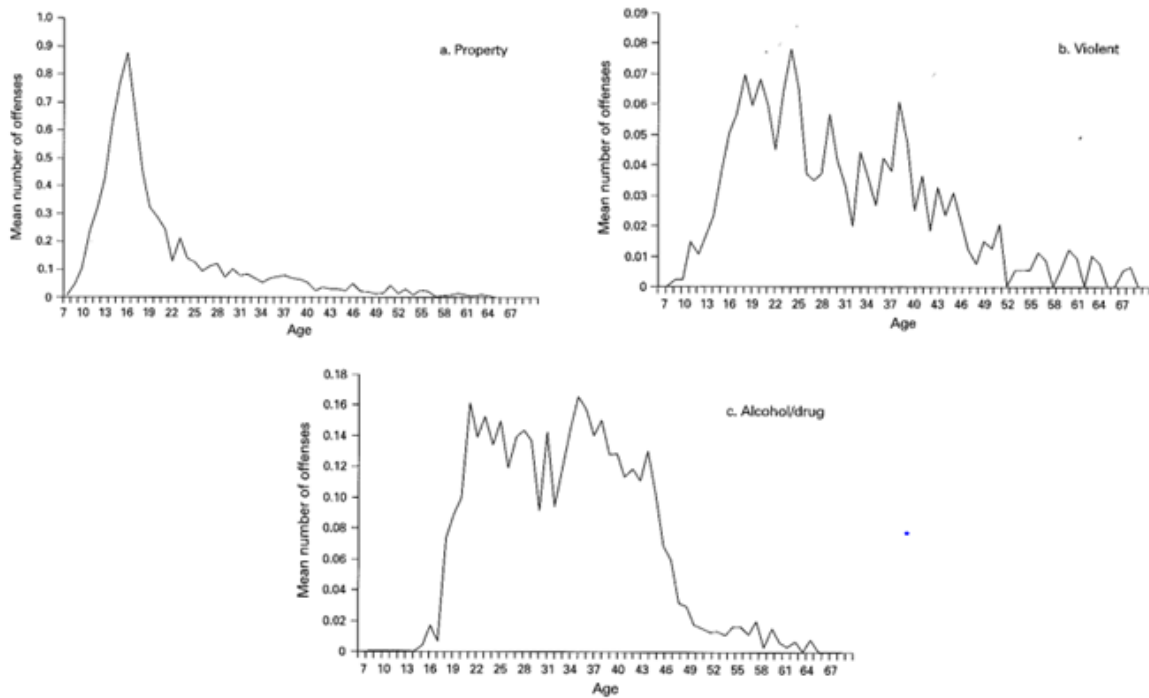
Age

The age-crime curve suggests that the likelihood of engaging in criminal behaviors peaks in early adolescence and declines rapidly with age (Greenberg, 1985; Farrington, 1986; Laub and Sampson, 2003). Although support for the age crime curve has been found across multiple datasets, methods, and geographic locations, variations in the peak and rate of decline have been found to vary by crime type (Steffensmeier et al., 1989). While age is often included in studies as a control variable, it is rarely the primary independent variable in studies of judicial decision-making.

As noted previously, DUI offenders exhibit characteristics that are not consistent with the general offending population. And, reflective of that uniqueness, research on the age-crime curve suggests that DUI offenders peak later, with more middle-aged offenders than most property or personal crimes (Steffensmeier et al., 1989). A study analyzing multiple types of crime using data from the 1980 Uniform Crime Reports found that the median age for driving under the influence was 33, lower only than gambling, and public drunkenness (Steffensmeier et al., 1989). The rate of decline was also slower than for many crimes, resulting in a flatter age-crime curve. The gradual decline in the DUI age crime curve may actually be caused by a secondary peak in offending in older ages.

Similarly, a review of offenders from the Glueck study found that drug and alcohol offenses, in general, remained relatively stable for offenders between the ages of 20 and 47 (Laub and Sampson, 2003). Figure 1 illustrates the rate of offenses by age from the Glueck data for property, violent, and alcohol offenses. The trends in the rate of offending by offense type were found to greatly vary, with the rate of alcohol crimes remaining relatively stable for longer periods of time.

Figure 1. Mean Number of Property, Violent, and Alcohol/Drug Offenses by Age



Source: Laub and Sampson, 2003

A problem with the DUI literature is a general inconsistency in the way that age is operationalized across different studies. A significant proportion of studies categorize age into different groupings of young, middle aged, and older offenders, although the thresholds for these categories vary (Liu et al., 1997). Some studies include age as a linear term (Marowitz, 1998; Homel, 1981), while others include age as a curvilinear term (Shapiro and Votey, 1984). These

inconsistencies make it difficult to firmly establish patterns for the relationship between age, driving under the influence, and recidivism.

Based on national self-report data, one study found nearly 10% of alcohol-impaired driving episodes were among individuals between 18 and 20 years of age (Liu et al., 1997). Individuals between the ages of 21 and 34 reported the most frequent number of alcohol-impaired driving episodes (Liu et al., 1997). The rate of driving under the influence declined with age, following the peak in young adulthood (Liu et al., 1997). Unfortunately, this nationwide survey grouped age into four categories (18-20, 21-34, 35-54, >55) making it difficult to identify a possible secondary peak among middle-aged offenders.

In contrast, research using three categories of age found that offenders in the middle group were most likely to commit DUIs, with rates of offending relatively similar to those of young adults. Shapiro and Votey (1984) found that offenders between age 26 and 55 were the most likely to drive drunk. Specifically, this group of offenders was 1.2 percent more likely to drive impaired than individuals 25 and younger, and 4.7 percent more likely to drive impaired than individuals over the age of 55 (Shapiro and Votey, 1984). This finding is largely supportive of general trends found in the age-crime curve for DUI offenders.

It is clear that age affects DUI offenders in a unique way. DUI offenders are older than the general population, and the decrease in the probability of offending is more gradual for DUI offenses. Problems still remain with regard to consistent measurement of age, undermining the ability to general generalizable conclusions.

DUI Offenders and Sentencing

While it is likely that judges' sentencing decisions are based largely on legal factors, there is some indication that demographic characteristics have some effect on the sentencing of

DUI offenders. Additionally, the selection of different types of offenders into various punishment outcomes may affect the findings of studies that evaluate the effectiveness of various treatment options. The following is a review of existing literature concerning the sentencing of DUI offenders and general sentencing patterns established in the criminological literature.

Race

Racial disparities at sentencing are well researched in the general criminological literature; but the literature on racial disparities for DUI offenders is limited. Most of the sentencing literature that analyzes racial disparities focuses on the different sentencing outcomes among black and white offender populations. Controlling for legal variables, studies consistently find that blacks are sentenced to more harsh punishments than white offenders (Spohn, 1990; Spohn Gruhl, and Welch, 1981).

Using a focal concerns theoretical framework, Steffensmeier et al. (1998) posits that blacks are sentenced to harsher sentences due to stereotypes about different racial groups. Because Blacks are perceived as more dangerous and more likely to recidivate, they are more likely than Whites to be sentenced to prison.

A study by Steen, Engen, and Gainy (2005) confirmed these findings. Using interviews with court actors (judges, prosecutors, and defense attorneys), Steen et al (2005) found that judges use stereotypes about racial groups to justify harsher penalties against minority offenders than white offenders.

These patterns of racial disparity are also seen among studies analyzing DUI offenders. Cherpitel and Bond (2003) found that Mexican Americans were significantly more likely than whites to be convicted of a DUI offense but less likely than whites to be referred to a DUI treatment program, a pattern suggesting that Mexican Americans are perceived as having less

rehabilitative potential than Whites. While the authors conclude that Mexican Americans are less likely to be sentenced to treatment programs, they also found that Mexican Americans were more likely to have a prior DUI conviction. It may be that the racial differences in sentencing are actually reflective of differences in criminal history. Other research on general offending population suggests that racial differences in sentencing may be largely mediated by differences in prior conviction records, indicating the need for adequate control measures of prior criminal history to understand the unique relationship between race and sentencing (Frase, 2009).

Gender

Males are likely to receive significantly harsher punishments than female offenders, in terms of both the likelihood of an incarceration sentence and the length of incarceration (Doerner and Demuth, 2009; Steffensmeier et al., 1998; Feldmeyer and Ulmer, 2011). The influence of gender on sentencing decisions has been found to be stronger than other extra-legal variables, such as race, as well as legal variables, such as trial disposition (Steffensmeier et al., 1998; Feldmeyer and Ulmer, 2011).

Gender disparities at sentencing are premised on gender stereotypes about criminal behavior. Research suggests that females are significantly less likely to engage in criminal behavior and, when they do, they are more likely to participate as an accomplice to males (Steffensmeier and Allan, 1996). Research on gender and crime has found that the gender gap narrows for less serious types of crime.

Individual differences between men and women also mediate the gender gap. Although males and females are equally influenced by risk, females' risk taking is typically less violative of the law. Females are generally more protective of relationships and emotional commitments,

resulting in fewer risk-taking behaviors, while males are more likely to take risks for status or competitive advantage.

Few studies have analyzed the effect of gender on sentencing decisions for DUI offenders, although gender is universally included as a covariate in recidivism analyses. Because males are overwhelmingly more likely than females to drive under the influence (MacDonald and Mann, 1996; Yu, 1994), judges are probably more likely to view female DUI offenders as less likely to recidivate, and consequently to be less dangerous.

There is no empirical reason to suggest that the gender gap in sentencing would operate differently for DUI crimes than for other offenses. DUI offenses are often considered a less serious crime, suggesting that the gender gap may be narrower among DUI offenders than predatory offenders, but female DUI offenders are still more likely than male DUI offenders to receive less harsh sentences. Additional analysis is needed to analyze the main effect of gender on sentencing as well as interactions between gender and other offense characteristics, such as the type of DUI offense, and sentencing.

Age

General research on age and sentencing across crimes has found a curvilinear relationship between age and sentencing (Steffensmeier, Kramer, and Ulmer, 1995). Young offenders (ages 21-25) have been found to receive the harshest sentences, while the oldest offenders (ages 50-70) receive the most lenient sentences. Very young offenders (ages 18-20) receive sentences similar to offenders in their 30's and 40's. The patterns of age and sentencing mirror the patterns of age and offending, in general, and these curvilinear findings have been confirmed in multiple studies (Demuth and Steffensmeier, 2004; Steffensmeier and Demuth, 2000). These findings suggest that judges perceive young adolescents to pose the greatest risk to the general population, a

perception that is consistent with what is found among patterns of offending and desistance through the life course.

Because the age crime-curve for DUI offenders is flatter and peaks beyond early adolescence, the age of a DUI offender may influence a judge's decision at sentencing differently than it would for non-DUI offender. Age may shape whether the judge perceives the offender as a young, "social drinker" or an older, "chronic drinker" (DeMichele, Payne, and Lowe, 2013). Additional research at the sentencing phase for DUI offenders is needed to determine the degree to which research on the effects of age for the general offending population is applicable to DUI offenders.

DUI Recidivism

The likelihood that individual offenders will reoffend is a primary concern of criminal justice officials. While data suggests that two-thirds of criminals, in general, will reoffend (Langan and Levin, 2002), DUI offenders recidivate at a significantly lower rate. State-based cross-sectional analysis of offenders arrested for DUI offenses have found anywhere from 21% to 47% of DUI offenders are repeat offenders (Fell, 1995), and these cross-sectional snap-shots may be upwardly biased by the number of offenders who are career DUI recidivists. Longitudinal studies have provided additional insight as to the number of offenders who are likely to offend after a DUI conviction. More recent studies place the rate of recidivism for DUI offenders between 20% and 35% (Cornish and Marlow, 2003; Schell, Chan, and Morral, 2006).

Research on DUI offenders varies in the operationalization of recidivism, with some studies analyzing rearrest for DUI offenses only, for all traffic offenses, or for all criminal offenses. A study of 1,000 DUI offenders in New South Wales found that 37.5% of offenders were reconvicted for some offense within three years of a DUI conviction; about half of the

recidivating offenders (13 percent of the total sample) were reconvicted for a DUI offense (Homel, 1981). A significant portion of the recidivating offenders were convicted of a non-DUI traffic offense such as speeding or negligent driving (Homel, 1981). This study included offenders sentenced for their first or subsequent DUI offense and does not account for the possible differences between offenders who commit only one DUI and those who recidivate one, or more times.

The general focus on DUI offenses as the indicator of recidivism excludes individuals who continue to commit non-DUI criminal offenses. Studies generally assume that DUI offenders are different from the general offending population, and that they commit only DUI offenses. Additional research that integrates more thorough measures of criminal behavior is needed to distinguish between individuals who recidivate by committing another DUI or traffic offense, individuals who recidivate by engaging in non-traffic criminal behavior, and individuals who truly desist from all types of criminal behaviors.

Studies of the general offending population suggest that a small group of offenders are responsible for the majority of crimes, a pattern that is also found for DUI offender populations. It appears that a small group of DUI offenders are impervious to punishments, regardless of how severe they may be (Homel, 1981). Additional differences in the recidivism rate of DUI offenders are often tied to individual characteristics of the offender in question. These patterns are described below.

Race

Studies analyzing racial differences in DUI recidivism are limited, as samples are often not large enough to assess variance among racial groups. One exception is the study by Cherpitel and Bond (2003), which analyzed differences in recidivism among White and Mexican

American offenders. This study found that Mexican Americans were significantly less likely than Whites to recidivate when the offenders were arrested but not convicted. In contrast, Mexican Americans were more likely than Whites to recidivate when convicted of a DUI offense. These racial differences were largely mediated by controls for prior DUI convictions, although additional measures for the seriousness of an offender's overall prior record were not included in the study. Rather, the authors used only a dichotomous yes/no measure to indicate whether the offender had a prior DUI conviction. Absent a better control for prior criminal record, the estimates of racial differences in recidivism may be biased by the omission of legal variables.

Gender

Females are less likely than males to recidivate (Steffensmeier and Allan, 1996). Research on the age-crime curve has found that female criminal careers begin and peak earlier than males, and females are particularly less likely than males to repeat violent offenses. An explanation for these findings can be found in individual commitments to criminal lifestyles. Studies find that, compared to males, females do not have a strong commitment to criminal behavior. Evidence also supports the conclusion that crime is more stigmatizing for females; females face a greater potential cost to life chances as a result of criminal behavior than males. These patterns have been upheld for DUI offenders where research has found that males are more likely than females to be repeat offenders (Meyer, Anderson, Perrine, and Fortini, 1993).

Despite an upward trend in rates of females arrested for DUI, males are still nearly 5 times more likely than females to drive under the influence (Liu et al., 1997). A large study of DUI offenders in California found that males were 56.9% more likely than females to recidivate (Marowitz, 1998).

The gender difference in recidivism diminishes as the number of prior violations increases (Rauch et al., 2010). A study covering DUI arrests in Maryland over 5 years found that females account for 51% of drivers with no prior DUI record, but, respectively, only 18%, 13 %, and 8% of drivers with 1, 2, and 3 or more DUI arrests. While Rauch et al. found that the relative risk of recidivating among offenders with no prior DUI conviction was 3.9 times higher for males than for females, they found no significant difference in recidivism for males and females with 1, 2, or 3 or more prior DUI arrests (Rauch et al., 2010). Similarly, Taxman and Piquero (1998) found that gender was not a predictor of recidivism when using a sample of first-time and repeat DUI offenders. Overall, then, females are different from males, but for the small population of repeat offenders, the gender differences in recidivism are less significant.

There are also differences in the factors that are related to whether or not females or males recidivate. A study of DUI offenders sent to treatment facilities in Texas found that social support was critical to the effective rehabilitation of female offenders (Maxwell and Freeman, 2007). Females were less likely to complete treatment, and reported significantly more problems with drugs and alcohol following treatment. In addition, female offenders were more likely than males to live with another person who also abused drugs or alcohol (although the percentages were low overall: 9% of females and 7% of males). The findings from this convenience sample suggest that gender differences may exist for the effectiveness of particular treatments and/or the social contexts in which offenders live.

These studies suggest that females are, overall, less likely to commit DUI offenses and less likely to be repeat-DUI offenders. Although universally included as a covariate in studies of DUI offenders, more research is still needed to understand gender patterns in recidivism and the effectiveness of treatment for DUI offenders.

Age

The age-crime curve is likely influenced by differences in recidivism by age. In Homel's (1981) study of DUI offenders in New South Wales, age was found to be predictive of recidivism, in general, but not of reconvictions for DUI offenses. That is, younger offenders are more likely to engage in criminal behavior than older offenders, but not more likely to drive under the influence than older offenders. Homel (1981) suggests that the null finding is explained by the presence of two competing high risk groups: young criminal offenders and older alcoholics. The recidivism rate for both of these populations is high, which undermines the age effect.

While the age-crime curve for DUI offenders suggests that DUI offenders are generally older than predatory offenders, some research suggests that young DUI offenders are more likely to recidivate than older offenders. A study analyzing 21 million driver records in Maryland between 1999 and 2004 found that the average age of offending was 42 years (Rauch et al., 2010). The average age of offenders decreased as the number of prior DUI offenses increased; the average age of DUI offenders with one prior DUI offense was 33, and the average of DUI offenders with two or more prior DUI offenses was 35. This pattern suggests that younger offenders were more likely to recidivate than older offenders, but that the average age of DUI offenders is still likely higher than other crimes, regardless of the number of prior offenses.

Additional research finds that age is predictive of recidivism beyond the first DUI, but not after the second or subsequent DUI offenses. Specifically, Yu (1994) found that younger offenders were more likely than older offenders to commit a second DUI offense, but there was no effect of age on the likelihood of committing a third or subsequent offense. Age at first DUI

offense may be helpful in identifying which offenders are likely to recidivate, but is less helpful in identifying the small group of career DUI offenders.

The findings on the relationship between age and recidivism for DUI offenders suggest that younger offenders are more likely to recidivate than older offenders, but age may not matter for repeat offenders. As noted before, this research is affected by inconsistencies in the measurement of age. Unique differences in age groups for recidivism suggest that age should not be tested as a linear effect, but rather as a categorical variable with different age groups, allowing studies to assess both young social drinkers and older problem drinkers for whom patterns in recidivism may differ.

Prior Record

Analyses of DUI offenders' prior records have been commonplace in recidivism studies. Approaches vary between describing DUI offenders who are problem drinkers who drive, and problem drivers who drink (Marowitz, 1998). Studies vary in their inclusion of prior criminal offenses, prior non-driving alcohol involved offenses, and prior DUI offenses.

Offenders with a prior traffic record are more likely to recidivate than offenders without a prior traffic record. A study of 77 randomly selected offenders in New Jersey found that prior record was the most significant predictor of recidivism (defined as rearrest for a DUI) (Cavaiola, Strohmetz, and Abreo, 2006). The study found no significant differences for demographic characteristics, including gender and age, though the small sample had limited power to detect these relationships. The study also found no significant difference associated with BAC level. The study used two screening tools (the Michigan Alcoholism Screening Test and the Minnesota Multiphasic Personality Inventory-2) and found no support for a relationship between these clinical scales and recidivism, with the exception of the Lie Scale. Offenders who recidivated

scored higher on the Lie Scale, suggesting that these offenders were likely to present themselves as more favorable on other questionnaire responses. The findings for prior record were stronger than the findings on the Lie Scale. DUI offenders who recidivated were more likely to have had their license suspended prior to their initial DUI conviction (38% compared to 6% of one-time offenders). This study assessed only prior traffic offenses, limiting what understanding can be gathered regarding prior criminal records as a whole. A broader analysis of prior criminal records may reveal additional problem behaviors that predict the likelihood of recidivism after a DUI conviction.

Additional research has found that different types of prior traffic records are predictive of recidivism for DUI offenders, and that these variables are stronger than other individual offender or offense characteristics. A study of 53,000 convicted DUI offenders in California found prior DUI convictions, prior accidents while driving under the influence, and prior non-DUI traffic convictions to be predictive of recidivism (Marowitz, 1998). The study found that other variables, such as BAC, only slightly differentiated between first and repeat offenders, but repeat offenders recidivated at a much higher rate. Thus, it appears that variables may be able to distinguish between those who commit multiple DUIs and those who commit only one DUI, but are less able to distinguish between the likelihood of third and subsequent DUI offenses. The number of prior convictions was also more strongly predictive of recidivism than BAC level, particularly for intermediate ranges of BAC. This conclusion supports the literature that suggests a small number of severe offenders account for the majority of repeat DUI offenses.

Finally, research suggests that the likelihood of committing a DUI offense increases with each additional prior DUI. That is, offenders who recidivate seem to be increasingly impervious to sanctions for DUI crimes. A study analyzing 21 million driver records in Maryland found that

the rate of DUI offenses (per 1,000 drivers) among individuals with one prior DUI arrest was 24.3 compared to 3.4 for those with no prior DUI record and 35.9 for those with two prior DUI arrests (Rauch et al., 2010). Thus, the odds of an individual committing a DUI offense increased as the number of prior DUI arrests increased.

Overall, the literature on prior records suggests that prior DUI offenses, prior criminal driving offenses, and prior accidents are predictive of recidivism; however, the tendency to use DMV data has limited analysis of criminal records as a whole. Future studies need to include prior criminal records and more indicators of general criminal behaviors.

Blood Alcohol Content

Blood alcohol content has sometimes been considered a signal for the seriousness of DUI offenses and possibly a signal for underlying alcohol dependency. However, studies on the relationship between BAC and alcohol dependency have been inconclusive. Nevertheless, the level of BAC has important implications for judges' perceptions of the seriousness of an offender, and it is commonly included in studies of DUI offenders. In many states, BAC is used to determine both the severity of the DUI charge (National Conference of State Legislatures, 2012) and the placement the offender in particular forms of treatment (Voas et al., 2011).

Some research has supported the hypothesis that higher levels of blood alcohol content correlate with more serious offending. A study in New York that compared DUI offenders sentenced for driving under the influence with a BAC of .08 or greater to offenders sentenced for driving impaired but with a BAC between .05 and .07 found that individuals with a higher level of BAC were more likely to recidivate than were those who were impaired, but below the official legal threshold for BAC (Yu, 1994). The author suggested that a higher BAC is demonstrative of an underlying alcohol dependency that influences drivers' higher recidivism level.

Other research suggests that the relationship between BAC and offense seriousness is not linear, but curvilinear, and contextualized by other offense related characteristics. A study of 53,000 DUI offenders in California found a curvilinear relationship between BAC level and recidivism (Marowitz, 1998). Offenders with low BAC levels (.00 - .09) and high levels (.35 and above) had a relatively high rate of recidivism compared to offenders with an intermediate BAC level (.09 - .29). The author suggested that the high rate of recidivism for low BAC offenders and the consequent curvilinear relationship was reflective of the high prevalence of drug use among low BAC DUI offenders (Marowitz, 1998). The effect of BAC was moderated by characteristics of the offender's prior record.

This study also suggests there may be fundamental differences between DUI offenders under the influence of drugs, alcohol, or both. Understanding these differences is especially important given recent changes in state policies concerning the legalization of marijuana (e.g., Washington and Colorado). Changes in law enforcement policies in these states may lead to an increase in the targeting of drug impaired DUI offenders, increasing the need for research that analyzes the characteristics of these offenders.

In contrast to studies that have found BAC to be predictive of recidivism, other studies have found that BAC is not a significant predictor of DUI recidivism. One study using a 12-year follow-up period for first time offenders found that BAC was not predictive of recidivism (Cavaiola, Stohmetz, and Abreo, 2007). However, the study was limited to 77 offenders and probably did not have the statistical power to detect variance related to BAC level at time of arrest. An additional study of 59 first-time and repeat-DUI offenders from a single judicial district in Pennsylvania found no significant differences in BAC for the two groups of offenders (Dugosh et al., 2013). This study also suffers from a limited sample, undermining its statistical

power. Finally, an analysis of 235 DUI offenders who underwent an evaluation for alcohol dependency found no significant relationship between BAC and alcohol abuse, dependency, or problem drinking (Wieczorek et al., 1992). This last study suggests that BAC is not an effective proxy indicator for underlying substance dependencies.

Existing studies have been inconclusive with regard to the relationship between BAC and recidivism among DUI offenders, although the studies finding no effect are methodologically weaker (i.e., have smaller samples) than those that do find an effect. Additionally, the direct relationship between BAC and sentence types may bias findings in DUI research. It is unclear whether the relationship between BAC and recidivism is reflective of offender dangerousness, an underlying dependency problem, or effectiveness of different types of sentence. Further research is needed to determine whether BAC is predictive of DUI recidivism, if the effects are limited to alcohol impaired drivers, if the relationship is linear, and if the relationship is independent of different types of sentence.

County Context

The relationship between neighborhood characteristics and recidivism has been frequently researched in the general criminology literature. Community characteristics may directly influence criminal behavior, but may also moderate the previously discussed relationships between individual characteristics and criminal behavior. Community characteristics are important for both stages of this thesis. First, community contexts may influence judge's decisions at sentencing. Second, community contexts may moderate the effects of a criminal label, influencing whether or not an offender recidivates.

First, community resources may influence a judge's decision of what type of punishment to impose on offenders in their jurisdiction. For example, studies have found the amount of

available county jail space predicts whether or not offenders are sentenced to incarceration sentences (Ulmer and Johnson, 2004). These findings suggest that judges consider available county resources when deciding how to sentence particular offenders. Similar studies have also found that judges consider community resources when deciding whether offenders should be sentenced to prison or alternative sentences (Ostrom et al., 2002; Ulmer and Kramer, 1996). These studies, which specifically analyzed drug offenders, found that judges sentenced offenders to jail rather than alternative programs, due to the lack of community drug treatment programs. Ulmer and Kramer (1996) found that individual characteristics moderated these findings, with financially stable offenders being more likely to be sentenced to alternative sanctions. Research suggests that county resources are one of the strongest determinants of the use of alternative sanctions (Tonry, 1990).

Limited research has analyzed how community resources affect judicial decision making. In a study of offenders in Pennsylvania, Bowles (2011) found that the likelihood of receiving intermediate sanctions was moderated by the type of crime. Specifically, she found that county funding for intermediate punishments was related to an increase in the odds of receiving intermediate sanctions compared to incarceration. In counties receiving funding for intermediate punishments, the odds of receiving these alternative sanctions were highest among drug offenders, although the effects were strongest for property offenders. This finding suggests that judges consider the available rehabilitative facilities and base their sentences on whether or not they believe offenders will have adequate access to rehabilitative treatment within the community. Although the Bowles study excluded DUI offenders, her results suggest that judges are likely to consider rehabilitative opportunities for drug *and* alcohol dependent offenders when

making decisions at sentencing. Judges are likely to believe that alternative sanctions, such as ARD, are more effective in areas where adequate rehabilitative treatment facilities are present.

Second, community characteristics may moderate the effects of individual characteristics, including a criminal label, on recidivism, either encouraging or discouraging continued criminal behavior. The theory of reintegrative shaming posits that community context may moderate the relationship between punishment and future criminal behaviors. Specifically, Braithwaite (1989) hypothesized that communities that are high in residential mobility and urbanization are less likely to reflect communitarian characteristics that can protect against recidivism.

Communitarian societies are more likely than individualistic societies to have cohesive and interdependent characteristics that are necessary for the effective reintegration of offenders. The stability of communitarian societies create the conditions necessary for mutual obligation, trust, and group loyalty, which together increase the costs to engaging in criminal behaviors.

In general, research has found that community characteristics affect recidivism. In 2006, Kubrin and Stewart called for researchers to include community characteristics in the analysis of recidivism. The authors posited that community characteristics influence the ability of offenders to reintegrate into society. Measures of community disadvantage and concentrated extremes of poverty and affluence were found to directly correlate with recidivism. Controlling for individual characteristics, their study found that increases in community disadvantage were related to increases in recidivism. Individuals returning to areas with higher concentrations of wealth were found to recidivate at lower rates than offenders returning to areas with concentrated poverty. Following these findings, the authors called for additional research to validate their findings across different samples and community contexts.

Following the call made by Kubrin and Stewart (2006), a study of offenders released from prison in Florida found that higher levels of resource deprivation were related to higher levels of violent crime, and lower levels of drug crime, but resource deprivation had no effect on property crime (Mears et al., 2008). Racial segregation was not directly related to recidivism, but was a moderator for the recidivism of various demographic groups. That is, although young, nonwhite males were most likely to recidivate, particularly for drug crimes, the effects of resource deprivation decreased as racial segregation increased. These findings suggest that community characteristics may influence recidivism differently for different groups of offenders. While this study addresses interactions between individual demographic characteristics and community characteristics, it does not test how different sentences may be moderated by social contexts.

Although theorized, research suggests that community differences do not moderate the effects of a criminal label. That is, the effects of a criminal label are consistent across different social contexts. A study comparing a sample of over 95,000 offenders who were either convicted of a felony or received a deferred judgment found no support for concentrated disadvantage⁵ or an index of concentrated extremes⁶ as moderators of the effect of a criminal label on recidivism (Chiricos et al., 2007). Using hierarchical linear modeling, the authors found statistically significant variation between the 67 counties in the state of Florida, but the differences were not substantial. The authors did find that concentrated extremes of poverty and affluence were related to higher levels of recidivism and that higher levels of concentrated disadvantage were related to lower levels of recidivism. However, these variables did not

⁵ The authors constructed a measure of concentrated disadvantage by combining percentage black, percentage of families receiving public assistance, percentage of persons living below the poverty level, and the percentage of families headed by a single mother.

⁶ The index of concentrated extremes was calculated as the [(number of affluent families – number of poor families) / total number of families]

interact with the type of adjudication, indicating that these characteristics did not moderate the effects of a criminal label. The authors also included measures of the county crime rate and police presence, but neither was significant as a main effect, or in cross level interactions with individual characteristics.

Overall, the relationships between county characteristics, sentencing, and recidivism are unclear for DUI offenders. Studies of DUI offenders tend to focus on individual characteristics, ignoring the community characteristics that may also influence individuals' criminal behaviors. Community characteristics may undermine or strengthen rehabilitative efforts, resulting in higher or lower rates of recidivism. It is also possible that community characteristics are unrelated to recidivism because DUI offenses are mobile in nature. That is, they may not be committed near the offender's residence. Additional studies analyzing offenders within various types of court and community variables are necessary to understand how social contexts may relate to recidivism.

The Current Study

The current study seeks to apply research on sentencing and recidivism to DUI offenders, who contribute significantly to the prevalence of arrest and conviction records across the United States. Most existing literature focuses on the effects of particular types of sanctions, such as jail time or license suspension, but studies do not address the broader influence of a criminal label. This study analyzes whether criminal labels are necessary to achieve the goals of reducing recidivism, or whether these labels actually perpetuate criminal behaviors.

Pennsylvania, the 6th most populated state in the union, recorded 98,884 million vehicle miles in 2012 (USDOT, 2013). In the same year, Pennsylvania reported the fourth highest number of traffic fatalities resulting from alcohol-impaired-drivers with a BAC of .08 or higher

(NHTSA 2013). Nationally, arrests for driving under the influence decreased 37 percent from 1990 – 2010 and 12 percent from 2000 – 2010 (Snyder, 2012). However, Pennsylvania saw *increases* in arrests for driving under the influence in the same time period. From 1990 – 2009, arrests for DUI offenses increased 20 percent and from 1999-2009 arrests for DUI offenses increased 29 percent (PCCD, 2010).

First-time DUI offenders in the state of Pennsylvania may be sentenced to either a guilty conviction or diverted to an accelerated rehabilitative disposition. Both dispositions include similar treatment programs. Offenders in both groups may be sentenced to up to one year of probation, 90 days of license suspension, and mandatory drug or alcohol treatment in a community facility. This study seeks to understand, above and beyond the types of sanctions imposed, whether or not the ability to expunge a criminal record following completion of a sentence has a positive or negative effect on future criminal behaviors.

Diversion vs. Conviction

In Pennsylvania, prosecutors and judges have the option of sentencing first-time DUI offenders to a guilty conviction or processing the offender through a diversion alternative, accelerated rehabilitative disposition (ARD). At least 21 other states have similar types of diversion alternatives for DUI offenders (Rauch et al., 2010). No research has been conducted to detail what offense and offender characteristics influence prosecutor's processing and judge's sentencing decision, or which outcome is most effective for first-time DUI offenders. Without analyses of these decision-making processes and program effectiveness, widespread inconsistencies and erroneous judgments are possible across jurisdictions within the state.

This study is important for understanding what patterns are emerging in the processing of DUI cases, and whether these patterns differ across court locations. Additionally, this study is

necessary to determine whether prosecutors and judges are imposing the most effective forms of punishment for a DUI offense. If the main goals of the system are to punish offenders for harm done and to reduce the likelihood that an offender recidivates, then comparative analyses of different court outcomes are crucial.

In Pennsylvania, diversion-eligible offenders have the option of applying for an accelerated rehabilitative disposition (ARD). The defendant, the defendant's attorney, or any other interested person may ask the district attorney to consider the case before the defendant for the ARD program. If the district attorney decides to move forward with the ARD program, the case is presented to a Court of Common Pleas Judge. The judge has the option of accepting the motion for the ARD program, or denying access to the ARD program and moving forward with the charges as indicated by the law. Thus, initial discretion is given to the district attorney to decide whether or not the defendant will be considered for an ARD program, but the final disposition decision is left to the judge.

Diversion programs function as a sort of insurance policy for offenders. If they do not commit another DUI offense, they will not have a criminal record. However, it is nearly guaranteed that the next offense will be prosecuted through a guilty conviction⁷. Additionally, if offenders fail to complete the terms of their diverted sentence, the ARD may be revoked and the offender is likely to be convicted for the initial DUI offense. The initial interaction with the criminal justice system may be enough to shift an individual's perception of the certainty of being caught and labeled a criminal offender, thus facilitating the desistance process regardless of the severity of punishment. That is, it is possible that the fear of the criminal label will motivate individuals to change, regardless of the characteristics of the punishment itself.

⁷ Pennsylvania Statutes indicate that only first-time DUI offenders are eligible for ARD programs; however, it appears that some jurisdictions are providing diversion dispositions for some second-time offenders.

Diversion and guilty convictions could equally affect a change in an offender's perception of certainty with regard to apprehension and punishment.

Only one study has looked at DUI offenders and diversion alternatives. Using a sample of offenders in Maryland, Taxman and Piquero (1998) found that a guilty conviction increases the odds of reconviction for a DUI by 12 percent compared to those receiving a probation without judgment disposition⁸. They isolated the unique effects for first-time DUI offenders and found that the risk of recidivism for this subsample was 27 percent higher with a guilty conviction compared to diversion alternatives. The authors found that the conviction effect was significant only for first time offenders, indicating that initial interactions with criminal justice organizations are uniquely important. They also found that these effects were independent of any type of rehabilitative treatment program. Because this study has not been replicated, it is possible that the findings may differ in a different jurisdiction or with a more recent sample.

With the exception of Taxman and Piquero's (1998) study, the literature has failed to address the potential impact of a permanent criminal label for first-time DUI offenders. Prior studies are conflicting on the effects of "mark of a criminal record" and life course outcomes. Studies have analyzed the impact of a prison sentence (Pager, 2003), different incarceration lengths (Loeffler, 2013), and arrest without conviction for misdemeanor offenses (Uggen et al., 2014) on employment opportunities, but no study has analyzed the specific effects of a conviction for a misdemeanor offense, specifically DUI offenses, and life course outcomes.

In general, I expect to find a low recidivism rate and particularly low risk for future accidents among first-time DUI offenders. The National Highway Traffic Safety Administration 1990 report found that only one in six drivers killed in accidents with a BAC of at least .20 had a

⁸ Probation without judgment dispositions operate similarly to Pennsylvania's Accelerated Rehabilitative Disposition programs. Offenders successfully completing the terms of their sentence are allowed to expunge the offense from their criminal record.

prior DUI conviction. This finding suggests that the type of recidivating offense should be of interest. Offenders who recidivate by committing another DUI may be different from offenders who recidivate by committing some other offense. DUI sentencing policies may be effective in preventing future instances of driving under the influence, but not effective in reforming other forms of criminality. Controlling for selection into different punishments is necessary to obtain unbiased estimates of the effects of different types of punishment (Homel, 1981).

It is unclear how punishment results in the reformation of behavior. Specifically, there is nothing in the existing literature to suggest that the *threat* of a future conviction would have any less of an effect on behavior than an actual conviction for an offender's first violation of DUI laws. Individuals sentenced to ARD know that an arrest during the time of the ARD sentence will result in reconviction for their initial DUI offense. Additionally, individuals know that they may receive a diversion sentence only for their first offense; thus any subsequent DUI would result in a guaranteed conviction. I expect ARD to have no less of a deterrent effect than a guilty conviction. If anything, it may be that individuals are actually more cautious following an ARD disposition because they have more to lose than do those who have a guilty conviction. Thus, this insurance type policy may have a greater effect on the reduction of recidivism.

Hypotheses

This project focuses on two central questions: (1) who is likely to be sentenced to diversion sentencing programs, and (2) what types of treatment are most effective for DUI offenders. Each of these questions can be analyzed with respect to individual offender characteristics, offense characteristics, and demographic characteristics of the counties within which the offender is sentenced. The following hypotheses are proposed.

Part 1: Selection into Diversion

Hypothesis 1: White offenders will be more likely than minority offenders to receive ARD.

Prior literature suggests that minorities are more likely than whites to be sentenced to strict punishments (Steffensmeier et al., 1998). Studies of DUI offenders show that whites are more likely to receive lenient sentences (Cherpitel and Bond, 2003). Similarly, whites have been found to be more likely to receive rehabilitative dispositions (Cherpitel and Bond, 2003). Despite higher rates of whites driving under the influence compared to non-whites, judges are likely to be informed by broader criminal stereotypes, resulting in harsher sentences for non-white offenders (Steen, Engen, and Gainy, 2005).

Hypothesis 2: Female offenders will be more likely than male offenders to receive ARD.

Despite the increasing rates of females arrested for DUI, males still account for a significant majority of DUI offenders (Schwartz, 1998). Females are also less likely to recidivate, in general, making them better candidates for alternative sanctions than their male counterparts (Rauch et al., 2010; Meyer et al., 1993).

Hypothesis 3: The youngest and oldest offenders will be least likely to receive ARD.

Homel (1981) found that reconviction rates were highest among young offenders and old offenders. He posited that the young “criminal” offenders and the older “alcoholics” present the highest risk of recidivism. Additionally, younger drivers are consistently found to have the highest rate of DUI violations (Rauch et al., 2010; Liu et al., 1997; Yu, 1994). At the other end

of the age spectrum, older offenders may seem to harbor the least amount of rehabilitative potential due to a higher prevalence of alcohol dependency (Homel, 1981).

Hypothesis 4: Offenders with more serious prior records will be less likely than offenders with less serious prior records to receive ARD.

Studies have found prior records predictive of DUI recidivism (Cavaiola et al., 2006; Marowitz, 1998). Extensive prior records may be indicative of problem drivers who drink, rather than problem drinkers who drive, suggesting the need for harsher punishments rather than a focus on rehabilitation for an underlying alcohol problem. Additionally, a prior record signals a failure of previous sanctions to reform behaviors, thus justifying harsher punishments.

Hypothesis 5: Offenders with a higher BAC, alcohol-impaired DUI will be less likely than offenders with a low BAC, alcohol-impaired DUI to receive ARD.

Despite mixed research findings, higher levels of BAC have been sometimes noted as an indicator of greater alcohol dependency (Yu, 1994). Higher levels of BAC may signal to judges that offenders are more serious risks for violating DUI laws, resulting in harsher punishments (Marowitz, 1998).

Hypothesis 6: Offenders charged with driving under the influence of drugs will be less likely than offenders charged with driving under the influence of alcohol to receive ARD.

Limited research exists to directly compare drug and alcohol impaired DUI offenses. However, data that does exist suggests that drug offenders are more likely than alcohol offenders to recidivate (Marowitz, 1998). The illegal nature of drugs are likely to signal to judges that drug-impaired drivers are at a higher risk of engaging in criminal behaviors in the future.

Hypothesis 7: Offenders sentenced in rural counties will be less likely than offenders sentenced in urban counties to receive ARD.

Rural counties are less likely than urban counties to have an abundance of resources for treating drug and alcohol offenders. Research indicates that the availability of resources are a critical determinant in the sentencing of offenders (Tonry, 1990). Absent effective rehabilitative treatment centers, offenders in rural counties will be less likely than offenders in urban counties to receive accelerated rehabilitative dispositions.

Hypothesis 8a: Offenders sentenced in counties that receive state funding for drug and alcohol restrictive intermediate punishment programs will be more likely than offenders sentenced in counties that did not receive state funding for D&A RIP programs to be sentenced to ARD.

Hypothesis 8b: Counties with higher amounts of state funding per active offender for drug and alcohol restrictive intermediate punishment programs will be more likely than counties with lower amounts of state funding per active offender to sentence first time DUI offenders to ARD.

Literature suggests that county resources are a significant influence on sentencing decisions (Ostrom et al., 2002; Ulmer and Kramer, 1996; Tonry, 1990). In Pennsylvania, counties must apply for state funding for drug and alcohol restrictive intermediate punishment programs. For this study, I hypothesize that application for these funds signals that counties are committed to the rehabilitative treatment of drug and alcohol offenders. Consequently, offenders should be more likely to receive accelerated rehabilitative dispositions in counties that have applied for and received state funding for D&A RIP programs.

Part 2: Effectiveness of Treatment

Hypothesis 9: Offenders sentenced to ARD will be less likely to recidivate than offenders receiving a guilty conviction.

Individuals sentenced to a guilty conviction are likely to have lower perceptions of procedural fairness than individuals sentenced to ARD. Guilty convictions carry with them a stigma that can lead to social disapproval and exclusion, increasing the likelihood of recidivism (Laub and Sampson, 2003; Braithwaite, 1989). Additionally, literature suggests that more severe punishments actually result in higher rates of recidivism (Homel, 1981), particularly with respect to convictions rather than diversion alternatives (Chiricos et al., 2007; Taxman and Piquero, 1998).

Hypothesis 10: White offenders are more likely than minority offenders to recidivate.

White offenders are more likely than offenders of another race to drive under the influence (Liu et al., 1997). While other studies have found minorities are more likely to recidivate (e.g., Cherpitel and Bond, 2003), these studies did not control for differences in prior criminal history.

Hypothesis 10b: Race will interact with diversion. White offenders sentenced to a guilty conviction will be less likely than minority offenders sentenced to guilty convictions to recidivate. Minority offenders sentenced to diversion will be less likely than white offenders sentenced to diversion to recidivate.

Cherpitel and Bond (2003) found a significant specific deterrent effect for conviction for white offenders, but not Mexican American offenders. However, this study included only a one year follow up period, likely too short to effectively identify effects of sanctions. Minority offenders are more likely to view ARD as a significant break from expectations at sentencing. They are

consequently more likely to view an ARD sentence as a just sentence rather than an expected sentence (Cherpitel and Bond, 2003). Additionally, the higher social status of white offenders provides an additional protective barrier against the negative effects that are associated with a criminal label (Laub and Sampson, 2003). Although some research suggests that criminal labels have more negative effects for whites (see Chiricos et al., 2007), DUI offenses may be an exception due to the accepted nature of drinking in society and the perception that driving under the influence is not a serious crime (Harris, 2001).

Hypothesis 11: Female offenders are less likely than male offenders to recidivate.

Research on criminal behaviors in general find that females are less likely than males to recidivate (Steffensmeier and Allan, 1996). Evaluations of the main effect of gender on recidivism after a DUI conviction indicate that females are less likely to recidivate after an initial DUI offense (Rauch et al., 2010; Marowitz, 1998; Liu et al., 1997; Meyer et al., 1993).

Hypothesis 11b: Gender will interact with diversion. Females sentenced to a guilty conviction will be more likely than females sentenced to ARD to recidivate. Males sentenced to ARD will be more likely than males sentenced to a guilty conviction to recidivate.

Research suggests that a DUI conviction for a female carries more significant negative effects than for male offenders (Shore and McCoy, 1987). The greater social status of males is likely to provide a protective effect from criminal labels, while females are more likely to be affected by a stigma from deviant behaviors (Giordano, Cernkovich, and

Lowery, 2004). This expectation is consistent with findings on the effects of felony labeling for males and females (Chiricos et al., 2007).

Hypothesis 12: Older offenders will be less likely than young offenders to recidivate.

Data consistently finds that younger DUI offenders are more likely than older offenders to recidivate (Liu et al., 1997; Homel, 1981; Rauch et al., 2010). This pattern is particularly true for first-time DUI offenders (Yu, 1994), the population which this study is limited to. This hypothesis is also consistent with general knowledge about the age-crime curve, which suggests that offending declines rapidly with age (Greenberg, 1985; Farrington, 1986; Laub and Sampson, 2003).

Hypothesis 13: Offenders charged with only a DUI will be less likely than offenders charged with additional, non-DUI crimes to recidivate.

The types of offenses included in a judicial proceeding provide some indication of whether the offender is a problem drinker who drove or a problem individual who drinks. Problem drinkers who drive are likely to be sentenced with only a DUI offense, and may be rehabilitated, given their participation in alcohol and drug rehabilitation programs. On the other hand, offenders arrested and sentenced for other non-DUI related offenses are more likely to be problem individuals who engage in multiple forms of delinquent behavior. Consequently, individuals with additional, non-DUI charges may be less successfully rehabilitated with alcohol and drug treatment programs, resulting in higher recidivism rates (Marowitz, 1998).

Hypothesis 14: Offenders with more serious prior records will be more likely than offenders with less serious prior records to recidivate.

DUI offenders with prior records have been found to recidivate at higher rates than DUI offenders without prior criminal or traffic records (Rauch et al., 2010; Cavaiola et al., 2006; Marowitz, 1998). Similar to hypothesis 13, prior, non-DUI records are likely to be indicators of problem offenders who occasionally drink, rather than problem drinkers who drive (Marowitz, 1998).

Hypothesis 15: Offenders with a higher BAC will be more likely than offenders with a low BAC to recidivate.

Many studies use BAC as a proxy for seriousness of the DUI offense. Offenders with a high level of BAC are assumed to have greater alcohol dependency than offenders with low levels of BAC (Yu, 1994). In this study, BAC is intrinsically tied to the period of license suspension for offenders. Thus, this hypothesis is also testing the effect of longer periods of license suspension (because of state law it is unable to test the interaction between different levels of BAC and time periods of license suspension). Research suggests that license suspension is the most effective form of sanction for DUI offenders (Peck et al., 1985).

Hypothesis 16: Offenders charged with driving under the influence of drugs will be more likely than offenders charged with driving under the influence of alcohol to recidivate.

Recidivism research suggests that individuals convicted of driving under the influence of drugs are more likely to recidivate than alcohol-impaired drivers with a low BAC and as likely to recidivate as alcohol-impaired DUI offenders with high levels of BAC (Marowitz, 1998). Drug impaired driving may be indicative of more serious underlying deviant behaviors (drug-impaired drivers are, essentially, violating two laws: drug prohibition and driving under the influence).

County Characteristics

Hypothesis 17: Offenders sentenced in rural counties will be less likely than offenders sentenced in urban counties to recidivate.

A cornerstone component of the theory of reintegrative shaming is the community context in which ex-offenders live. Braithwaite (1989) hypothesizes that communitarian neighborhoods are more conducive than individualistic neighborhoods to effective rehabilitation. Specifically, the theory posits that communities that are high in residential mobility and urbanization are less likely to protect against recidivism. In addition, communitarian societies are suggested to be more likely than urban areas to exhibit characteristics necessary for the effective reintegration of offenders following interactions with the criminal justice system. Consequently, offenders in rural areas should be less likely to recidivate, particularly when they receive accelerated rehabilitative dispositions (a reintegrative sanction).

Methods

Sample

This thesis used data from the Administrative Office of Pennsylvania Courts (AOPC) to identify offenders sentenced for a DUI offense in a Pennsylvania Court of Common Pleas during 2006 and 2007. Common Pleas Courts are responsible for sentencing offenders charged with misdemeanor and felony criminal offenses throughout the state, with the exception of the County of Philadelphia⁹. Courts submit information on all defendants' initial and final charges, and offense dispositions to the AOPC, making this dataset one of the most comprehensive statewide datasets in the country. Additional offender and offense related variables were merged using records of arrest and prosecution (RAP sheets) from the Pennsylvania State Police. County level

⁹ In Philadelphia, the Municipal Court handles most DUI cases.

data was compiled from the U.S. Census Bureau and various state websites detailing expenditures on drug and alcohol treatment facilities across jurisdictions in the state.

The sample for this study was limited to offenders sentenced to their first DUI offense. And to offenders who were eligible for the Accelerated Rehabilitative Disposition (ARD) program. Offenders qualify for an ARD sentence if they are being charged with their first DUI offense in ten years, if no accident occurred in connection with the DUI offense that caused serious bodily injury to someone other than the defendant, and if there was no passenger under 14 years of age in the vehicle. If the offender completes all terms of his/her ARD program, including attending treatment programs, fulfilling community service hours, and/or paying economic sanctions, the DUI is expunged from their record. These individuals never have to report their arrest for a DUI and the arrest would not appear in standard background checks. Despite these laws authorizing individuals to have the offense expunged, the offenses are maintained in data collected by the AOPC, presenting a unique opportunity to study this population. Alternative datasets, such as offender criminal history reports, are unlikely to contain these records following successful completion of treatment programs and the subsequent expungement of the DUI offense. Second-time and multiple DUI offenders, offenders charged with vehicular manslaughter or homicide while DUI, and those charged with endangering a minor were removed from the sample.

Data

Data for this study were compiled from several sources. The initial list of DUI cases was selected from a statewide database acquired from the Administrative Office of Pennsylvania Courts. This database contained all offenders sentenced in a Common Pleas Court in the state of Pennsylvania. Offenders were selected if they were sentenced to a DUI offense in 2006 or 2007.

In 2003, the Pennsylvania State Legislature passed Act 2003-24, which overhauled DUI statutes in the Pennsylvania Consolidated Statutes. Offenders arrested prior to the implementation of the new laws (February 1, 2004) would have been charged under the previous DUI statute.

Additionally, it appeared that some offenders were still charged under the old statute, even after its repeal. Due to these changes in the law, offenders were selected if they were charged for an offense under the previous Pennsylvania DUI statute (18 Pa.C.S. §3731) or the current Pennsylvania DUI statute (18 Pa.C.S. §3802).

The use of multiple official data sources significantly increases the validity of the sample. Prior studies on DUI offenders often used data from a single source, and may be missing a portion of the DUI offender population. Research using driving records or conviction records miss DUI offenders for four reasons: (1) laws allowing DUI offenses to be expunged, (2) plea bargaining to non-DUI offenses, (3) the use of administrative sanctions rather than criminal convictions, and (4) the use of separate databases for diversion-program participants (Rauch et al., 2010). Because of these possible omissions, Rauch et al. suggest that current knowledge about recidivism by DUI offenders may be flawed. In contrast to these missing data problems, the AOPC data captures all DUI offenses processed in criminal courts (the primary venue for disposition of DUI cases in Pennsylvania), while the data from the State Police indicate all arrests for DUI, even if the arrest did not result in formal criminal convictions.

Administrative Office of Pennsylvania Court Data.

The original data was formatted in a vertical file; each observation represented an individual offense. Consequently, most individual offenders had multiple observations in the data for a single judicial proceeding as well as multiple judicial proceedings present in the data. Offenses were grouped within offender by creating a unique identifier using name and date of

birth, a proxy Social Security Number¹⁰, offense tracking numbers, and state identification numbers. The use of multiple variables to construct a unique identifier was necessary due to slight variations in the way a name was entered across observations (e.g., the inclusion and then exclusion of a middle initial) and missing data (e.g., null values for offense tracking number and state identification numbers). Within the dataset, the earliest judicial proceeding in which an offender was sentenced for a DUI was selected for the sample. All additional judicial proceedings were removed because they were either prior or recidivating offenses. Information on prior and recidivating offenses was captured using the Pennsylvania State Police data.

Offenders were included in the data only if they were eligible for ARD, since ARD ineligible offenders differ in important ways from ARD eligible offenders. Offenders were also removed if they were charged with permitting another individual to drive under the influence (75 Pa.C.S. §1575). Offenders charged under the permitting statute authorized the use of a motor vehicle they own or otherwise have control over to another individual who is under the influence. The sentencing guidelines for these offenders are different from standard DUI offenders. Because these offenders did not actually decide to drive under the influence, they do not fit the target population for this study.

The sample was limited to offenders who were charged only with a first-time DUI offense. Thus, offenders charged with both a first-time and second or subsequent DUI offense were excluded from the study (n = 9,764). In some instances, the charges corresponded to

¹⁰ In order to protect sensitive offender data, the Pennsylvania Commission on Sentencing has developed an algorithm to create a proxy alpha-numeric string variable for offenders' unique Social Security Numbers. This same algorithm is used for data obtained from the AOPC, the Pennsylvania State Police, and the PCS to allow for consistency across datasets. This consistency allowed me to use the proxy SSN to match offenders across multiple datasets while protecting sensitive data of individuals in the dataset. This identifier was necessary to match data for those offenders that had slight variations in name or missing data across different data sources. Absent this identifier, individuals would have been removed from the sample during the compilation of data from multiple sources.

offenses that occurred on the same day, and in other instances, the charges were associated with different offense dates.

There are three possible explanations for why offenders might have both first and second DUI offenses. First, offenders may be originally charged with a first-time offense before the courts realize that they have a prior record, and the charges are adjusted accordingly. Second, individuals may be inappropriately charged with a second or subsequent DUI and the charges are adjusted to a first-time offense through the court process. Finally, offenders may commit additional DUIs prior to being convicted and sentenced for their initial DUI, resulting in multiple DUIs being disposed of in the same judicial proceeding. Because the data lack additional information needed to identify how these individuals should be treated, they were removed from the sample.

Similarly, some offenders in the AOPC data were sentenced to both a conviction and diversion sentence. Offenders with both types of disposition were removed in order to isolate two distinct groups of offenders on the treatment variable ($n = 102$). Lastly, individuals were removed if they had neither a diversion nor guilty disposition due to ineligibility on the treatment variable ($n=1,350$). These offenders were likely either found not guilty through trial or negotiated a plea deal and were subsequently convicted of other, non-DUI related offenses.

Pennsylvania State Police Data.

Records of arrest and prosecution (RAP sheets) were obtained for each offender in the dataset. Data from the Pennsylvania State Police include information on each arrest of an individual for which there was a charged offense, regardless of whether or not the charge resulted in a conviction. From these data I was able to identify the DUI offense that corresponds to the AOPC data and construct profiles of an offender's arrests before and after the primary DUI

offense. These data were used to calculate variables that measure the offender's prior criminal history and recidivism after being sentenced for a DUI offense. Finally, these data were used to obtain demographic information (e.g., race and gender) for individuals who were missing these demographic variables in the AOPC data.

In some instances, the Pennsylvania State Police RAP sheets were returned empty with only the offenders' basic demographic variables and no arrests ($n = 65$). In other cases, the police returned a completely blank RAP sheet and a notification that no records could be found for the SID ($n = 5,859$). In these instances, it is likely that the person's criminal history consists only of offenses that are eligible to be expunged and their RAP sheet was removed following the completion of his/her sentence. Since the sample includes a large number of individuals who received ARD for their DUI offense, it was not surprising to receive these responses in the RAP sheet request. These offenders were recorded as having no prior arrests and were counted as a success (i.e., no recidivism) after sentencing for the DUI offense¹¹. Because it is possible that these RAP sheets are missing due to inaccurate recording of SIDs in the AOPC or PCS data, additional sensitivity analyses were conducted that omitted these offenders to see whether the coefficients significantly changed when these individuals were included¹².

For some offenders, the SID submitted to the State Police was rejected. These responses were accompanied with a notification that the SID was invalid. These rejections were likely due to typographical errors during the data entry process in the county courthouses. These offenders

¹¹ In the final sample, after additional selection criteria were used, the total number of individuals who had a blank RAP sheet was reduced to 5 and the total number of individuals with an SID for which no records were found was reduced to 521.

¹² RAP sheets returned as blank or with no records found were coded as having no prior criminal record and as not recidivating after the primary offense included in the analyses. Thus, it is possible that including these individuals will artificially inflate the influence of criminal history in selection models, and may bias coefficients, including the treatment effect, in recidivism models.

were removed from the sample due to missing data on prior arrests and recidivating offenses (n = 343).

In order to split an individual's RAP sheet into prior offenses and recidivating offenses, the DUI offense from the AOPC data had to be identified in the RAP sheets. On the basis of offense tracking number, disposition date, and offense data, primary offenses (the DUI offenses in AOPC data) were flagged in the RAP sheets. I was able to match the primary offense for 95.7 percent of the offenders in the AOPC data. Offenders receiving ARD may have had their offenses expunged from their RAP sheets. When a primary offense could not be identified for an offender sentenced to ARD, the disposition date from the AOPC data was used to split arrests in the RAP sheets into prior and recidivating offenses.

A four-year observational period beginning on the date of sentence was used to create equal follow-up periods for each offender. Using equal follow up periods for each offender eliminates the need for additional statistical controls for different exposure times (Shadish, Cook, and Campbell, 2002). Offenders were removed if there was not a four year follow up period following their sentence for the DUI offense included in AOPC data. This may have been due to incarceration sentences that delayed release beyond 2010 (n = 31) or due to an offender dying during the four year follow up period (n= 3)¹³.

Pennsylvania Commission on Sentencing Data

The Pennsylvania Commission on Sentencing (PCS) has data on nearly all offenders sentenced in the Pennsylvania Common Pleas Courts. These data include offender and offense specific variables, but the data do not include information for offenders who are sentenced to ARD and those who are arrested for technical violations. Thus, information gathered from PCS

¹³ If the offender died during the 4 year follow up, but had a rearrest prior to his or her death, he or she were included in the sample and counted as a failure in recidivism analysis.

datasets is largely limited to offenders in the sample who were sentenced to a guilty conviction.

Two key sets of variables were used from the PCS data. First, minimum sentences for a judicial proceeding were used to calculate the date of release for offenders sentenced to incarceration. In order to determine the dates used for the four year observational period for recidivism, date of disposition was insufficient because incarcerated offenders would not have had an equal follow up period compared to non-incarcerated offenders. In order to calculate the date of release from incarceration, the minimum sentence for incarceration for a judicial proceeding was added to the disposition date. The period of observation for purposes of recidivism analysis was four years after this release date. Second, the PCS data was used to complete missing data found in either the AOPC or PCS data. This process is discussed below.

Offender Demographics

Variables for offender's age, race, and gender were originally coded from the AOPC data. If offenders had missing data for any of these variables, the demographics from the RAP sheets were used to fill in variable values. Offenders who were missing demographic information in the AOPC data and the RAP sheets had demographic variables pulled from the PCS data. After compiling demographic characteristics from these three sources, 7,424 offenders still had missing data for one or more demographic characteristics. Because these variables are necessary for both sections of analysis, offenders were removed if they had missing data on any of the three demographic variables.

Table 2. Sample Development		
	Offenders	Offenses
Original AOPC Data		1,526,561
Dataset with DUI Offenders	79,850	452,031
Offenders/Offenses Removed (AOPC):		
Repeat Offenders	6,748	37,381
Prior and Recidivism Offenses		52,092
Charged with 1st and 2nd or subs. DUI	9,764	60,729
Homicide by Vehicle	178	2,141
Homicide/Agg Assault while DUI	365	3,853
Permitting DUI	9	45
No Conviction or Diversion Sentence	1,350	8,734
Conviction and Diversion Sentence	102	627
Offenders/Offenses Removed (RAP)		
Missing SID	4,205	17,081
Wrong SID	51	195
Invalid SID	343	1,607
No Match for Primary Offense	2,454	12,529
No Four Year Follow Up	34	511
Missing Gender, Age, or Race	7,424	28,692
Final Dataset	46,823	225,814

Data Limitations

Missing SIDs – Law enforcement officers in the state of Pennsylvania issue each offender a unique SID upon his/her first arrest. Subsequent arrests are reported under the offender’s record using the unique identifier, thus compiling a single criminal history for each individual. In order to obtain records of arrest and prosecutions (RAP sheets) from the Pennsylvania State Police, each offender in the AOPC dataset needed a corresponding state identification number (SID). Not all offenders in the AOPC dataset had a valid SID. Using name and date of birth, a PCS staff member manually searched offenders in a statewide database to obtain missing SIDs.

For some offenders, SIDs were not found when manual searches in state databases were completed. For other offenders, the State Police returned notice that the SID was invalid. Offenders missing an SID (n = 4,205) or who had an invalid SID (n = 343) in the data were removed from the dataset.

Missing BAC level – Inconsistency in the reporting of blood alcohol content has been a significant problem in DUI research. The National Traffic Safety Board issued recommendations to 45 states in 2012 addressing the issue of missing BAC levels and inconsistent reporting within state collected data. The data for the present study were created prior to these recommendations. The AOPC data did not include a separate variable for the recording of the specific BAC level for each offense. However, the statutes are constructed in a way that allows us to code general categories of BAC. DUI offenses in Pennsylvania are graduated based on BAC; thus, the subsection of the DUI offense for which an offender was charged was used to construct a separate variable for BAC level (See Appendix A). Some offenders were recorded only under the general impairment statute and thus do not have a specific BAC level. Because higher BAC levels are associated with harsher statutory punishments, it is unlikely that an offender with a high BAC would be charged under general impairment. Therefore, the estimates in this study are conservative representations of BAC and its influence on selection into different treatment options.

Mental Health/Addiction Information – The data obtained from AOPC and the Pennsylvania State Police do not include any addiction or mental health information. While these variables have been used in some other research concerning DUI sentencing and treatment, their absence in the study is probably of little consequence, because the Pennsylvania DUI statutes indicate that the results of a drug and alcohol assessment should not influence the

decision of whether or not to divert. Additionally, the alcohol and drug treatment assigned to offenders is supposed to be the same whether they are sentenced to ARD or a guilty conviction.

Independent Variables

Offender Characteristics. The demographic characteristics used in the current study include race, gender, and age. Gender was dummy coded with male equal to 1 and female as the reference group. Male offenders accounted for 78.8 percent of the total sample and females represented 21.2 percent of the total.

Race was dummy coded, with white equal to 1 and other races equal to 0. The sample was largely white (90.8 percent), and African Americans accounted for most of the remaining sample (8.3 percent). The data included indicators for Hispanic (.15 percent), Asian/Pacific Islander (.7 percent), and Indian (.04 percent), but these race categories lacked the sample size to be analyzed independently. Due to these sample limitations, race was coded into white and non-white.

The offender's age was measured at the time of the offense. Unlike crimes such as burglary, which may have a substantial gap in time between the date of offense and the date on which the offender was arrested, arrests for driving under the influence are almost always instantaneous with the event. As a per se crime, trials are less likely for DUI offenses, and sentencing tends to occur in close temporal proximity to the offense date. The mean age for the sample was 33.25 years (standard deviation = 11.89). As previous literature suggests that there may be two high risk populations for DUI offenses (under 25 and 35-45), age is included as a categorical variable with several age categories.

Criminal History. Criminal history variables were coded from the RAP sheets provided by the Pennsylvania State Police. Included in the analyses was a continuous indicator for the

total number of prior arrests, a dichotomous indicator for whether or not the offender had a prior traffic offense that was not a DUI, and a continuous variable for the age of the offender at his or her first arrest. The mean number of prior arrests was 1.30 (SD = 2.31). The mean age at first arrest was 28.5 years (SD=11.4). Fifteen percent of the sample had a prior criminal traffic offense that was not a DUI. These prior traffic offenses include summary offenses (such as speeding tickets), but only if they were associated with more serious offenses (misdemeanors or felonies) that involved an arrest and that were processed in a criminal court.

Offense Characteristics. Pennsylvania statutes contain several different characteristics of driving under the influence offenses. First, offenders may be under the influence of alcohol, controlled substances, or both alcohol and controlled substances. Second, offenders' level of intoxication is measured by blood alcohol content, and the four categories of intoxication levels include general impairment, .08-.99, .10-.159, and .16 and greater. The general impairment category includes special cases such as minors (under 21) and commercial vehicle drivers who may not have blood alcohol content greater than .02, but is also used as a catch-all for low BAC levels when not specified above the .08 level. This category also includes drug offenders for which there is no blood alcohol content to record. Five different categories were constructed to capture the types of DUI offenses: drug, drug and alcohol, alcohol - low BAC (<.10), alcohol - medium BAC (.10-.159), and alcohol - high BAC (>.16). Alcohol-involved DUIs with a low BAC serve as the reference group in analyses.

For purposes of this thesis, the DUI category also serves as a proxy for the type of license suspension that a given offender is sentenced to. In Pennsylvania, license suspension is directly tied to the level of blood alcohol content. Offenders with a BAC below .10 are not sentenced to any license suspension. Offenders in the medium BAC category (.10 - .159) are sentenced to a

30-day license suspension. Offenders in the high BAC category (.16 or greater), offenders for which the BAC is unknown, offenders charged with a drug-involved DUI, and offenders who refuse to submit to a breathalyzer test are sentenced to a 60-day license suspension. Offenders below the age of 21 are sentenced to a 90-day license suspension.

Offense Seriousness. The number of charges included in an offender's disposition was included as a continuous count measure and used as a proxy indicator of the seriousness of an offender's case. Additionally, a dichotomous variable was included to indicate whether the most serious offense was a felony. Finally, a dichotomous variable was included to indicate whether the offender's judicial proceeding included an offense that was more serious than his or her DUI (as indicated by the grade of each offense).

Case Processing. A continuous variable for the time to punishment was also included. This variable was constructed by calculating the number of weeks between an offender's arrest and sentencing date.

Contingency Effects. To test labeling theories of contingency effects, two interactions were included in the model predicting recidivism. The indicator of diversion was interacted with gender and race to determine whether or not differential effects exist for varying demographic characteristics in our sample.

County Level Variables. This study includes several measures from the US Census and various Pennsylvania state agencies to test the relationship between structural conditions and the likelihood of receiving a diversion sentence, as well as the influence of social contexts on criminal behavior. Social Explorer was used to obtain data from the 2006-2010 American Community Survey 5-year estimates. This study includes measures of each county's population

density, percent of non-white residents per county, percent of residents below the poverty line, and percent of the county's population that were males between the ages of 18 and 24.

County Resources. Measures of different resources available to counties in Pennsylvania for the treatment of alcohol and drug offenders were also included. Specifically, the amount of state funding provided to each county for drug and alcohol restrictive intermediate punishment programs was collected from the Pennsylvania Commission on Crime and Delinquency (PCCD) website.

A complete list of the drug and alcohol treatment facilities in each county was obtained from the Pennsylvania Department of Health's website. A count of the number of treatment facilities in each county was calculated. In order to control for differences in county population, a ratio was created to depict the number of treatment centers per 10,000 residents in each county.

Dependent Variables

Assignment to Treatment. In this study, the outcome variable is a dichotomous variable indicating whether the offender was diverted to an ARD program or sentenced for a guilty conviction. Almost exactly half of the sample (50.4%) received an ARD sentence for their final disposition.

Recidivism. For this study, recidivism is conceptualized as a rearrest within four years of the final disposition. Research shows that two-thirds of offenders are rearrested within the first three years following release, and the use of three year follow up periods was recommended for consistency in the field by the National Advisory Commission on Criminal Justice Standards and Goals after comparing results from different studies that used various follow-up periods (Langan and Levin 2002, National Advisory Commission on Criminal Justice Standards and Goals 1973). A 12 year follow-up study by Cavaiola, Stohmetz, and Abreo (2007) concludes that a longer

follow-up period should be used for assessing recidivism among impaired drivers. Although longer follow-up periods might be ideal, a shorter follow-up period allows for more consistent comparisons across existing literature and is able to account for the majority of recidivism on average (Homel, 1981). Additionally, our data includes offenders who may not have completed the terms of their sentence until 2008. RAP sheets were obtained from the State Police in 2014, censoring the possible follow-up period at a maximum of 6 years.

The data for this thesis lack an indicator of when an offender is officially released from jail or probation, and rearrest is possible while on probation. Pennsylvania statutes indicate that a first time DUI offender may be sentenced to up to 72 hours of imprisonment and a minimum of 6 months' probation. Additionally, those sentenced to ARD programs may undergo supervision between 6 months and one year. Extending the recidivism analysis to 4 years ensures a full three year follow-up period for individuals successfully completing the terms of their sentence while also capturing recidivism for offenders who fail prior to the completion of their probation sentence.

Analytic Strategy

This thesis uses two level, logistic, hierarchical linear modeling to nest individual offenders within 60 judicial districts. In general, each judicial district in the Courts of Common Pleas processes all cases from a single county. However, seven of the districts are composed of two counties¹⁴. In order to control for additional dependence that results from offenders being processed through the same judicial district, these counties were combined at the second level. This structure allows a quasi-contextual analysis of county demographics.

¹⁴ Level two measures for judicial districts that cover two counties were created by taking the average of the specific variable across both counties.

Because the analysis includes individual offenders nested within judicial districts, hierarchical linear modeling is necessary to account for dependence and bias that results from the influence of county and courtroom characteristics on the dependent variable. That is, offenders within a given location may be exposed to unique county or courtroom characteristics that affect their value on the dependent variable in the same way.

The standard equation for a random coefficient HLM model is:

$$\begin{aligned}
 Y_{ij} &= \beta_{0j} + \beta_{1j}X_{ij} + r_{ij} \\
 \beta_{0j} &= \gamma_{00} + \gamma_{01}W_j + u_{0j} \\
 \beta_{1j} &= \gamma_{10} + u_{1j}
 \end{aligned}$$

The use of a dichotomous dependent variable violates several assumptions of ordinary least squares regression, requiring the use of an alternate functional form to account for given limitations. Specifically, dichotomous outcomes are bounded (between 0 and 1) and the residuals do not follow a normal distribution. Thus, this study uses a generalized linear model with a logistic link function to predict the probability that an individual will receive an ARD sentence given their values on individual and county level covariates.

The generalized linear model is:

$$\eta = \beta_{0j} + \beta_{1j}X_{1ij} + \beta_{2j}X_{2ij}$$

The standard outcome of y is replaced with an alternative link function to translate between the linear outcome and the parameter of the probability distribution. This outcome provides for a linear distribution that corrects for violations of the dichotomous outcome variable by normalizing the distribution. The linear outcome (log odds) must then be transformed into a non-linear, bounded scale that is consistent with the probability model and possible values of the

outcome measure. For this study, the link function is a logistic function $\mu_i = g(\eta_i)$, expressing the value for the probability model as a function of the value from the linear model. The logistic function, μ_i , is calculated as:

$$\mu_i = \exp(\eta_i)/(1+\exp(\eta_i)) = 1/(1+\exp(-\eta_i))$$

Given that the linear model provides for an alternative outcome that functions as a linear variable, the equations for level-2 are unchanged from standard HLM analysis.

Model 1: Selection into treatment

The first question this thesis seeks to answer is what characteristics influence the sentencing of offenders to either accelerated rehabilitative dispositions or guilty convictions? To answer this question, I use a logistic hierarchical linear model to analyze the probability that offenders are sentenced to ARD rather than a guilty conviction. The dependent variable is a dichotomous indicator where 1 represents ARD and 0 represents a guilty conviction.

Independent variables at level-1 include all offender demographic characteristics, offender prior criminal history indicators, and offense characteristics. Independent variables at level-2 include county characteristics, as well as indications of alcohol and drug treatment facilities within the jurisdiction of the judicial district.

Model 2: Effectiveness of treatment

The second question this thesis seeks to answer is whether different sentences affect the recidivism of first-time DUI offenders. For this analysis, I used a two level, logistic, hierarchical linear model to analyze the probability that individual offenders will recidivate within 4 years of their first DUI. For the first set of analyses, the dependent variable is a dichotomous indicator where 1 represents an arrest for any new offense and 0 represents no arrest. For the second set of

analyses, the dependent variable will be modified to contain indicators for only DUI offenses. That is, models will analyze whether or not offenders were rearrested specifically for driving under the influence. These two models will allow for the comparison of variables that predict recidivism in general compared to those that predict whether or not individuals will be repeat DUI offenders.

Importantly, this model includes all level-1 and level-2 variables that are analyzed in the sentencing models. While selection into different types of sentence may bias the probability of recidivism, additional procedures such as propensity score matching are not necessary for this paper. All variables that predict the likelihood of being sentenced to diversion or guilty convictions are controlled for in this model, thus controlling for any selection effects. Absent additional data with which I could develop propensity score models, there is no advantage to employing selection techniques for this thesis.

Results

The results of this thesis are presented in four parts. First, descriptive statistics are presented for offense, offender, and county characteristics. Second, bivariate and multivariate models analyzing selection into ARD versus a guilty conviction are presented. Third, bivariate and multivariate analyses of the effectiveness of sanctions on general offending are presented.

Descriptive Statistics

Offender and Offense Characteristics

The sample for this thesis includes 46,823 first-time offenders, sentenced in Pennsylvania Courts of Common Pleas in 2006 and 2007, who were ARD eligible, who had a RAP sheet returned from the Pennsylvania, and who had a full four year follow-up period. The data include slightly more cases from 2007 ($n = 27,228$) than 2006 ($n = 19,595$)¹⁵. As Table 2 reports, the sample was largely homogenous with respect to demographic characteristics, but varied on offense level characteristics and indicators of criminal history. Half of the sample was sentenced to an accelerated rehabilitative disposition (ARD), and the other half was sentenced to a guilty conviction. About one third of the sample was rearrested within 4 years of their disposition for the first-time DUI offense.

¹⁵ Reports from the Pennsylvania Commission on Crime and Delinquency showed an increase in DUI arrests by 6 percent between 2006 and 2007, supporting our finding that more cases were disposed of in the latter year of our sample. Upward trends in arrests also occurred as a result of the 2003-2004 changes in Pennsylvania DUI laws, resulting in more cases being disposed in later years due to delays in case processing.

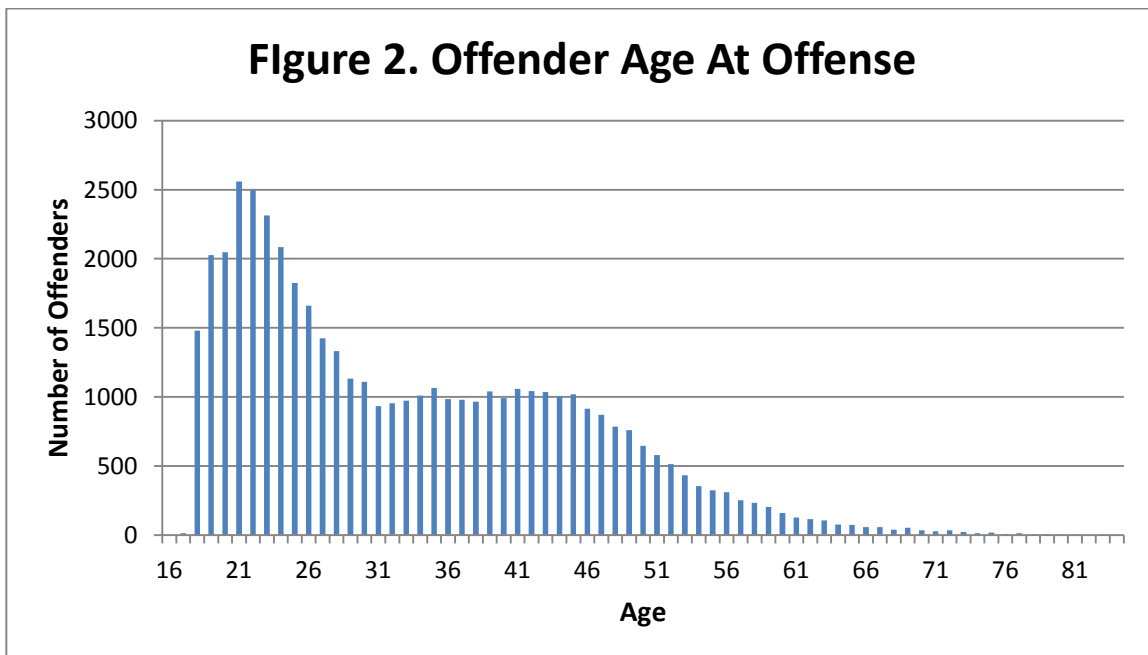
Table 3. Descriptive Statistics (Offenders N = 46, 823 and Offenses N = 225,814)

	Mean	SD	Min	Max
Offender Demographics				
Gender (%)				
Male	78.8	--	--	--
Female	21.2	--	--	--
Race (%)				
White	90.8	--	--	--
Black	8.3	--	--	--
Asian/Pacific Islander	0.7	--	--	--
Native American	0.0	--	--	--
Hispanic	0.2	--	--	--
Other	0.0	--	--	--
Age at Offense	33.3	11.9	16	100
Age Categories (%)				
Under 21	11.9	--	--	--
21-25	24.1	--	--	--
26-30	14.2	--	--	--
31-35	10.5	--	--	--
36-40	10.6	--	--	--
41-45	11.0	--	--	--
46-50	8.5	--	--	--
Over 50	9.1	--	--	--
Criminal History				
No. Prior Arrests	1.3	2.3	0	40
Prior DUI Arrests (%)	16.0	--	--	--
Prior DUI Conviction (%)	7.8	--	--	--
Prior BUI Arrests (%)	0.03	--	--	--
Prior non-DUI Traffic Arrests (%)	7.2	--	--	--
Age at First Arrest	28.5	11.4	10	100
Offense Characteristics				
Type of Disposition (%)				
Guilty Conviction	49.6	--	--	--
ARD	50.4	--	--	--
Rearrest within 4 Years (%)	31.9	--	--	--
Year of Disposition (%)				
2006	41.8	--	--	--
2007	58.2	--	--	--
Days to Sentencing	315.6	354.5	1	9118
Most Serious Offense - Felony (%)	3.4	--	--	--
Most Serious Offense - DUI (%)	87.5	--	--	--
Type of Convicted or Diverted DUI (%)				
Drug	4.7	--	--	--
Alcohol (Gen. Impairment)	24	--	--	--
Alcohol (BAC .08-.10)	5.6	--	--	--
Alcohol (BAC .10-.16)	25.6	--	--	--
Alcohol (BAC > .16)	40.1	--	--	--
Total Conviction or Diversion Charges	2.6	2.0	0	80

Demographics

The majority of offenders in the sample were male, white, and between the ages 21 and 45. Age was originally conceptualized as a continuous variable. However, as shown in Figure 1, the distribution of the age of the offenders at the time of the offense is not normally distributed. Consistent with the findings in other samples (e.g., Laub and Sampson, 2003), the distribution of age peaks in early adolescence, declines through the late twenties, plateaus between 30 and 45, and then declines through older ages. The mean age of the sample was 33.24 (SD = 11.89).

In order to address the non-normal distribution of age for the sample, age was grouped into a categorical variable using discrete 5 year categories (under 21, 21-25, 26-30, 31-35, 36-40, 42-45, 46-50, and over 50). The frequencies for these categories are presented in Table 2. Alternative categorical combinations were tested in the bivariate analyses.



Criminal History.

Offenders in the sample had an average of 1.3 prior arrests ($SD = 2.31$). Over half of the sample (52.7%) had no prior arrests, and thus, the DUI offense was their first ever arrest for a criminal offense. These prior offenses include minor traffic offenses (e.g., speeding, failure to yield, etc.) only if they were processed in a Court of Common Pleas with more serious misdemeanor and felony offenses.

Types of prior arrest are also coded in the data. A small portion of the sample had a prior arrest for driving under the influence, and an even smaller portion of the sample had a prior DUI conviction. Given that the sample included only first-time offenders, these individuals with prior DUI arrests and convictions appear to be incorrectly coded. However, there are two reasons why individuals with a prior DUI arrest or conviction may be sentenced for a first-time offense in 2006 or 2007. First, individuals who were previously arrested but not convicted of a DUI likely accepted plea deals in which their prior DUI offense was reduced to a non-DUI traffic offense, such as reckless driving. Only prior DUI convictions matter for determining the type of charge for an individual who was driving under the influence. Second, Pennsylvania statutes indicate that prior DUI convictions matter at sentencing only if they occurred within ten years of the offense for which the offender is being sentenced. Thus, individuals may be convicted of a first-time DUI offense if all prior DUI offenses on their record occurred more than ten years prior to the 2006 or 2007 offense.

Less than one percent of the sample had a prior arrest for boating under the influence (BUI). While this offense is not covered under the same statutes, individuals who engage in boating under the influence may be more likely to drive under the influence. Additionally, judges may view prior BUI arrests as an indicator of more serious alcohol dependency or may

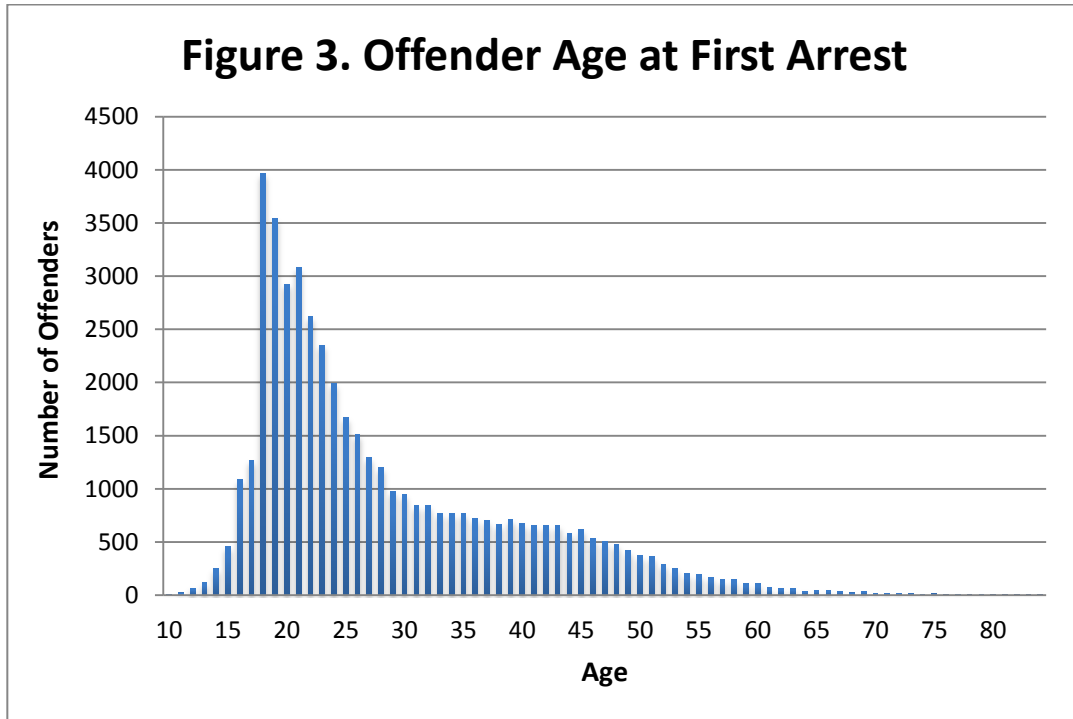
view these offenders as more likely to drive under the influence. Because the sample of offenders who had a prior BUI offense was so small, they were grouped with offenders who had a prior DUI offense.

Because literature suggests that problem drivers, in general, may be more likely to drive under the influence of drugs or alcohol, an indicator for prior non-DUI traffic offenses was included. These prior non-DUI traffic offenses included misdemeanor and felony offenses, such as reckless driving, as well as summary offenses when they were cited during an arrest for a more serious offense. Eight percent of the sample had a prior non-DUI traffic offense.

Finally, the data include a measure of age at first arrest. For 52.7% of the sample, the age at first arrest is the age at offense discussed in the offender demographics, but for the other half of the sample, age at first arrest was calculated by computing the age of the offender at his or her earliest arrest in the RAP sheets. The average age at first arrest for this sample was approximately five years less than the average age of offenders at the time of their first DUI offense. Interestingly, the standard deviation is almost exactly same for these two age distributions, and the differences occur largely as a function of the downward shift in the distribution. Figure 2 depicts the distribution for age at first offense. This age curve more closely approximates the general age-crime curve and has only one peak in young adulthood.

Comparing the distribution of age for first-time DUI arrests and first criminal arrests raises an interesting question regarding the DUI offenders who are arrested in the second peak of the current offense distribution. Analysis of prior arrest suggests that older first-time DUI offenders are likely to have engaged in other criminal behaviors through their life course. The second peak in the age distribution for DUI offenders may be influenced by individuals who fail to fully desist from delinquency beyond adolescence and young adulthood, rather than

individuals who do not engage in criminal behavior through the life course but drink and drive later in adulthood. This interesting question will be addressed in future research.



Offense Characteristics

The characteristics of offenders' cases varied not only in terms of DUI specific characteristics, but also in terms of the seriousness of additional charges and the procedures of case processing.

For the majority of the sample the DUI charge was the most serious charge in the case disposition.¹⁶ For a small group of offenders the most serious offense they were charged with

¹⁶ Seriousness of charges included in each offender's judicial proceeding was determined by the grade (e.g., misdemeanor 3, misdemeanor 1, felony 3, felony 1).

was a felony (first-time DUI offenses are varying grades of misdemeanors, depending on the BAC level). On average, offenders in the sample were convicted of only one offense.¹⁷

There are six different types of DUI offenses in Pennsylvania: drug, drug and alcohol, alcohol – BAC < .08, alcohol – BAC .08 - .10, alcohol – BAC .10 - .16, and alcohol – BAC > .16. If offenders had an alcohol-related DUI, the highest BAC associated with conviction or diversion dispositions was selected. The most common type of DUI offense in this sample was an alcohol-related DUI with a BAC greater than .16. There were no offenders in the sample for whom the most serious convicted or diverted DUI was a drug and alcohol DUI. The least common type of DUI was an alcohol-related DUI with a BAC between .08 and .10.

Almost a quarter of the offenders were sentenced for an alcohol-related offense under the general impairment statutes. As previously discussed, offenders may be sentenced under general impairment statutes if they have a BAC below .08 or if BAC information was missing, but it is unlikely that offenders with a BAC above .08 would be sentenced under this statute because of differences in sentencing guidelines for higher levels of BAC. Thus, general impairment and low BAC (.08-.10) were combined in analyses. Drug impaired DUIs were included as their own category.

Differences in case processing were evidenced by the number of days between the DUI offense and the final disposition. As noted previously, DUI offenses are unique from other offenses, such as burglary, in that the date of offense is the same as the arrest date. Thus, this measure is the same as the days between arrest and punishment. The average number of days between an offender's DUI offense and punishment was 315.6 (SD = 354.5). The median

¹⁷ There were some individuals convicted of as many as 80 offenses. Upon further evaluation using publicly available docket sheets, I determined these numbers of charges were legitimate. Cases varied in the types of associated offenses (e.g., multiple counts of child pornography, multiple counts of forgery or bad checks, or multiple counts of possession of illicit substances), but the number of charges does not appear to be a coding error.

number of days between a DUI offense and punishment was 217, indicating that the mean is strongly affected by a few outliers in the upper end of the distribution. The maximum number of days between an offense and disposition was 9118, approximately 24 years¹⁸.

County Characteristics

Contextual variables were gathered from a variety of sources. Differences between counties were present for demographic characteristics, program funding, and drug and alcohol treatment availability. Census variables obtained from the 2006-2010 American Community Survey estimates are presented for each of the 67 Pennsylvania Counties. PCCD program funding for drug and alcohol restrictive intermediate punishment (D&A RIP) is provided for the 37 counties that received funding and program funding for county intermediate punishment (CIP) is provided for the 55 counties receiving funding. Finally, information for treatment centers and the types of treatment available is provided for all 67 Pennsylvania Counties.

¹⁸ After further analysis, using publicly available docket sheets, the cases in the extreme high end of the range were determined to be legitimate. Docket sheets indicated that these individuals failed to appear at hearings, had bench warrants issued for their arrest, but were not apprehended for years (in some cases decades) and were sentenced following their apprehension.

Table 4. Level 2 Descriptive Statistics (Counties N = 67)

	Mean	Median	SD	Min	Max
Census Demographics					
Total Population	188,249.3	89,153.0	265,767.1	5,197	1,504,950
Population Density (per sq. mile)	463.1	139.4	1,415.4	13.1	11,222.5
Percent White	92.2	95.2	8.5	41.4	98.7
Percent Black	4.2		6.4	0.1	44.0
Percent Male	49.6	49.1	2.3	47.0	64.6
Percent Male - Age 18-24	4.9	4.5	1.8	3.4	15.8
Percent Male - Age 25-34	5.6	5.5	1.1	3.9	12.2
Percent Male - Age 35-44	6.7	6.6	0.7	5.1	9.6
Percent Male - Age 45-54	7.8	7.8	0.6	6.0	9.1
Percent below poverty (Ages 18-64)	11.4	10.9	3.5	4.5	22.7
PCCD Program Funding					
Received D&A RIP Funding 2007-2008 (%)	47.8	--	--	--	--
D&A RIP Funding Award Amounts (N = 32)					
Total Funding, 2007-2008 (\$)	538,073.09	277,248.00	1,232,129.51	17,738	7,117,498
Amount of Funding Expended 2007-2008 (\$)	498,521.06	312,122.50	861,391.83	71,355	5,011,904
Total Funding Per Active Offender 2007-2008 (\$)	661,736.00	15,537.00	17,930.70	2,181	95,268
Received CIP Funding 2007-2008 (%)	82.10	--	--	--	--
CIP Funding Award Amounts (N = 55)					
Total CIP Funding, 2007-2008 (\$)	59,678.04	25,301.00	100,249.76	4,375	605,717
Amount of CIP Funding Expended 2007-2008 (\$)	60,587.13	28,550.00	99,976.45	4,375	605,717
Total CIP Funding Per Exiting Offender 2007-2008 (\$)	1,321.27	413.00	2,518.24	0	14,699
Percent of CIP Offenders, DUI 2007-2008	36.7	32.0	32.6	0	100
Alc. And Drug Treatment Centers					
Number of Facilities	10.1	5.0	16.6	1.0	116.0
Inpatient	2.7	1.0	5.7	0.0	43.0
Outpatient	7.7	0.0	11.5	1.0	74.0
Partial Hospitalization	1.6	0.0	3.2	0.0	21.0
Psych Hospital	0.1	0.0	0.4	0.0	2.0
Type of Treatment					
Detoxification	1.5	1.0	2.3	0.0	14.0
Drug-Free	11.4	5.0	18.4	1.0	120.0
Chemotherapy	1.2	1.0	2.1	0.0	12.0
Transitional Living	0.1	0.0	0.4	0.0	3.0
Intake Evaluation and Referral	0.1	0.0	0.3	0.0	2.0
Maintenance	0.9	0.0	1.9	0.0	13.0

Census Data. Pennsylvania is composed of 48 rural counties and 19 urban counties.¹⁹ Consequently, the total population in each county varies greatly, from just over 5,000 to more than 1.5 million. Population density provides an alternative measure of population that also provides information about how rural or urban a county may be.

Census demographics reveal that most counties in Pennsylvania are disproportionately white, with some counties approaching 100% racial homogeneity. Because the offender level data is analyzed using a dichotomous race indicator (white and non-white), the county-level race variable was also categorized as a white vs. non-white dichotomy.

The gender and age composition of each county was included using the ACS estimate for the percent of the population that were males between the ages of 18 and 24. To contextualize this measure, descriptive statistics are provided in Table 4 for the overall gender distribution, as well as the distribution of males across several age categories.

Finally, an economic indicator for the percent of individuals between the ages of 18 and 64 living below the poverty line measured by the American Community Survey was included. Rate of poverty for this age group varied between 4.5 percent and 22.7 percent.²⁰

The distributions of population density and racial composition were positively skewed.²¹ Transformations were not able to normalize the distribution of population density, but the log transformation most closely approximated normality ($\text{Chi}^2(2) = 7.59, p = .022$). In its original form, population density was highly correlated with percent white. However, the log transformation of population density reduced this correlation. Percent white was not

¹⁹ Classifications for rural and urban counties are provided by the Center for Rural Pennsylvania (www.rural.palegislature.us).

²⁰ Percent in poverty was negatively skewed. Although tests suggested that a log transformation would provide a normal distribution of the variable, the benefit gained was not greater than the cost associated with interpreting transformed variables. Subsequently, this variable was included in its original form.

²¹ Ladder, gladder, and sktest programs in STATA were used to explore the distribution of each variable and potential transformations.

transformed. Analysis of possible transformations found that transformations did not significantly benefit the distribution of this variable.

The indicator for percent male between the ages of 18 and 24 was highly concentrated in the lower range of the distribution. Normality in distribution was reached through transforming the variable using a $1 / X^2$ formula ($\text{Chi}^2(2) = 1.32, p = .516$). This transformation was included in analyses, which reverses the interpretation of effects. Using the transformed variable, higher values represent a smaller percent of the population that are males between the ages of 18 and 24.

In seven instances, a single judicial district comprises two counties. For analyses, offenders are nested within judicial district. A single measure for each judicial district was calculated by averaging county variables for each appropriate jurisdiction.

PCCD Funding. County intermediate punishment (CIP) is an alternative sanction that is more serious than probation, but less serious than confinement. These programs are reserved for non-violent offenders, and are supported through funds appropriated on an annual basis from the Pennsylvania Legislature. Drug and alcohol treatment-based county restrictive intermediate punishment (D&A RIP) is a type of CIP sentence that is clinically prescribed for drug and alcohol dependent offenders. Funding for both CIP and D&A RIP is awarded by the Pennsylvania Commission on Crime and Delinquency (PCCD). In the Fiscal Year 2007-2008, 58 counties received a total of 3.354 million dollars for CIP programs and 33 counties received a total of 17.218 million dollars for D&A RIP programs.

The total amount of funding awarded for each county program and the amount of funding expended are reported for the counties that received program funding.²² For D&A RIP, a ratio of the amount of funding per active offender²³ is also reported. For CIP, the amount of funding per exiting offender²⁴ was reported. Finally, the percent of CIP offenders who were DUI offenders was also reported. In some counties, none of the CIP funds were used for DUI offenders, while other counties used 100% of their funds for DUI offenders.

Drug and Alcohol Treatment. The number of and types of drug and alcohol treatment centers available in each county also varied. As of 2014, each county had at least one facility available. Types of treatment facilities included inpatient centers, outpatient centers, partial hospitalization,²⁵ and psychiatric hospitals.²⁶ Facilities may provide one or multiple types of drug and alcohol treatment. Types of treatment included detoxification, drug-free programs,²⁷ chemotherapy, transitional living, maintenance, and intake, evaluation, and referral programs.

The most common type of treatment facility was an outpatient facility (n = 515, statewide), followed by an inpatient facility (n = 180, statewide). More rare were psychiatric hospitals (n = 7, statewide) and facilities that used partial hospitalization (n = 108, statewide).

²² The amount of funding awarded was highly correlated with population density ($r = .96$ and $.81$). Consequently, a dichotomous indicator of whether or not funding was received as well as a measure for the percent of CIP funds used for DUI offenders were included in multivariate analysis.

²³ The number of active offenders is calculated from the number of offenders in the D&A RIP program throughout the funding period, measured quarterly.

²⁴ The number of exiting offenders includes the number of offenders who successfully completed CIP or were terminated from the program during the funding period. Offenders can be terminated due to an arrest, technical violation of probation, or other reasons.

²⁵ Partial hospitalization facilities are generally used for offenders who benefit from more intense supervision than outpatient facilities but do not require 24/7 monitoring.

²⁶ Some facilities were mixed methods facilities offering multiple treatment methods, such as inpatient and outpatient services.

²⁷ The Pennsylvania Department of Health (2014) classifies the drug-free approach as, “The provision of guidance, advice, and psychological treatment as a means to deal with the client's emotional structure and concurrent problems without the use of a maintenance substance. Temporary medication for treatment of physiological conditions or as an adjunct to psychosocial treatment may be utilized in this approach.”

The most common type of treatment was drug-free programs, followed by detoxification programs.

The hypotheses in this thesis suggest that the availability of treatment is important to sentencing decisions, not necessarily the type of treatment. In order to control for population, the number of treatment facilities was included as a ratio representing the number of treatment facilities per 10,000 residents, but type of treatment was omitted from the models.

Sentencing of Offenders

The first portion of the analyses addresses which offender, offense, and county characteristics are related to decisions at sentencing for first-time DUI offenders. The analysis begins with bivariate statistics showing the characteristics of offenders who are found guilty and those who receive ARD. Descriptive statistics are followed by hierarchical linear logistic models that nest individual offenders within judicial districts.

Bivariate Analyses

Each of the offender and offense characteristics differed significantly between offenders who receive ARD and those sentenced for a guilty conviction. Table 5 presents bivariate statistics for offender characteristics by type of disposition, Table 6 presents bivariate statistics for offense characteristics by type of disposition, and Table 7 presents bivariate statistics for county characteristics by type of disposition

Table 5. Offender Descriptive Statistics by Type of Disposition (N=46,823)

Offender Characteristics	Guilty (N)	ARD (N)	Guilty (%)	ARD (%)	Sig. ¹
Gender					***
Male	19,385	17,498	52.6%	47.4%	
Female	3,850	6,090	38.7%	61.3%	
Race					***
White	20,473	22,046	48.2%	51.8%	
Non-White	2,762	1,542	64.2%	35.8%	
Age at Offense					***
Under 21	2,465	3,104	44.3%	55.7%	
21-25	5,145	6,134	45.6%	54.4%	
26-30	3,440	3,219	51.7%	48.3%	
31-35	2,597	2,339	52.6%	47.4%	
36-40	2,706	2,254	54.6%	45.4%	
41-45	2,814	2,348	54.5%	45.5%	
46-50	2,096	1,881	52.7%	47.3%	
Over 50	1,972	2,309	46.1%	53.9%	
Mean	33.7	32.8			***
Prior Arrests					***
0	8,290	16,399	33.6%	66.4%	
1	5,415	4,832	52.8%	47.2%	
2	3,250	1,389	70.1%	29.9%	
3-5	4,102	826	83.2%	16.8%	
6 plus	2,178	142	93.9%	6.1%	
Mean	2.0	0.5			***
Prior DUI/BUI Arrest					***
No	17,500	21,833	44.5%	55.5%	
Yes	5,735	1,755	76.6%	23.4%	
Prior DUI Convictions					***
No	20,007	23,188	46.3%	53.7%	
Yes	3,228	400	89.0%	11.0%	
Prior Other Traffic Arrest					***
No	20,349	23,082	46.9%	53.1%	
Yes	2,886	506	85.1%	14.9%	
Age at First Arrest					***
Less than 16	664	271	71.0%	29.0%	
16-20	7,776	5,323	59.4%	40.6%	
21-24	4,961	5,529	47.3%	52.7%	
25-29	3,333	3,549	48.4%	51.6%	
30-34	2,012	2,243	47.3%	52.7%	
35-39	1,535	1,894	44.8%	55.2%	
40-44	1,181	1,735	40.5%	59.5%	
45-49	900	1,308	40.8%	59.2%	
50 and Older	873	1,736	33.5%	66.5%	
Mean	26.4	29.5			***

¹ χ^2 tests were used for categorical variables and t-tests were used for continuous variables

*** p < .001 ** p < .01 * p < .05

Bivariate analyses reveal significant differences in offender demographics for those who are convicted and those who receive ARD. Females, whites, and younger offenders were more likely to be sentenced to ARD than males, non-whites, and older offenders. Individuals with fewer prior arrests were more likely than those with more prior arrests to be sentenced to ARD.²⁸

As expected, individuals with a prior arrest or conviction for driving (or boating²⁹) under the influence were less likely than individuals with no prior arrest or conviction for DUI to be sentenced to ARD. Similarly, offenders with no prior non-DUI traffic arrests were more likely than individuals with a prior arrest for non-DUI offenses to receive ARD. Finally, individuals who were first arrested at a younger age were less likely to receive a diverted sentence than those who were first arrested at older ages.³⁰

²⁸ The decision was made to use a categorical variable for total prior arrests due to the large number of offenders with no prior arrests. In addition, a categorical variable allows for a more in-depth investigation into the differences between no prior arrests, one prior arrest, and multiple prior arrests.

²⁹ Fewer than 10 offenders had a prior BUI arrest and these arrests were consequently grouped with prior DUI arrests.

³⁰ In the models, age at first arrest was included as a categorical variable. The non-normal distribution, combined with the previous decision to include age at offense as a categorical variable, meant that a categorical variable for age at first arrest provided a more effective presentation of the effects of the age-crime trajectory and DUI sentencing.

Table 6. Offense Descriptive Statistics by Type of Disposition (N=46,823)

Offense Characteristics	Guilty (N)	ARD (N)	Guilty (%)	ARD (%)	Sig. ¹
Case Disposition Year					***
2006	11,227	8,368	57.3%	42.7%	
2007	12,008	15,220	44.1%	55.9%	
Days to Sentence	305.0	326.1			***
Most Serious Grade in Judicial Proceeding					***
Misdemeanor	21,825	23,421	48.2%	51.8%	
Felony	1,410	167	89.4%	10.6%	
Most Serious Offense Was DUI					***
No	4,587	1,269	78.3%	21.7%	
Yes	18,648	22,319	45.5%	54.5%	
Type of DUI					***
Drug	1,596	589	73.0%	27.0%	
Alcohol - BAC <.10	7,355	6,534	53.0%	47.0%	
Alcohol - BAC .10-.16	5,421	6,551	45.3%	54.7%	
Alcohol - BAC > .16	8,863	9,914	47.2%	52.8%	
Total Conviction or Diversion Charges	2.5	2.7			***

¹ χ^2 tests were used for categorical variables and t-tests were used for continuous variables

*** p < .001 ** p < .01 * p < .05

Offense characteristics and case processing characteristics also varied by type of sentence. The time to punishment was longer for individuals receiving diversion than for individuals sentenced for a guilty conviction, although the mean for these two groups varied by less than two weeks. Individuals who had a felony charge included in their judicial proceeding were significantly less likely to receive an ARD. Similarly, individuals with additional, non-DUI charges in their judicial proceeding were less likely to receive an ARD. These findings are not surprising since other offenses may not be eligible for ARD or may increase the seriousness of the overall judicial proceeding, decreasing the likelihood that judges are willing to impose an ARD for the associated DUI offense.

Diverted sentences were more likely to be given for alcohol offenders than for drug offenders. Surprisingly, among alcohol-impaired offenders, ARD was more likely to be imposed for offenders with medium or high BAC levels than for individuals with a low BAC level.

Table 7. Level 2 Descriptive Statistics by Type of Disposition (N=46,823)

County Characteristics	Guilty (N)	ARD (N)	Guilty (%)	ARD (%)	Sig. ¹
Population Density (ln)	6.2	6.1	--	--	
Percent White (ln)	4.5	4.5	--	--	***
Percent Male 18-24 (1/x ²)	0.1	0.0	--	--	**
Percent Poverty 18-64 (ln)	2.2	2.2	--	--	***
Treatment Centers Per 10,000 Residents (ln)	-0.7	-0.7	--	--	*
Received D&A RIP Funding					
No	5,325	5,317	50.0%	50.0%	
Yes	17,910	18,271	49.5%	50.5%	
Received CIP Funding					
No	673	968	41.0%	59.0%	
Yes	22,562	22,620	49.9%	50.1%	
Percent of CIP Funding Used for DUI	41.0	36.6			

¹ χ^2 tests were used for categorical variables and t-tests were used for continuous variables

*** p < .001 ** p < .01 * p < .05

Differences in judicial district characteristics were less pronounced. Table 5 presents the statistics for the transformed county-level variables that are used in analyses.³¹ Population density, percent white, percent of residents between the ages of 18 and 64 below the poverty line, and rate of treatment centers per 10,000 residents were all log transformed. Percent of male residents between the ages of 18 and 24 was transformed using the 1/x² transformation. County characteristics were more homogenous than offender and offense characteristics for offenders sentenced for a guilty conviction or ARD. Population density was not significant in bivariate analyses. Offenders living in counties with a higher percentage of white individuals,

³¹ Bivariate analysis using the original variables that were not transformed produced different results in significance testing because of the skewed distributions of the variables in their original form. Thus, I opted to present the statistics for the final form of the variable that is included in multivariate analyses.

fewer males between the ages of 18 and 24, a higher percent of individuals in poverty, and more treatment centers available to residents were more likely to receive ARD than to be found guilty for their DUI. Although statistically significant, the absolute differences in these categories were minimal.

Descriptive statistics and bivariate analyses allow for an initial investigation of the types of offenders sentenced for a guilty conviction or receiving ARD, but they do not control for other characteristics in the dataset. Multivariate analyses allow for an evaluation of the effects of different variables while controlling for the effects of other variables in the dataset. Additionally, the use of multivariate analyses allows for the separation of individual-level characteristics from the effects that may similarly affect different offender sentenced in the same judicial district. The following analyses estimate the effects of offender, offense, and county characteristics on sentencing decisions.

Unconditional Model

An initial unconditional model using a linear functional form confirmed information presented in the bivariate analyses. Absent any independent variables, the intercept (shown in Table 6) was equivalent to the mean of the dependent variable in the sample (b = .50 and 50 percent of the sample received diversion).

Fixed Effects	Coef.	Odds	SE	T-ratio	df	P-value
Intercept	0.50	1.65	0.036	109.009	46,822	0.000

Additional unconditional models using a logit link function were specified with and without random intercepts (see Table 9 and Table 10). Random intercepts allow for variation in the slope for different groups or, in this thesis, judicial districts. The model without random

intercepts is presented with model-based standard errors and robust standard errors. Because the robust standard error is 16 times larger than the model-based standard error, these findings provide support for the use of random intercepts.

Model-Based SE	Coef.	Odds	S.E.	T-ratio	df	P-value
Intercept	0.015	1.02	0.009	1.631	46,822	0.102
Robust SE	Coef.	Odds	S.E.	T-ratio	df	P-value
Intercept	0.015	1.29	0.144	0.104	46822	0.917

The model including random intercepts (see Table 10) adds a variance component for the intercept, allowing the slope to vary across judicial districts (the level-2 unit). The highly significant variance component indicates there was significant variation in guilty convictions and ARDs across judicial districts in the state.

Fixed Effects	Coef.	Odds	S.E.	T-ratio	df	P-value
Intercept	-0.088	0.916	0.117	-0.755	59	0.453
Random Effects	SD	Variance	df	chi-square	P-value	
U0	1.137	1.29	59	6910.151	0.000	

Level – 1 Conditional Models

An initial model including only level-1 variables was analyzed to determine whether or not random coefficients were needed for variables in the model. The question with random coefficients is whether or not the effect of particular variables varies across judicial districts. For example, does the effect of being white depend on the judicial district that the offender is sentenced in?

Two methods were used to determine which coefficients should be random. First, two versions of the full level-1 model were compared; the first used model-based standard errors, while the second used robust standard errors (see Appendix A). If the robust standard errors are substantially larger than the model-based standard errors, there was reason to believe that random coefficients were needed.

An additional method used to determine the necessity for random coefficients is analyzing the χ^2 test of variance components that are added in the random coefficients model. Collinearity of variables in addition to small cell sizes for some of the categorical variables prevented a model from converging with random coefficients.

A correlation matrix of the variables included in analyses revealed potentially problematic correlations between the age at offense and age at first arrest variables (see Appendix B). This problematic pattern was likely because 52.7% of the sample had no prior arrests. Thus, the age at their DUI offense was used for age at first arrest. The focus of analysis using age at first arrest variables is concerned with whether individuals who begin their criminal career at a younger age are considered more or less dangerous to the community. I categorized age at first arrest into four categories (< 15, 16-20, 21-24, and 25 and older) which corresponded to young adolescents, older adolescents, young adults, and adults. Additionally, this categorization allows comparison of different portions of the distribution of age at first arrest.

An additional problem arose during the testing for random coefficients. Included in the model are several sets of categorical variables (age at offense, age at first arrest, number of prior arrests, and type of DUI). In several instances, one or two, but not all of the categories were identified as needing randomized coefficients. This finding required changing all of the categories for a given variable to random coefficients.

After analyzing both the comparisons of standard errors and significance tests of randomized variance components, I decided the final model should include random coefficients for age at offense, number of prior arrests, prior DUI arrest, most serious offense – felony, most serious offense – DUI, type of DUI, and multiple conviction or diversion charges.

The final level-1 model is presented in Table 11 with appropriate variables entered as random or fixed coefficients. The variance components for random coefficients are presented in Table 12. Coefficients (log odds for logistic regression) are presented along with odds ratios for each variable. Significance tests for random coefficients are presented in Appendix C.

Males were significantly less likely than females to be sentenced for an ARD. White offenders were more likely than non-white offenders to be sentenced for an ARD. The relationship between age at offense and disposition outcome was largely linear. As age increased, so too did the odds of being sentenced for ARD rather than for a guilty conviction. There were no significant differences for the younger portion of the sample. Age did not appear to be significant for distinguishing sentencing outcomes between age groups unless offenders were more than 30 years old. The oldest offenders, those more than 50 years old, were twice as likely to be sentenced to an ARD compared to the youngest offenders in the dataset.

Prior record also followed a linear pattern, with increasing numbers of prior arrests relating to lower odds of being sentenced to ARD. Offenders whose RAP sheet included a prior arrest for a DUI or a non-DUI traffic arrest also had a significant reduction in the odds of being sentenced for an ARD.

Table 11. Level-1 Random Coefficients Logistic HLM Predicting ARD
(N=46,823)

Variable	Coef.		SE	Odds Ratio
Intercept	-2.840	***	0.347	0.058
Male	-0.404	***	0.051	0.668
White	0.257	***	0.049	1.292
Age at Offense				
21-25	-0.052		0.075	0.949
26-30	0.145		0.093	1.156
31-35	0.308	**	0.098	1.360
36-40	0.273	**	0.099	1.314
41-45	0.377	**	0.103	1.459
46-50	0.582	***	0.111	1.790
50+	0.803	***	0.112	2.232
Number of Prior Arrests				
1 prior arrest	-0.741	***	0.089	0.476
2 prior arrests	-1.469	***	0.110	0.230
3-5 prior arrests	-2.411	***	0.152	0.090
6+ prior arrests	-3.568	***	0.211	0.028
Prior DUI Arrest	-0.445	***	0.097	0.641
Prior Other Traffic Arrest	-0.529	***	0.064	0.589
Age at first arrest				
< 15	0.648	***	0.091	1.912
16-20	0.413	***	0.056	1.511
21-24	0.337	***	0.055	1.401
Most Serious Offense - Felony	-1.268	***	0.160	0.282
Most Serious Offense - DUI	1.647	***	0.119	5.193
Days to Sentencing	0.000		0.000	1.000
Type of DUI				
Drug	-0.616	***	0.118	0.540
Alcohol - BAC .10-.16	0.223		0.118	1.250
Alcohol - BAC >.16	0.152		0.121	1.164
Multiple Charges Convicted or Diverted	1.878	***	0.296	6.543

*** p < .001 ** p < .01 * p < .05

It appears that judges considered offenders who began engaging in criminal arrests at a younger age as more deserving of lenient punishments. Specifically, offenders who were first arrested at a younger age were more likely than offenders who were first arrested at 25 years of

age or older to be sentenced for an ARD rather than for a guilty disposition. These results are likely caused by the large portion of the sample who had no prior arrests and, thus, their age at first arrest was the same as their age at offense.

Although only a small part of the sample (3%), offenders who were sentenced for a felony charge along with their DUI were significantly less likely than those who had only misdemeanor charges to be sentenced to ARD. These felony charges were likely not ARD eligible and it appears that judges considered these offenders in greater need of a harsher sentence. Similarly, offenders whose most serious offense was the first-time DUI had 5 times the odds of being sentenced to ARD compared to offenders who were sentenced for an offense more serious than their DUI offense.

Surprisingly, BAC level did not have a significant effect on sentencing outcomes when controlling for all other offender and offense characteristics. However, drug-impaired DUI offenders were significantly less likely than alcohol-impaired DUI offenders to be sentenced for ARD. This finding suggests there are fundamental differences in how judges view drug- and alcohol-impaired DUI offenders and their rehabilitative potential, but that judges do not distinguish between offenders who have a higher or lower BAC at the time of their offense.

Variance components provide information regarding the range of effects for random coefficient variables across counties. The standard deviations of variance components were used to calculate upper and lower bounds for the effects of each random coefficient for 68% of the sample. The results are presented in log odds, and exponentiated to present the corresponding odds ratios. These findings further highlight the variance in effects of offender and offense characteristics across judicial districts, supporting the use of random coefficient models.

Table 12. Range of Effects for Level-1 Random Coefficients

Variable	Coefficient	SD of Variance Component	Low Log Odds ¹	High Log Odds ¹	Low OR ²	High OR ²
Intercept	-2.840	2.546	-5.385	-0.294	0.005	0.745
Male	-0.404	0.266	-0.670	-0.138	0.512	0.871
Age 21-25	-0.052	0.424	-0.476	0.372	0.621	1.450
Age 26-30	0.145	0.494	-0.349	0.638	0.705	1.893
Age 31-35	0.308	0.522	-0.214	0.830	0.807	2.293
Age 36-40	0.273	0.453	-0.180	0.727	0.835	2.068
Age 41-45	0.377	0.518	-0.141	0.896	0.869	2.449
Age 46-50	0.582	0.586	-0.003	1.168	0.997	3.215
Age 50+	0.803	0.563	0.240	1.366	1.271	3.919
1 Prior Arrest	-0.741	0.598	-1.339	-0.144	0.262	0.866
2 prior arrests	-1.469	0.739	-2.208	-0.730	0.110	0.482
3-5 prior arrests	-2.411	0.989	-3.400	-1.421	0.033	0.241
6+ prior arrests	-3.568	1.336	-4.904	-2.232	0.007	0.107
Prior DUI Arrest	-0.445	0.605	-1.050	0.160	0.350	1.173
Most Serious Offense - Felony	-1.268	0.735	-2.002	-0.533	0.135	0.587
Most Serious Offense - DUI	1.647	0.798	0.849	2.446	2.337	11.538
DUI - Drug	-0.616	0.684	-1.299	0.068	0.273	1.071
DUI Alcohol .10-.16	0.223	0.827	-0.604	1.051	0.547	2.859
DUI Alcohol > .16	0.152	0.836	-0.684	0.987	0.505	2.684
Multiple Charges	1.878	2.217	-0.339	4.096	0.713	60.086

¹Calculated by Log Odds +/- 1SD

²Calculated by EXP(LogOdds +/- 1SD)

The models presented for level-1 characteristics do not include any control for known differences between judicial districts. Subsequent models include level-2 variables in an attempt to understand how court and community characteristics influence variance in judicial decisions for first-time DUI offenders in Pennsylvania.

Level-1 and level-2 Hierarchical Logistic Model

The second level of the hierarchical models for this thesis includes characteristics of the court and community of the judicial district in which offenders are sentenced. The sample of offenders is nested within 60 different judicial districts. Due to problems with collinearity of variables at level-2, the models include only two measures for PCCD funding, four measures from the Census demographic variables, and one indicator of available treatment.

No variables at level-2 explained differences in the sentencing of offenders. This suggests that, although there are significant differences in the sentencing of offenders across judicial districts, these differences cannot be explained by the measures available in this thesis. This finding is consistent with previous findings that were unable to identify characteristics of counties that account for the variance in sentencing decisions across different jurisdictions (Chiricos et al., 2007).

Despite the lack of findings at level-2, the full model presents the most accurate representation of level-1 characteristics because of the added court and community controls. Using the final estimates provided in Table 13, conclusions can be made about the support for hypotheses focused on the initial questions regarding the sentencing of first-time DUI offenders.

Table 13. Final Random Coefficients Logistic HLM Predicting ARD (N=46,823)

Variable	Coef.		SE	Odds Ratio
Level-1 Offenders				
Intercept	-2.629 ***		0.470	0.072
Male	-0.401 ***		0.051	0.669
White	0.256 ***		0.049	1.292
Age at Offense				
21-25	-0.045		0.075	0.956
26-30	0.152		0.091	1.164
31-35	0.319 **		0.097	1.376
36-40	0.278 **		0.097	1.321
41-45	0.388 **		0.102	1.474
46-50	0.594 ***		0.111	1.811
50+	0.813 ***		0.112	2.254
Number of Prior Arrests				
1 prior arrest	-0.747 ***		0.090	0.474
2 prior arrests	-1.474 ***		0.112	0.229
3-5 prior arrests	-2.398 ***		0.151	0.091
6+ prior arrests	-3.586 ***		0.213	0.028
Prior DUI Arrest	-0.447 ***		0.097	0.640
Prior Other Traffic Arrest	-0.529 ***		0.064	0.589
Age at first arrest				
< 15	0.648 ***		0.091	1.912
16-20	0.413 ***		0.056	1.512
21-24	0.337 ***		0.055	1.401
Most Serious Offense - Felony	-1.270 ***		0.160	0.281
Most Serious Offense - DUI	1.650 ***		0.118	5.207
Days to Sentencing	0.000		0.000	1.000
Type of DUI				
Drug	-0.613 ***		0.117	0.542
Alcohol - BAC .10-.16	0.218		0.119	1.243
Alcohol - BAC >.16	0.147		0.121	1.159
Multiple Charges Convicted or Diverted	1.884 ***		0.297	6.577
Level-2 Judicial District				
Received PCCD CIP Funding	-0.256		0.439	0.774
Percent of CIP Funds Used for DUI	-0.001		0.004	0.999
Ln Population Density	0.168		0.186	1.183
Ln Percent White	2.535		2.103	12.615
Transformed Percent Male Aged 18-24	-0.695		8.173	0.499
Ln Percent Poverty Aged 18-64	0.212		0.466	1.236
Ln Treatment Centers per 10,000 Residents	-0.084		0.274	0.920

*** p < .001 ** p < .01 * p < .05

White offenders were more likely than non-white offenders to be sentenced for an ARD rather than a guilty conviction. This finding provides support for *hypothesis 1* and is consistent with prior research in general sentencing literature (Steffensmeier et al., 1998; Steen, Engen, and Gainy, 2005) and studies of DUI offenders (Cherpitel and Bond, 2003). In addition, these findings are robust, even controlling for prior number of arrests. Previous authors have suggested that race is confounded with prior record (Frase, 2009), but these findings suggest that race has an independent effect above and beyond the effect of prior arrest records.

Consistent with *hypothesis 2*, female offenders were more likely than male offenders to receive ARD for their first-time DUI offense. Consistent with prior research, males were a significantly larger part of the sample for this study (Schwartz, 1998), but had lower odds of receiving ARD. This suggests that judges view females as more rehabilitative and a lesser threat to recidivate.

Contrary to what was expected with *hypothesis 3*, age appeared to have a linear effect on the odds of receiving ARD. The original hypothesis posited that the youngest and oldest offenders would be least likely to receive ARD, implying a curvilinear effect between age and the odds of sentence outcomes. Increasing age was related to an increase in the odds of receiving ARD. The oldest offenders (those 50 or older) were more than twice as likely to receive ARD than the youngest offenders (those under 21). There were no significant differences in the effect of age on the odds of receiving ARD for offenders between the ages of 16 and 30. This finding does not follow patterns found among general relationships between age and sentencing (Steffensmeier, Kramer, and Ulmer, 1995; Demuth and Steffensmeier, 2004; Steffensmeier and Demuth, 2000), and suggests that the age of a DUI offender influences judges decisions at sentencing differently than it would for non-DUI offenders.

One of the strongest findings was that more serious prior records resulted in a decrease in the odds of receiving ARD. Although prior DUI convictions are the only offenses that disqualify offenders from being ARD eligible, judges clearly took into consideration all prior arrests when deciding whether a DUI offender should receive ARD. Three findings from this model support *hypothesis 4*. First, each increase in the number of prior arrests was related to a decrease in the odds of receiving ARD. Second, those offenders with a prior DUI arrest had 36 percent lower odds of receiving ARD than those offenders without a prior DUI arrest. Finally, offenders with a prior non-DUI traffic arrest had 42 percent lower odds than offenders without a prior non-DUI traffic arrest. The last two findings indicate that judges consider not only the general trajectory of criminal behavior in an offender's past, but also the specific type of offenses in an offender's criminal history.

No support was found for an effect of BAC level on the likelihood of receiving ARD. While prior research has been mixed on the effect of BAC on judicial decision-making (Yu, 1994; Marowitz, 1998), the current study found that there was no significance difference in the likelihood of receiving ARD rather than a guilty conviction for offenders of any BAC level. *Hypothesis 5* was consequently not supported, and it appears that level of intoxication does not have an impact on the perceived potential for rehabilitation of offenders in Pennsylvania.

Although the effect of BAC was not significant, the type of intoxication associated with a DUI offense was significant. Consistent with expectations from *hypothesis 6*, offenders charged with a drug-impaired DUI had 48 percent lower odds of receiving ARD than offenders charged with an alcohol-impaired DUI offense.

Unconditional models indicated there was significant variation in the likelihood of receiving ARD across judicial districts. Despite this significant variation, none of the level-2

models were able to predict type of disposition. *Hypothesis 7* originally suggested that offenders in urban counties would be more likely to receive ARD than offenders in rural counties, but the measure of population density found no differences in the model. *Hypotheses 8a and 8b* suggested that counties with greater access to state resources would be more invested in rehabilitative options for offenders, and consequently more likely to divert DUI offenders from guilty convictions. However, this study found no direct relationship between state funding programs the likelihood of difference sentencing outcomes. It is still possible that county resources had a significant influence on sentencing decisions (Ostrom et al., 2002; Ulmer and Kramer, 1996; Tonry, 1990), but the measures available for this study were not able to capture this relationship.

Sensitivity Analysis: Excluding Philadelphia

Although Philadelphia is the largest, most urban county in the state of Pennsylvania, our data is absent a majority of DUI offenses sentenced in the Philadelphia County Judicial District. As noted previously, Philadelphia County processes a majority of its low-level misdemeanor offenses in Municipal Courts rather than Courts of Common Pleas. The final dataset included only 144 offenders from Philadelphia County. Of these offenders, only 1 was sentenced for diversion disposition, while 143 were sentenced for a guilty conviction. In addition, these offenders were likely to be more serious offenders or who had more serious non-DUI offenses included in their disposition, since only more serious cases are processed in the Philadelphia Court of Common Pleas.

Due to differences in the demographic characteristics of Philadelphia compared to the rest of the state, I thought it might be possible the inclusion of Philadelphia was biasing

coefficients. In addition, I thought that removing Philadelphia would remove an outlier in level-2 characteristics, which may have influenced the null findings in previous models.

Models predicting sentencing decisions using only level-1 coefficients were replicated on data excluding Philadelphia offenders. A replication of the full model, including level-1 and level-2 variables, was also replicated for this subsample. The results of these models are presented in Table 14 and Table 15.

Comparison of the coefficients from the models with and without Philadelphia revealed no strong differences. There were no changes in statistical significance or the direction of effects for either model. Any differences in coefficients were minimal. The lack of significant differences provides support for our sample in the ability to generalize results to offenders throughout the state, with the exception of Philadelphia. None of the findings were biased by the inclusion of cases from Philadelphia. The lack of bias is largely due to the large overall sample size, and very small amount of data from Philadelphia.

Table 14. Level-1 Random Coefficients Logistic HLM Predicting ARD, Excluding Philadelphia (N=46,679)

Variable	Coef.	SE	Odds Ratio
Level-1 Offenders			
Intercept	-2.827 ***	0.352	0.059
Male	-0.400 ***	0.051	0.671
White	0.257 ***	0.049	1.293
Age at Offense			
21-25	-0.047	0.075	0.954
26-30	0.152	0.093	1.165
31-35	0.316 **	0.098	1.372
36-40	0.281 **	0.099	1.325
41-45	0.386 **	0.103	1.471
46-50	0.596 ***	0.111	1.814
50+	0.815 ***	0.112	2.258
Number of Prior Arrests			
1 prior arrest	-0.750 ***	0.089	0.473
2 prior arrests	-1.475 ***	0.110	0.229
3-5 prior arrests	-2.409 ***	0.153	0.090
6+ prior arrests	-3.572 ***	0.211	0.028
Prior DUI Arrest	-0.443 ***	0.097	0.642
Prior Other Traffic Arrest	-0.529 ***	0.064	0.589
Age at first arrest			
< 15	0.649 ***	0.091	1.914
16-20	0.414 ***	0.056	1.513
21-24	0.337 ***	0.055	1.401
Most Serious Offense - Felony	-1.257 ***	0.160	0.285
Most Serious Offense - DUI	1.655 ***	0.119	5.234
Days to Sentencing	0.000	0.000	1.000
Type of DUI			
Drug	-0.616 ***	0.118	0.540
Alcohol - BAC .10-.16	0.220	0.119	1.246
Alcohol - BAC >.16	0.146	0.122	1.157
Multiple Charges Convicted or Diverted	1.899 ***	0.299	6.677

*** p < .001 ** p < .01 * p < .05

Table 15. Full Random Coefficients Logistic HLM Predicting ARD, Excluding Philadelphia (N=46,679)

Variable	Coef.		SE	Odds Ratio
Level-1 Offenders				
Intercept	-2.926	***	0.344	0.054
Male	-0.391	***	0.051	0.677
White	0.257	***	0.049	1.293
Age at Offense				
21-25	-0.045		0.074	0.956
26-30	0.161		0.091	1.174
31-35	0.320	**	0.096	1.377
36-40	0.281	**	0.097	1.325
41-45	0.397	***	0.102	1.488
46-50	0.608	***	0.111	1.837
50+	0.820	***	0.112	2.271
Number of Prior Arrests				
1 prior arrest	-0.760	***	0.090	0.468
2 prior arrests	-1.486	***	0.112	0.226
3-5 prior arrests	-2.403	***	0.152	0.090
6+ prior arrests	-3.588	***	0.213	0.028
Prior DUI Arrest	-0.443	***	0.098	0.642
Prior Other Traffic Arrest	-0.529	***	0.064	0.589
Age at first arrest				
< 15	0.649	***	0.091	1.913
16-20	0.414	***	0.056	1.513
21-24	0.338	***	0.055	1.402
Most Serious Offense - Felony	-1.264	***	0.160	0.283
Most Serious Offense - DUI	1.670	***	0.120	5.311
Days to Sentencing	0.000		0.000	1.000
Type of DUI				
Drug	-0.619	***	0.118	0.539
Alcohol - BAC .10-.16	0.215		0.120	1.240
Alcohol - BAC >.16	0.145		0.122	1.156
Multiple Charges Convicted or Diverted	1.899	***	0.300	6.682
Level-2 Judicial District				
Received PCCD CIP Funding	0.141		0.267	1.152
Percent of CIP Funds Used for DUI	-0.004		0.003	0.996
Ln Population Density	0.012		0.199	1.012
Ln Percent White	-4.601		2.700	0.010
Transformed Percent Male Aged 18-24	-0.242		8.297	0.785
Ln Percent Poverty Aged 18-64	0.541		0.427	1.718
Ln Treatment Centers per 10,000 Residents	0.001		0.291	1.001

*** p < .001 ** p < .01 * p < .05

Recidivism – All Crimes

The second portion of analyses addresses post-sentencing criminal behaviors of first-time DUI offenders. The models in this section answer the question of what offense, offender, and county characteristics are related to rearrest for a criminal offense within 4 years after sentencing for a first-time DUI offense. The analysis begins with bivariate statistics showing the characteristics of offenders who recidivate and those who do not recidivate. Descriptive statistics are followed by hierarchical linear logistic models that nest individual offenders within judicial districts.

Less than one percent of the sample (65 offenders) were rearrested as absconders. These individuals were initially counted as recidivists, but after further examination it appears that these offenders are conceptually different from other recidivists. Absconders are individuals who were wanted for crimes they had previously committed. It is likely that these individuals were arrested immediately after their release from incarceration for an offense that was committed prior to their DUI. That is, these individuals were not arrested for committing *new* offenses. Consequently, these 65 offenders were removed from this section of analyses on recidivism, reducing the sample for this section to 46,758 offenders.

Bivariate Analyses

Table 16 presents the demographic and criminal history characteristics of offenders who were rearrested within four years of their DUI sentence and those who were not rearrested. Table 17 presents bivariate statistics for the relationships between offense characteristics and recidivism. Most importantly for this thesis, there were statistically significant differences in recidivism by type of disposition. Offenders sentenced for a guilty conviction were more likely than offenders receiving ARD to recidivate. Although statistically significant, the difference in

the percent of offenders who receive ARD and recidivate and those who are sentenced for a guilty conviction and recidivate is only 7%, suggesting that the difference may be substantively important. Finally, table 18 presents bivariate statistics for the relationships between level-2 (judicial district) characteristics and recidivism.

Demographic profiles of those who recidivated and those who did not were significantly different. Males, Whites, and young offenders were more likely than females, non-whites, and older offenders to recidivate. Offenders with more prior arrests were more likely than offenders with fewer prior arrests to recidivate. Offenders whose first arrest was the DUI offense recidivated about half as much as offenders with six or more prior arrests.

Interestingly, offenders with a prior DUI or BUI arrest recidivated less than offenders without a prior DUI or BUI arrest. On the other hand, offenders with a prior traffic arrest were more likely than offenders without a prior arrest record to recidivate. Offenders who began engaging in criminal behavior at an earlier age were more likely than those who started offending at an older age to recidivate.

Table 16. Descriptive Statistics of Offender Characteristics by 4 Year Recidivism (N=46,758)

Offender Characteristics	Clean (N)	Arrest (N)	Clean (%)	Arrest (%)	Sig. ¹
Gender					***
Male	24,983	11,900	67.7%	32.3%	
Female	7,118	2,822	71.6%	28.4%	
Race					***
White	20,473	22,046	48.2%	51.8%	
Non-White	2,762	1,542	64.2%	35.8%	
Age at Offense					***
Under 21	2,992	2,577	53.7%	46.3%	
21-25	7,183	4,096	63.7%	36.3%	
26-30	4,525	2,134	68.0%	32.0%	
31-35	3,414	1,522	69.2%	30.8%	
36-40	3,457	1,503	69.7%	30.3%	
41-45	3,863	1,299	74.8%	25.2%	
46-50	3,043	934	76.5%	23.5%	
Over 50	3,624	657	84.7%	15.3%	
Mean	34.6	30.3			***
Prior Arrests					***
0	17,956	6,733	72.7%	27.3%	
1	7,272	2,975	71.0%	29.0%	
2	2,979	1,660	64.2%	35.8%	
3-5	2,821	2,107	57.2%	42.8%	
6 plus	1,073	1,247	46.3%	53.8%	
Mean	1.0	1.7			***
Prior DUI/BUI Arrest					***
No	26,737	12,596	68.0%	32.0%	
Yes	5,364	2,126	71.6%	28.4%	
Prior DUI Convictions					
No	29,588	13,607	68.5%	31.5%	
Yes	2,513	1,115	69.3%	30.7%	
Prior Other Traffic Arrest					***
No	30,114	13,317	69.3%	30.7%	
Yes	1,987	1,405	58.6%	41.4%	
Age at First Arrest					***
Less than 16	376	559	40.2%	59.8%	
16-20	7,608	5,491	58.1%	41.9%	
21-24	7,140	3,350	68.1%	31.9%	
25-29	4,922	1,960	71.5%	28.5%	
30-34	3,193	1,062	75.0%	25.0%	
35-39	2,579	850	75.2%	24.8%	
40-44	2,289	627	78.5%	21.5%	
45-49	1,752	456	79.3%	20.7%	
50 and Older	2,242	367	85.9%	14.1%	
Mean	29.3	25.0			***

¹ χ^2 tests were used for categorical variables and t-tests were used for continuous variables

*** p < .001 ** p < .01 * p < .05

Although significant, rates of recidivism varied by only 1% between 2006 and 2007, indicating that there was no meaningful difference in recidivism by year. Offenders who recidivated had cases that had been processed more quickly from arrest to punishment (M = 304.5 days) than those who did not recidivate (M = 320.7 days), $t =$, $p < .001$. However, the difference in the average time to punishment was only two weeks, which was likely not substantial considering that cases took, on average, a year to process through the courts.

Offense Characteristics	Clean (N)	Arrest (N)	Clean (%)	Arrest (%)	Sig. ¹
Case Disposition					***
Guilty	15,109	8,126	65.0%	35.0%	
ARD	16,992	6,596	72.0%	28.0%	
Case Disposition Year					*
2006	13,562	6,033	69.2%	30.8%	
2007	18,539	8,689	68.1%	31.9%	
Most Serious Grade in JP					***
Misdemeanor	31,280	13,966	69.1%	30.9%	
Felony	821	756	52.1%	47.9%	
DUI and More Serious Offense	3,435	2,421	58.7%	41.3%	
DUI Most Serious Offense	28,666	12,301	70.0%	30.0%	
Type of DUI					***
Drug	1,144	1,041	52.4%	47.6%	
Alcohol - BAC <.10	9,152	4,737	65.9%	34.1%	
Alcohol - BAC .10-.16	8,473	3,499	70.8%	29.2%	
Alcohol - BAC > .16	13,332	5,445	71.0%	29.0%	
Total Conviction or Diversion Charges	2.5	2.8			***

¹ χ^2 tests were used for categorical variables and t-tests were used for continuous variables

*** $p < .001$ ** $p < .01$ * $p < .05$

More serious offenders – those who had felony charges or were charged with offenses that were more serious than a DUI – were more likely than less serious offenders to recidivate. Offenders arrested for a drug-impaired DUI were noticeably more likely than those arrested for alcohol-impaired DUIs to recidivate. It may also be possible that these two findings are related.

Drug-impaired offenders, who are also charged with possession of illegal substances, are likely to have charges included in their disposition that are more serious than the DUI offense.

Contrary to expectations, offenders with lower levels of BAC were more likely than offenders with higher levels of BAC to recidivate.

County Characteristics	Clean (N)	Arrest (N)	Clean (%)	Arrest (%)	Sig. ¹
Population Density (ln)	6.1	6.2	--	--	*
Percent White (ln)	4.5	4.5	--	--	
Percent Male 18-24 (1/x ²)	0.1	0.1	--	--	**
Percent Poverty 18-64 (ln)	2.2	2.2	--	--	***
Treatment Centers (Per 10,000 Residents)	-0.7	-0.7	--	--	
Received D&A RIP Funding					
No	7,302	3,340	68.6%	31.4%	
Yes	24,799	11,382	68.5%	31.5%	
Received CIP Funding					***
No	1,059	582	64.5%	35.5%	
Yes	31,042	14,140	68.7%	31.3%	
Percent of CIP Funding Used for DUI	38.2	40.0			***

¹ χ^2 tests were used for categorical variables and t-tests were used for continuous variables

*** p < .001 ** p < .01 * p < .05

County-level measures were found to be significant, but not substantively different. Two exceptions to this finding were for measures of CIP funding and the use of CIP funding for DUI offenders. Bivariate statistics indicate that counties without CIP funding had higher rates of recidivism than counties that did not receive CIP funding. Among those counties that received CIP funding, recidivism was more likely in jurisdictions that used more of their funding for DUI offenders. This finding may be reverse causal. That is, counties may use more of their CIP funds on DUI offenders if there is significant recidivism among the DUI offenders in that jurisdiction.

While these bivariate statistics reveal a significant pattern of recidivism by type of disposition, the statistics do not control for other characteristics that may be causing this effect. Multivariate analyses allow for the removal of selection effects and identification of the unique effect between a criminal label and recidivism.

Unconditional Models

An initial linear probability model confirmed the rate of recidivism found in bivariate analyses. Table 19 presents the initial unconditional model, in which the coefficient represents the mean of the dependent variable for the overall sample. Consistent with the bivariate statistics, 31 percent of the sample was rearrested within the four-year follow-up period.

Fixed Effects	Coef.	Odds	SE	T-ratio	df	P-value
Intercept	0.313	1.370	0.012	25.61	46,757	0.000

An initial hierarchical linear model supported the use of random intercepts. A model using a fixed intercept had significantly larger robust standard errors than model-based standard errors, suggesting significant variance in the intercept across level-2 units. Table 20 presents the coefficients from a fixed intercept hierarchical model using a logit link function, and both the model-based and robust standard errors.

Model-Based SE	Coef.	Odds	S.E.	T-ratio	df	P-value
Intercept	-0.780	0.456	0.009	-78.64	46,757	0.000
Robust SE	Coef.	Odds	S.E.	T-ratio	df	P-value
Intercept	-0.784	0.457	0.057	-13.785	46757	0.000

A final conditional model was developed using random intercepts. Table 21 shows the coefficient and variance component for the intercept in the unconditional model.

Table 21. HLM Unconditional Model of Recidivism Outcome Clean vs Arrest - Logit Link
Function Model - Random Intercepts (N = 46,758)

Fixed Effects	Coef.	Odds	S.E.	T-ratio	df	P-value
Intercept	-0.782	0.438	0.034	-23.198	59	0.000
Random Effects	SD	Variance	df	chi-square	P-value	
U0	0.236	0.056	59	658.716	0.000	

The variance component for the random intercept was highly significant ($p < .001$), and indicated wide variance in the likelihood of recidivism across judicial districts. Thus, the following conditional models use random intercepts to allow for variation across judicial districts.

Level-1 Conditional Models

An initial conditional model including only the indicator of type of disposition was created first. Table 22 shows the model that includes a dichotomous indicator where 1 represents offenders who receive accelerated rehabilitative disposition. Type of disposition was included as a random coefficient, and found to be highly significant, indicating that the effect of diversion on criminal behavior varies significantly by judicial district.

Table 22. Level-1 Random Coefficients Logistic HLM Predicting Recidivism
(N=46,758)

Variable	Coef.		SE	Odds Ratio	
Intercept	-0.624	***	0.042	0.536	
Accelerated Rehabilitative Disposition	-0.244	**	0.066	0.783	
Variance Components		SD	V.C.	Chi2	P-value
Intercept - U0		0.284	0.080	341.000	0.000
ARD - U1		0.449	0.201	546.000	0.000

*** $p < .001$ ** $p < .01$ * $p < .05$

This model provides initial information regarding the effect of a guilty conviction on recidivism. In general, offenders receiving diversion had 22 percent lower odds of recidivating than offenders who were sentenced for a guilty conviction. However, the effect of a criminal

label was not consistent across jurisdictions. The standard deviation of the random coefficient indicates that the effect of diversion on recidivism ranged between -0.693 and 0.205 (0.500 and 1.23 for odds ratios) for roughly 68 percent of offenders.

Part 1 of this thesis indicated disparity in the selection into ARD programs. Although the whole sample used in this thesis is technically ARD eligible, only half of the offenders were actually granted the diversion alternative to a guilty conviction. Absent any additional covariates in the model, it is unclear whether the effect of diversion on recidivism is a direct effect, or a reflection of the differential selection of less serious offenders into diversion programs.

Initial models using fixed effects for all level-1 variables were used to determine the need for random coefficients for different variables in the model. There was significantly less variance in the effects of variables across judicial districts for recidivism than was seen with predictions of sentencing presented earlier (see Appendix F). In order to confirm the findings from comparisons of model-based and robust standard errors, a model including random coefficients for all level-1 variables was also analyzed (see Appendices G and H). Significance tests of variance components further supported the decision of which variables should be fixed in the model. It was not surprising to find less variance in the correlates of recidivism over different judicial districts. Criminal behavior is likely to be influenced by the characteristics of individual offenders, and those effects are likely to be similar across geographic space. In contrast, sentencing decisions are largely influenced by contextual factors. In addition, this thesis posits that sentencing decisions are influenced by perceptions of individual characteristics, which may vary across different contexts.

The final level-1 model included six random coefficients and is presented in Table 23. The standard deviation of variance components and consequent range of effects across judicial

districts are presented in Table 24 (full statistical tests for random coefficients in this model are available in Appendix I).

Table 23. Level-1 Full Logistic HLM Predicting Recidivism (N=46,753)

Variable	Coef.	SE	Odds Ratio
Level-1 Offenders			
Intercept	0.051	0.069	1.052
Accelerated Rehabilitative Disposition	0.022	0.062	1.022
Male	0.069 **	0.026	1.071
White	-0.119 *	0.051	0.888
Age at Offense			
21-25	-0.444 ***	0.054	0.642
26-30	-0.768 ***	0.058	0.464
31-35	-0.853 ***	0.051	0.426
36-40	-0.917 ***	0.051	0.400
41-45	-1.178 ***	0.054	0.308
46-50	-1.289 ***	0.055	0.276
50+	-1.762 ***	0.052	0.172
Number of Prior Arrests			
1 prior arrest	0.201 ***	0.050	1.223
2 prior arrests	0.592 ***	0.053	1.808
3-5 prior arrests	0.963 ***	0.062	2.619
6+ prior arrests	1.498 ***	0.069	4.471
Prior DUI Arrest	-0.379 ***	0.039	0.685
Prior Other Traffic Arrest	0.102 *	0.043	1.107
Age at first arrest			
< 15	0.085	0.105	1.089
16-20	-0.133 ***	0.033	0.875
21-24	-0.127 **	0.041	0.881
Most Serious Offense - Felony	0.058	0.055	1.059
Most Serious Offense - DUI	-0.197 ***	0.028	0.821
Days to Sentencing	0.000 ***	0.000	1.000
Type of DUI			
Drug	0.346 ***	0.043	1.413
Alcohol - BAC .10-.16	-0.053	0.043	0.949
Alcohol - BAC >.16	-0.001	0.036	0.999
Multiple Charges Convicted or Diverted	0.021	0.029	1.022

*** p < .001 ** p < .01 * p < .05

The full level-1 model provides preliminary analyses of the effects of offender and offense related variables on recidivism, absent additional controls for characteristics of judicial

districts. Additionally, this model controls for the variables previously included in the sentencing model, many of which were found to predict selection into ARD programs. Without additional variables that could be related to selection, this model would not control for the selection bias for the effect of diversion.

Table 24. Range of Effects for Level-1 Random Coefficients

Variable	Coef	SD of Variance Component	Low Log Odds ¹	High Log Odds ¹	Low OR ²	High OR ²
Intercept	0.051	0.313	-0.262	0.364	0.769	1.439
ARD	0.022	0.402	-0.380	0.424	0.684	1.528
White	-0.119	0.209	-0.328	0.090	0.720	1.095
1 Prior Arrest	0.201	0.259	-0.057	0.460	0.944	1.584
2 prior arrests	0.592	0.234	0.358	0.826	1.431	2.285
3-5 prior arrests	0.963	0.249	0.714	1.212	2.042	3.359
6+ prior arrests	1.498	0.226	1.272	1.723	3.567	5.602

¹Calculated by Log Odds +/- 1SD

² Calculated by EXP(LogOdds +/- 1SD)

Most notably, the main effect of diversion on recidivism is no longer significant. This suggests that the effect of diversion on recidivism is due to selection bias of less serious offenders into ARD programs. However, the variance component for the random coefficient is still highly significant and indicates that the effect of a diversion varies greatly across judicial districts ($\chi^2(55) = 370.35, p < .001$). Thus, the absence of a significant effect in the model, is likely also influenced by the wide variation of effects across context.

Demographic characteristics had the most significant effect on recidivism. White offenders were less likely than non-white offenders to recidivate, females were less likely than males to recidivate, and older offenders were less likely than younger offenders to recidivate. The criminal history of individuals also produced several significant main effects. Offenders with no prior arrests were less likely than offenders with prior arrests to recidivate. Offenders with a prior non-DUI arrest were more likely to recidivate, while offenders with a prior DUI arrest were significantly less likely to recidivate. Offenders whose first arrest was between the ages of 16 and 24 were actually less likely than offenders first arrested after age 24 to recidivate.

Offense and case processing characteristics appeared to have some effect on the likelihood of recidivism. Offenders who were convicted or received diversion for an offense more serious than a DUI were more likely to recidivate than offenders for whom the most serious offense was a DUI. Offenders who had cases processed more quickly were actually more likely than offenders who had cases processed more slowly to recidivate, although the overall effect of time on recidivism was small ($b = -0.0002$). This coefficient translates to an effect of -0.073 log odds for each additional year in the time to punishment. The relationship between BAC and recidivism was not significant, but drug-impaired offenders were more likely than alcohol-impaired offenders to recidivate.

Level-1 Conditional Model with Interactions

Two of the hypotheses posited that the effect of diversion would be conditioned by race and/or gender. Level-1 conditional models were analyzed again with the inclusion of an interaction between type of disposition and race and type of disposition and gender. Results from the level-1 model including interactions are presented in Table 25.

Table 25. Level-1 Full Logistic HLM With Interactions, Predicting Recidivism (N=46,753)			
Variable	Coef.	SE	Odds Ratio
Intercept	0.165	0.081	1.179
Accelerated Rehabilitative Disposition	-0.239 *	0.113	0.788
Male	-0.002	0.038	0.998
White	-0.180 **	0.056	0.835
Age at Offense			
21-25	-0.443 ***	0.054	0.642
26-30	-0.768 ***	0.058	0.464
31-35	-0.851 ***	0.051	0.427
36-40	-0.916 ***	0.051	0.400
41-45	-1.177 ***	0.055	0.308
46-50	-1.287 ***	0.055	0.276
50+	-1.761 ***	0.052	0.172
Number of Prior Arrests			
1 prior arrest	0.201 ***	0.050	1.223
2 prior arrests	0.592 ***	0.053	1.807
3-5 prior arrests	0.962 ***	0.062	2.617
6+ prior arrests	1.491 ***	0.069	4.441
Prior DUI Arrest	-0.375 ***	0.039	0.687
Prior Other Traffic Arrest	0.103 *	0.043	1.108
Age at first arrest			
< 15	0.089	0.106	1.093
16-20	-0.131 ***	0.033	0.877
21-24	-0.126 **	0.041	0.882
Most Serious Offense - Felony	0.055	0.055	1.057
Most Serious Offense - DUI	-0.197 ***	0.028	0.822
Days to Sentencing	0.000 ***	0.000	1.000
Type of DUI			
Drug	0.343 ***	0.043	1.410
Alcohol - BAC .10-.16	-0.052	0.043	0.949
Alcohol - BAC >.16	-0.001	0.037	0.999
Multiple Charges Convicted or Diverted	0.021	0.029	1.021
Diversion * Male	0.126 *	0.055	1.134
Diversion * White	0.171 *	0.083	1.186

*** p < .001 ** p < .01 * p < .05

Type of disposition has significantly different effects as a function of the gender and race of offenders. The introduction of interaction effects for type of disposition and gender and for type of disposition and race revealed significant effects of diversion programs on recidivism. The main effect for diversion is now conditioned on gender and race. Results in this level-1

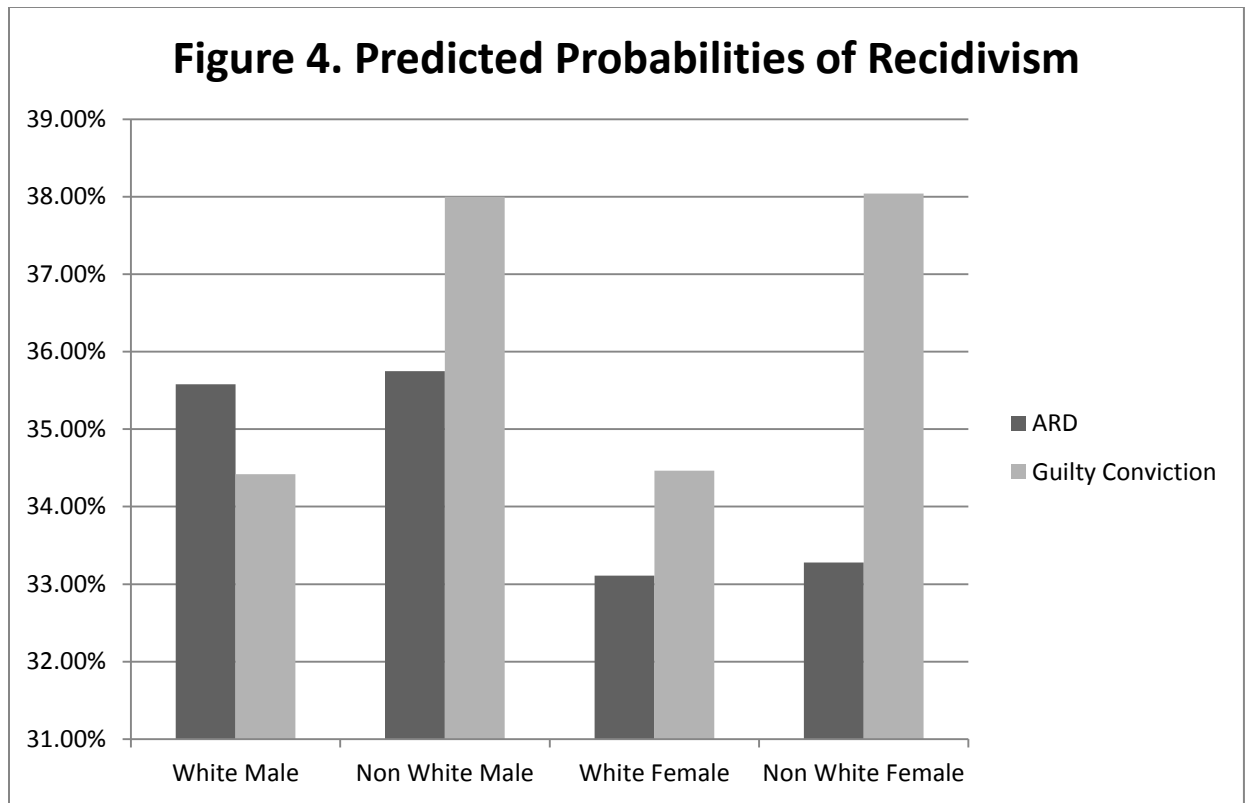
model indicate that, for whites, there was little diversion effect, but for nonwhites, there was a significant negative effect on diversion, such that diverted nonwhites had significantly lower recidivism rates. For gender, there was no significant difference in recidivism for a guilty conviction, but females were significantly less likely than males to recidivate when processed through an ARD program.

Level-1 and Level-2 Hierarchical Logistic Model

The final analyses for recidivism included level-2 covariates in an attempt to explain differences in recidivism across judicial districts. This final model provides the most stable estimates of the individual and county level correlates of recidivism. This model is used to determine final conclusions for the hypotheses proposed in this thesis.

The main effect for diversion was found to not be significant. However, significant effects were found for certain gender and racial categories in the sample, providing partial support for Hypothesis 9. There was no substantial main effect found for race and recidivism. The odds ratio of diversion for Whites sentenced to a guilty conviction was .838 while the odds ratio of diversion for Whites sentenced to ARD was 1.138. These effects nearly canceled each other out. Thus, there was no support for *Hypothesis 10a*. Despite this finding, ARD was found to have a negative effect on recidivism for non-white offenders.

Males and females sentenced for a guilty conviction were found to have no significant difference in recidivism. However, males receiving ARD were significantly more likely to recidivate than females receiving ARD. There appeared to be little effect of diversion for male offenders. In order to better understand the contingent labeling effects of diversion, Figure 4 depicts the predicted probabilities of recidivism for different racial and gender categories.



Older offenders were significantly less likely than younger offenders to recidivate.

Offenders who committed a DUI before the legal drinking age of 21 were the most likely to recidivate, followed by a nearly linear decrease with each additional five years of age. The odds of recidivism for offenders arrested for their first DUI offense at the age of 50 years or older were 83 percent lower than the odds of recidivism for the youngest offenders in the sample.

Offenders charged with an offense that was more serious than their DUI offense were more likely to recidivate than offenders whose most serious offense was their DUI offense. This finding suggests that offenders sentenced for more serious offenses beyond their DUI offense may have more serious criminal characteristics that increase their likelihood of engaging in criminal behaviors.

Similarly, offenders with more serious prior records were more likely than offenders with less serious criminal records to recidivate. The likelihood of recidivism increased with each

additional prior arrest. One prior arrest increased the odds of recidivism by almost 22 percent. At the more extreme end, offenders with six or more prior arrests had 343 percent greater odds of recidivism than offenders with no prior arrests.

Blood alcohol content was not predictive of recidivism, but offenders arrested for driving under the influence of drugs were more likely than offenders arrested for driving under the influence of alcohol to recidivate. This finding indicates that higher levels of BAC are not predictive of offenders' criminality or of their likelihood to continue engaging in criminal behaviors in the future.

Table 26. Full Logistic HLM Predicting Recidivism (N=46,758)

Variable	Coef.	SE	Odds Ratio
Level-1 Offenders			
Intercept	0.421 **	0.122	1.524
Accelerated Rehabilitative Disposition	-0.236 *	0.114	0.789
Male	-0.002	0.038	0.998
White	-0.177 **	0.059	0.838
Age at Offense			
21-25	-0.443 **	0.054	0.642
26-30	-0.767 ***	0.058	0.464
31-35	-0.851 ***	0.052	0.427
36-40	-0.915 ***	0.051	0.400
41-45	-1.176 ***	0.055	0.309
46-50	-1.287 ***	0.056	0.276
50+	-1.761 ***	0.053	0.172
Number of Prior Arrests			
1 prior arrest	0.198 ***	0.050	1.219
2 prior arrests	0.587 ***	0.053	1.799
3-5 prior arrests	0.958 ***	0.062	2.607
6+ prior arrests	1.489 ***	0.069	4.432
Prior DUI Arrest	-0.376 ***	0.039	0.687
Prior Other Traffic Arrest	0.103 *	0.043	1.109
Age at first arrest			
< 15	0.089	0.105	1.093
16-20	-0.130 ***	0.033	0.878
21-24	-0.125 **	0.042	0.882
Most Serious Offense - Felony	0.058	0.055	1.059
Most Serious Offense - DUI	-0.197 ***	0.028	0.821
Days to Sentencing	0.000 ***	0.000	1.000
Type of DUI			
Drug	0.342 ***	0.043	1.407
Alcohol - BAC .10-.16	-0.053	0.043	0.948
Alcohol - BAC >.16	-0.001	0.036	0.999
Multiple Charges Convicted or Diverted	0.021	0.029	1.021
Diversion * Male	0.126 *	0.055	1.134
Diversion * White	0.168 *	0.083	1.183
Level-2 Judicial District			
Received PCCD CIP Funding	-0.290 **	0.104	0.748
Percent of CIP Funds Used for DUI	0.000	0.001	1.000
Ln Population Density	-0.002	0.036	0.998
Ln Percent White	-0.116	0.360	0.891
Transformed Percent Male Aged 18-24	0.175	2.153	1.192
Ln Percent Poverty Aged 18-64	-0.221	0.145	0.802
Ln Treatment Centers per 10,000 Residents	0.046	0.045	1.047

*** p < .001 ** p < .01 * p < .05

The effect of the speed of case processing indicated that individuals who had their cases processed more quickly were less likely to recidivate; however, the difference was substantively

not important. These findings are consistent with prior research that has found no independent effect for the time to punishment and recidivism with DUI offenders (Yu, 1994). These findings do not necessarily indicate that there is an absence of a celerity effect for DUI offenders, but rather, that the effects of celerity may be subsumed by the immediate arrest for DUI offenders.

Level-2 variables were found to largely be insignificant in predictions of recidivism. However, one variable, whether or not a county received PCCD funding for CIP programs, was predictive of recidivism. Specifically, offenders living in counties that received PCCD CIP funding were less likely than offenders sentenced in counties that did not receive PCCD CIP funding to recidivate. A possible explanation for this finding is that jurisdictions that receive state CIP funding have a greater commitment to rehabilitation for DUI offenders. At this time, it is not clear whether these findings are influenced by DUI offenders in general or only by those who receive guilty convictions and are sentenced to CIP programs. It may be the case that recidivism rates are lower in jurisdictions with CIP funding because they are more likely to use intermediate punishments that successfully rehabilitate DUI offenders.

Discussion

This thesis is the first comprehensive statewide analysis of the sentencing and recidivism of first-time DUI offenders. The purpose of this study was to answer the call for extending criminology theories to a subset of the offending population that has generally not been included in analyses of criminal offending (Ross, 1984). The findings show both similarities and differences between DUI offenders and other types of offenders analyzed in prior research. Although the research has some limitations, the study contributes to our theoretical and practical knowledge, and lays the foundation for additional research on DUI offenders.

Summary and Review of Hypotheses

This sample was consistent with those used in previous studies of DUI offenders. The population of offenders was young, largely white, and majority male. In addition, there appeared to be two types of offenders: those who were not engaging in other types of criminal offenses, and those who committed a DUI following a history of engagement in other forms of criminal behaviors. There was also wide variation in the characteristics of cases and case processing. Only about one-third of the sample recidivated within four years of their DUI offense.

Unlike previous studies, this thesis included indicators of offender characteristics beyond demographics. Of primary importance, this thesis included measures of criminal history beyond traffic or motor vehicle offenses. Findings regarding age at prior arrest provide preliminary support, consistent with Marowitz's dichotomy, for the presence of two types of offenders: problem drivers who drink, and problem offenders who drink and drive.

In this section, I summarize this study's findings by systematically going through the 17 hypotheses that motivated the research. The hypotheses and the result for each hypothesis are presented in Tables 27 and 28.

Part 1 - Sentencing

Consistent with prior criminology research and with *Hypotheses 1 and 2*, white and female offenders were more likely than nonwhite and male offenders to receive more lenient sanctions. The thesis found a linear, rather than the hypothesized curvilinear relationship between age and sentencing. *Hypothesis 3* posited that the youngest and oldest offenders would be most likely to receive diversion. The results indicate that with increasing age, an offender's odds of receiving ARD increased. One exception was for offenders between the age 36 and 40, for whom there was a slight decrease in the odds of receiving ARD compared to offenders who

were younger or older. This exception likely reflects some consideration by judges of the second peak in the age distribution of DUI offenders.

Offenders with more serious prior records were less likely than offenders with less serious prior records to receive ARD, providing support for *Hypothesis 4*. Prosecutors and judges appeared to strongly consider an offender's past criminal behaviors when deciding whether or not an individual should receive diversion.

BAC level does not appear to be an important factor in prosecutors' and judges' decision making. *Hypothesis 5* anticipated that offenders with a higher BAC level would be more likely than offenders with a lower BAC to receive ARD. This hypothesis was not supported. Although prior research has yielded inconsistent results, this thesis found that BAC was not treated as a proxy for seriousness. However, consistent with *Hypothesis 6*, it appeared that drug-impaired offenders were generally viewed as more serious than alcohol-impaired offenders, and they were sentenced for a guilty conviction at a significantly higher rate.

Consistent with research analyzing the effects of a criminal record on recidivism (Chiricos et al., 2007) and the sentencing of offenders in Pennsylvania to intermediate punishments (Bowles, 2011), there were no significant county-level variables that could predict whether or not an offender received ARD. Thus, *Hypothesis 7 and 8* were not supported by the findings.

Table 27: Summary of Hypotheses: Part 1 - Sentencing

Hypothesis	Description	Result
1	White offenders will be more likely than minority offenders to receive ARD	Supported
2	Female offenders will be more likely than male offenders to receive ARD	Supported
3	The youngest and oldest offenders will be least likely to receive ARD	Partial Support
4	Offenders with more serious prior records will be less likely than offenders with less serious prior records to receive ARD	Supported
5	Offenders with a higher BAC, alcohol-impaired DUI will be less likely than offenders with a low BAC, alcohol-impaired DUI to receive ARD.	Not Supported
6	Offenders charged with driving under the influence of drugs will be less likely than offenders charged with driving under the influence of alcohol to receive ARD.	Supported
7	Offenders sentenced in rural counties will be less likely than offenders sentenced in urban counties to receive ARD.	Not Supported
8a	Offenders sentenced in counties that receive state funding for drug and alcohol restrictive intermediate punishment programs will be more likely than offenders sentenced in counties that did not receive state funding for D&A RIP programs to be sentenced to ARD	Not Supported
8b	Counties with higher amounts of state funding per active offender for drug and alcohol restrictive intermediate punishment programs will be more likely than counties with lower amounts of state funding per active offender to sentence first time DUI offenders to ARD.	Not Supported

Part 2 - Recidivism

States across the country have implemented a series of changes to their DUI laws (Lerner, 2011), but very few studies have analyzed the effectiveness of these changes. This study serves as a starting point for evaluating the effectiveness of programs aimed at DUI offenders. Controlling for selection, this thesis sought to better understand the effectiveness of Accelerated Rehabilitative Dispositions, and the effects of such programs on recidivism compared to the standard guilty conviction. The findings of this study indicate that a complex relationship exists between programs and recidivism.

DUI offenders were found to recidivate at a lower rate than the general offending population. The aggregate differences in recidivism between DUI offenders and the general

offending population may provide support for the exclusion of DUI offenders from most research on sentencing and recidivism, but they also highlight the need for research to better understand this large group of offenders.

Hypothesis 9 posited that offenders sentenced to ARD would be less likely to recidivate than offenders receiving a guilty conviction. Expectations of findings for the effects of diversion were further qualified by *Hypotheses 10 and 11*, which suggested that the effects would differ by gender and by race. The study did not find a direct effect for ARD, but did find an effect for females and for racial minorities. Specifically, white offenders were always less likely than minority offenders to recidivate, but differences in recidivism for whites receiving ARD and whites sentenced for a guilty conviction were not significantly different, while non-whites receiving ARD were significantly less likely than non-whites sentenced for a guilty conviction to recidivate.

There were no differences in the probability of recidivism for males and females who were sentenced for a guilty conviction. However, the probability of recidivism was significantly lower for females who received ARD compared to males who received ARD, suggesting that females were affected more significantly by the permanent criminal label that followed a conviction.

Older offenders were less likely than younger offenders to recidivate, providing support for *Hypothesis 12*. These findings are consistent with general criminology research on the age-crime curve, which indicates that the propensity for engaging in criminal behavior decreases through the life course.

More serious offenders were more likely than less serious offenders to recidivate. Measures of seriousness were captured in *Hypotheses 13 (DUI crimes only vs. DUI and non-DUI*

crimes) and 14 (more vs. less serious records). In both cases, individuals with more prior arrests were more likely to recidivate. The deterrent effects of punishment are likely to be less salient for individuals who have previously been processed through the criminal justice system. That is, if previous punishments failed to curb criminal behavior, it is not likely that sanctions for a DUI offense will alter an individual's behavior. Similarly, offenders charged with more serious non-DUI offenses in their case disposition were more likely to recidivate. The inclusion of more serious charges signals that these offenders are more serious offenders who are more committed to criminal behaviors.

Findings on the effects of criminal history and case seriousness characteristics and their influence on recidivism provide additional support for the existence of two types of DUI offenders. Offenders with more serious criminal histories and who are charged with additional non-DUI offenses are more reflective of criminal populations who drink, while those who do not have a prior record and are charged only with a DUI offense are more reflective of problem drinkers who drive.

Table 28: Summary of Hypotheses: Part 2 - Recidivism

Hypothesis	Description	Result
9	Offenders sentenced to ARD will be less likely to recidivate than offenders receiving a guilty conviction.	Partial Support
10a	White offenders are more likely than minority offenders to recidivate.	Not Supported
10b	Race will interact with diversion. White offenders sentenced to a guilty conviction will be less likely than minority offenders sentenced to guilty convictions to recidivate. Minority offenders sentenced to diversion will be less likely than white offenders sentenced to diversion to recidivate	Partial Support
11a	Female offenders are less likely than male offenders to recidivate.	Partial Support
11b	Gender will interact with diversion. Females sentenced to a guilty conviction will be more likely than females sentenced to ARD to recidivate. Males sentenced to ARD will be more likely than males sentenced to a guilty conviction to recidivate.	Partial Support
12	Older offenders will be less likely than young offenders to recidivate.	Supported
13	Offenders charged with a DUI offense as their most serious offense will be less likely than offenders charged with additional, more serious non-DUI crimes to recidivate.	Supported
14	Offenders with more serious prior records will be more likely than offenders with less serious prior records to recidivate.	Supported
15	Offenders with a higher BAC will be more likely than offenders with a low BAC to recidivate.	Not supported
16	Offenders charged with driving under the influence of drugs will be more likely than offenders charged with driving under the influence of alcohol to recidivate.	Supported
17	Offenders sentenced in rural counties will be less likely than offenders sentenced in urban counties to recidivate.	Not Supported

BAC is not predictive of recidivism. Thus, this thesis failed to find support for *Hypothesis 15*, which predicted that BAC would be positively related to recidivism. In this study, the only differences in recidivism for type of DUI offense was between drug-impaired and alcohol-impaired offenders. Thus, BAC is not likely to be a proxy for either the seriousness of the offense or the criminality of the offender. Thus, it should not influence the type of sanction given to DUI offenders. This finding calls into question the current graduated DUI laws in Pennsylvania, in which BAC level is a partial determinant of type of sanction.

Comparison of the findings from part I and part II of this thesis indicate that prosecutors and judges are, in general, considering the appropriate characteristics in deciding whether or not an offender should receive ARD. Prior record, age, gender, and race all appear to be significant considerations at sentencing, but they are also highly predictive of recidivism. The use of race at sentencing is problematic, although decision makers might be using factors highly correlated with race rather than race itself.

The general consistency between predictors and recidivism indicates that, in general, the correct offenders are receiving ARD. However, the findings of this thesis show that although judges are generally effective at identifying the individuals least likely to recidivate, they may overestimate the likelihood of recidivism for other individuals. The result of these perceptions is a near 50-50 split in the processing of offenders through ARD programs and sentencing of offenders for a guilty conviction. This possible overuse of guilty convictions for DUI conflicts with the evidence from this study indicating that ARD programs do not increase recidivism and could be useful alternative sanctions for all DUI offenders.

Theoretical Implications

This thesis sought to analyze DUI offenders through the lenses of deterrence, reintegrative shaming, and contingent labeling. Application of these theories to DUI offenders has provided a unique opportunity to analyze the appropriateness of these theories to a new population of offenders.

Deterrence. The fear of future punishment appears to be a salient deterrent, regardless of whether or not the offender obtains a formal criminal label through a guilty conviction. This thesis cannot test the initial threat of punishment and whether or not the laws deter driving under

the influence in general, but it can reach some initial conclusions about the threat of punishment for repeated criminal involvement.

The fact that the likelihood of recidivism is similar for offenders processed through an ARD program and for those who are sentenced for a guilty conviction suggests that the specific deterrent effect of punishment for DUI is the same for the two options. This apparent equivalence provides support for previous findings that suggest the certainty of punishment is more salient than the severity of punishment. Little substantive support was found for celerity of punishment, which is likely due to the immediacy of arrest, which probably captures most of the effects of the time to punishment.

The certainty of punishments was previously discussed in two separate ways: the certainty of apprehension and the certainty of sanctions. Due to the low probability of being arrested for a DUI in the first place, this thesis posited that arrest, regardless of punishment, would act as a strong deterrent to future criminal behaviors. The lack of a substantive difference between offenders receiving ARD and those with a guilty conviction, as well as the low overall rate of recidivism suggest that an arrest may be a sufficient mechanism for specific deterrence.

For both those receiving ARD and those sentenced for a guilty conviction, the perceived probability of being apprehended for a DUI is likely altered by their arrest for their first DUI offense. While this thesis is unable to test the perception of offenders before and after their arrest, the results indicate that most individuals did not recidivate following their first DUI arrest. An arrest may quell individuals' previously held beliefs that they are unlikely to be caught, or that they are fully capable of driving well under the influence. An arrest is necessary to interrupt the "not me" phenomenon and self-perceptions that may promote driving under the influence.

An arrest enters a new variable into the bounded rationality that informs individuals' decision-making.

Arrest and punishment for a DUI offense also alter the perceived certainty of punishment. Both offenders who are diverted through the ARD program and those who are sentenced for a guilty conviction face harsher sentences if they are arrested again in the future due to the graduated DUI laws in Pennsylvania. Thus, the certainty of punishment for both groups is the same, indicating that there should be little difference in the specific deterrent effects for DUI offenders. This study supported this hypothesis and found no overall difference in the recidivism of offenders between those who were diverted and those who were punished for a guilty conviction.

Reintegrative Shaming. The lack of an effect for severity of punishment may be due to the possibility that harsh punishments have a positive effect on recidivism. Reintegrative shaming posits that permanent criminal records may inhibit reintegration into prosocial roles following arrest and punishment for an offense due to the stigma and exclusion associated with criminal labels. This theory provides some explanation for why offenders may recidivate. Because a main effect was not identified for ARD in this study, it remains unclear whether or not reintegrative shaming is an appropriate theoretical explanation for the behavior of DUI offenders. Braithwaite (2001) indicates that there may be fundamental differences in the effect of a criminal label depending on the type of crime and its acceptability in society. The perceived lack of seriousness associated with DUI offences may lower the stigma associated with a DUI offense compared to more serious offenses, such as burglary or assault.

This thesis provides some support for reintegrative shaming sanctions. Access to a population of offenders who committed the same offense, but were processed in two separate

ways, with only half ending up with a permanent record, provided a unique opportunity to test the effects of a criminal record on recidivism. While ARD, in general, appears to be no better at reducing recidivism than a guilty conviction, interactions indicated that a criminal label had significant effects for some portions of the population.

Contingent labeling. Minorities and female offenders were significantly more likely to recidivate if they were sentenced for a guilty conviction compared to those who received ARD. The results here were consistent with previous findings indicating that the effects of a criminal label are contingent on demographic characteristics. Females and nonwhites were more likely than males and whites to experience significant negative effects from a criminal label, in that they were more likely to recidivate after a guilty conviction compared to a diversion program. Alternatively, it may be that judges are more accurate at predicting which females and minorities are likely to recidivate, and less accurate at predicting which males and whites are likely to recidivate.

These findings suggest that, among studies assessing the impact of a criminal label, it is important to evaluate the effects of a similar sanction on different types of offenders. Initially it seemed as though ARD programs had no relationship with recidivism. However, further analysis revealed that ARD programs were correlated with reductions in recidivism for some groups of offenders. Despite changes in the gender roles for females, it appears that females may still face greater stigma for drinking and driving than their male counterparts. In line with cumulative disadvantage research, it appears that nonwhites face greater stigma with a criminal record than their white counterparts. These findings together indicate that policies focused on the sentencing and rehabilitation of offenders should also take into consideration the characteristics of offenders, and how punishments may have varying effects across groups.

Policy Implications

The harshest penalties for DUI offenders are not the most effective. At a minimum, this study revealed there were no negative effects from using diversion. Models without interactions found a null effect, that is, no difference in the probability of recidivism for offenders receiving ARD and those who did not receive ARD. On the other hand, the results indicate that for some offenders, ARD appears to reduce the likelihood of recidivism.

The results indicate that diversion may be an effective alternative for minorities and females. Studies that attempt to determine the effectiveness of diversion programs may incorrectly conclude that the policies are ineffective. Rather than approaching programs with a “what works?” approach, this thesis suggests that the more appropriate question is what works for whom? Interactions revealed significant effects for non-whites and females who receive ARD for first-time DUI offenses.

Support for harsh DUI penalties often focuses on the risk that drivers pose to other drivers or pedestrians. However, this study found that most of DUI offenders are not involved in a serious accident, and therefore probably should not be subject to such severe punishments. These findings do not suggest that lesser punishments should be afforded to those drivers who do cause injury or death,³² but rather, that those offenders who do not cause injury or death should not be punished with the same severity. Correlates of this population of offenders evaluated in this study suggest that DUI offenders, in general, do not require harsh sanctions for effective rehabilitation.

Given the substantial costs of incarceration and community supervision, this thesis provides support for the use of alternative sanctions such as ARD. While discretion for

³² The sample excluded more serious offenders who were involved in an accident causing serious bodily injury or death.

prosecutors and judges does allow for the application of severe punishments to those perceived as most deserving (e.g., those involved in serious accidents or those who have a long history of criminal behavior), there is little evidence to support the imposition of permanent criminal records for the majority of first-time DUI offenders. Policies that encourage the use of diversion for first-time DUI offenders could increase consistency in sentencing across jurisdictions while avoiding the potentially harmful effect of a criminal label.

Limitations

This study has three limitations. First, the absence of complete data from Philadelphia undermines the ability to make the strongest possible comparison between urban and rural jurisdictions. Despite this limitation, the data do include a large sample of offenders from Allegheny County (where Pittsburgh is located) as well as several other urban counties. Nevertheless, no effect is found for variables at level-2.

Second, data regarding criminal prior records contain only offenses in which an arrest was made and the case was processed through a Court of Common Pleas. Thus, the sample does not include information on offenders' prior driving behaviors unless the offense was charged with other, more serious offenses. As a result, this thesis cannot make firm conclusions about the patterns of risky driving behaviors, and how those patterns may be related to sentencing and recidivism.

Third, data on the substance use and substance dependency of offenders were not available. While levels of dependency do not statutorily disqualify offenders from the ARD program, prosecutors and judges may be less likely to grant access to alternative sanctions if they believe the offender is less likely to be rehabilitated due to an underlying substance problem, an hypothesis that could not be tested in the present study.

Future Directions

Based on the findings in this study, there are six research questions that are next steps in our understanding of DUI offending and the treatment of DUI offenders. First, while this study investigates the correlates of sentencing and recidivism for first-time DUI offenders, it is unknown whether the characteristics of repeat DUI offenders are similar to or different from these first-time offenders. Expansion of this sample to include repeat DUI offenders could help identify characteristics that are predictive of DUI behaviors in general, and those that are able to distinguish between one-time and chronic DUI offenders.

Second, future research needs to better address the unique relationship between age and crime for DUI offenders. The downward shift in the distribution of offenders when comparing age at first-time DUI offense and age at first arrest suggests that offenders who are committing their first DUI offense at older ages may have first engaged in criminal behaviors during adolescence or young adulthood. This pattern raises the possibility that older DUI offenders are individuals who have desisted from more serious offenses, but still exhibit a tendency to engage in deviant behaviors, including drinking (or doing drugs) and driving.

Third, future studies should analyze the relationship between age and crime for repeat DUI offenders in order to better understand the relationship between age and DUI offenses. Additional within-person analysis of arrests for individuals who are first arrested for a DUI during the second peak of the distribution (ages 35-45) are needed to analyze the within person trajectory of criminal behavior and desistance or persistence patterns.

Fourth, future studies should combine motor vehicle records with criminal history records in order to provide a more thorough analysis of the effect of past behaviors on sentencing and recidivism. Currently, data on motor vehicle records are held by the Department of

Transportation, while criminal records are held by the Pennsylvania State Police. Synthesizing these data sources would provide for a more rich interrogation of the behavioral patterns of DUI offenders. This study provides some support for the influence of prior risky driving behaviors on harsher sentences using a measure for non-DUI traffic offenses, but only for offenses processed in criminal courts.

Fifth, to date, no research has been conducted regarding the willingness of DUI offenders to pay economic sanctions. However, it is likely that the combination of economic sanctions with other sanctions (particularly license suspension) increases the likelihood that economic sanctions will be paid. Because expunging a DUI following ARD requires successful completion of all terms of the sentence, including the payment of economic sanctions, offenders sentenced to ARD have greater incentives to pay economic sanctions than offenders sentenced to a guilty conviction.

Economic sanctions have also been found to be an effective deterrent to future DUIs, primarily because they are unavoidable (Yu, 1994). That is, offenders who need to reinstate their license must fulfill their economic sanction obligations prior to receiving their license. Although offenders may be able to avoid the immediate impact of license suspension (e.g., by driving without a license), valid forms of ID are needed for access to a variety of goods and services. The financial effects that result from economic sanctions should function as a disincentive to drinking and driving in the future. And, higher amounts of economic sanctions should have more impact than small amounts. Access to more comprehensive data on fees, fines, and restitution than are available in this dataset is needed to test the unique effects of economic sanctions for DUI offenders.

Finally, this study does not address the mechanisms through which a guilty conviction would result in higher rates of recidivism, but it does highlight the need for continued research. This study tests the effects of a criminal label only on recidivism and continued criminal behavior that is identified by the police. Although half of the individuals in the data did not recidivate, it is not clear whether the official criminal label affected an individual's opportunities to access prosocial bonds. Other research suggests that a criminal record, in general, may present a barrier to stable, employment opportunities with adequate salaries (Pager, 2003). Such findings indicate that there is a guilty conviction effect, above and beyond the existence of a prior record, suggesting that the type of prior conviction also matters. DUI offenses may signal to employers that a person has a drinking problem, making him or her a potentially unreliable employee. Audit studies analyzing the effects of a DUI record on access to employment should be conducted to understand whether a DUI record has negative effects on offenders' life chances.

Conclusion

Arrests for driving under the influence are the most frequent type of arrest in the United States, yet few studies have provided an in-depth interrogation of the characteristics of these offenders. This thesis extends criminological theories to a comprehensive dataset of DUI offenders in the state of Pennsylvania, and is able to provide a better understanding of the sentencing and recidivism of these offenders.

The introduction to this thesis suggested that DUI offenders may be a unique type of offender whose behavior could not be explained by existing criminological research. The current study found that while DUI offenders have some similarities to the general offending population, there were also differences that highlight the need for continued research on this subgroup of offenders. A better understanding of this population is necessary to guide policies that affect a

large population of arrestees in the United States. In general, diversion dispositions and guilty convictions seemed to equally affect recidivism, perhaps through a change in an offender's perception of certainty with regard to apprehension and punishment. Rather than supporting severe punishments for DUI offenders, the findings of this thesis suggest that offenders, at worst, have no difference in recidivism based on type of disposition, and, at best, benefit from the ability to expunge their criminal record.

Beyond the policy implications, this thesis provided a unique opportunity to test criminology theories through a comparison of ARD and sentencing after conviction using HLM models to account for differences across space. Concern over the effects of a criminal label has long been a focus in research, but studies seeking to understand these effects have often faced methodological challenges. Future research should continue to expand upon the current understanding of first-time DUI offenders to include repeat offenders and isolate the most effective treatment strategies to reduce the risks caused by DUI recidivism.

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Appendix A. Assessing the Need for Random Coefficients. Logit HLM Model With and Without Robust Standard Errors (N=46,863)

	Model With Normal Standard Errors						Model With Robust Standard Errors						Robust SE >	
	Coef	SE	T-ratio	df	P-value	Odds Ratio	Coef	SE	T-Ratio	df	P-value	Odds Ratio	SE, I = Yes	Difference
Intercept	-5.386	0.223	-24.186	59	0.000	0.005	-5.386	0.456	-11.800	59	0.000	0.005	1	2.050
Male	-0.380	0.030	-12.850	46792	0.000	0.684	-0.380	0.040	-9.528	46792	0.000	0.684	1	1.349
White	0.287	0.044	6.490	46792	0.000	1.333	0.287	0.047	6.096	46792	0.000	1.333	1	1.065
Age at Offense														
<21	-1.482	0.092	-16.098	46792	0.000	0.227	-1.482	0.139	-10.642	46792	0.000	0.227	1	1.513
21-25	-1.436	0.078	-18.312	46792	0.000	0.238	-1.436	0.117	-12.238	46792	0.000	0.238	1	1.496
26-30	-1.345	0.077	-17.579	46792	0.000	0.260	-1.345	0.101	-13.310	46792	0.000	0.260	1	1.321
31-35	-1.048	0.075	-14.007	46792	0.000	0.351	-1.048	0.101	-10.361	46792	0.000	0.351	1	1.352
36-40	-0.896	0.072	-12.512	46792	0.000	0.408	-0.896	0.073	-12.335	46792	0.000	0.408	1	1.014
41-45	-0.682	0.069	-9.845	46792	0.000	0.506	-0.682	0.068	-10.001	46792	0.000	0.506	0	
46-50	-0.332	0.069	-4.835	46792	0.000	0.718	-0.332	0.052	-6.374	46792	0.000	0.718	0	
Number of Prior Arrests														
0 prior arrests	3.806	0.110	34.747	46792	0.000	44.963	3.806	0.222	17.119	46792	0.000	44.963	1	2.030
1 prior arrest	2.860	0.103	27.811	46792	0.000	17.457	2.860	0.182	15.672	46792	0.000	17.457	1	1.775
2 prior arrests	2.028	0.104	19.473	46792	0.000	7.599	2.028	0.171	11.878	46792	0.000	7.599	1	1.639
3-5 prior arrests	1.207	0.104	11.561	46792	0.000	3.344	1.207	0.140	8.602	46792	0.000	3.344	1	1.344
Prior DUI Arrest	-0.622	0.043	-14.304	46792	0.000	0.537	-0.622	0.095	-6.524	46792	0.000	0.537	1	2.192
Prior Other Traffic Arrest	-0.526	0.062	-8.421	46792	0.000	0.591	-0.526	0.067	-7.849	46792	0.000	0.591	1	1.073
Age at first arrest														
< 15	1.660	0.144	11.538	46792	0.000	5.257	1.660	0.147	11.257	46792	0.000	5.257	1	1.025
16-20	1.341	0.097	13.761	46792	0.000	3.823	1.341	0.114	11.794	46792	0.000	3.823	1	1.167
21-24	1.192	0.090	13.197	46792	0.000	3.294	1.192	0.107	11.185	46792	0.000	3.294	1	1.180
25-29	0.997	0.088	11.324	46792	0.000	2.709	0.997	0.101	9.823	46792	0.000	2.709	1	1.153
30-34	0.808	0.088	9.211	46792	0.000	2.243	0.808	0.079	10.282	46792	0.000	2.243	0	
35-39	0.579	0.086	6.701	46792	0.000	1.784	0.579	0.074	7.818	46792	0.000	1.784	0	
40-44	0.489	0.087	5.646	46792	0.000	1.631	0.489	0.079	6.227	46792	0.000	1.631	0	
45-49	0.063	0.088	0.713	46792	0.476	1.065	0.063	0.081	0.774	46792	0.439	1.065	0	
Most Serious Offense - Felony	-1.035	0.101	-10.237	46792	0.000	0.355	-1.035	0.294	-3.522	46792	0.001	0.355	1	2.907
Most Serious Offense - DUI	1.559	0.045	34.731	46792	0.000	4.752	1.559	0.156	10.002	46792	0.000	4.752	1	3.472
Days to Sentencing	0.000	0.000	5.184	46792	0.000	1.000	0.000	0.000	0.647	46792	0.517	1.000	1	7.944
Type of DUI														
Drug	-0.806	0.065	-12.470	46792	0.000	0.447	-0.806	0.118	-6.810	46792	0.000	0.447	1	1.831
Alcohol - BAC .10-.16	0.115	0.034	3.347	46792	0.001	1.122	0.115	0.119	0.968	46792	0.334	1.122	1	3.459
Alcohol - BAC >.16	0.067	0.032	2.092	46792	0.036	1.069	0.067	0.077	0.863	46792	0.388	1.069	1	2.423
Multiple Charges Convicted or Diverted	1.521	0.032	47.906	46792	0.000	4.577	1.521	0.370	4.107	46792	0.000	4.577	1	11.665

Appendix B. Correlation Matrix – Independent Variables for Sentencing Model

	male	White	Age21	Age2125	Age2630	Age3135	Age3640	Age4145	Age4650	Age50	parrest0	parrest1	parrest2	parr35	parr6up	priorDUI	pothtraf
male	1																
White	-0.0386	1															
Age21	0.0371	0.0228	1														
Age2125	-0.0024	0.0333	-0.207	1													
Age2630	0.0025	-0.0254	-0.1496	-0.2294	1												
Age3135	-0.0082	-0.0282	-0.1261	-0.1934	-0.1398	1											
Age3640	-0.0292	-0.0046	-0.1265	-0.1939	-0.1402	-0.1182	1										
Age4145	-0.0375	0.0079	-0.1293	-0.1983	-0.1433	-0.1208	-0.1212	1									
Age4650	-0.0043	-0.0075	-0.1119	-0.1716	-0.1241	-0.1046	-0.1049	-0.1072	1								
Age50	0.0436	-0.0106	-0.1166	-0.1787	-0.1292	-0.1089	-0.1092	-0.1117	-0.0966	1							
parrest0	-0.1148	0.096	0.0983	0.096	0.0137	-0.0319	-0.0565	-0.0746	-0.0646	-0.0317	1						
parrest1	0.0165	0.0286	-0.0114	-0.0148	-0.0091	0.0102	-0.0006	0.0109	0.0083	0.0156	-0.559	1					
parrest2	0.0486	-0.0118	-0.032	-0.0313	0.0035	0.0121	0.0206	0.0234	0.0138	0.0044	-0.3502	-0.1755	1				
parr35	0.0696	-0.0768	-0.0609	-0.0589	-0.0083	0.011	0.0416	0.0515	0.044	0.0112	-0.3622	-0.1815	-0.1137	1			
parr6up	0.0675	-0.1505	-0.0742	-0.0662	-0.0073	0.0216	0.0439	0.0456	0.0515	0.0211	-0.2411	-0.1209	-0.0757	-0.0783	1		
priorDUI	0.0948	0.0279	-0.1373	-0.1718	-0.0759	0.0194	0.084	0.1442	0.1281	0.1102	-0.4609	0.1288	0.1889	0.2502	0.2011	1	
pothtraf	0.0796	-0.0722	-0.0622	-0.0603	-0.0034	0.0299	0.0382	0.0397	0.0251	0.0234	-0.2952	-0.017	0.0678	0.2081	0.3238	0.3417	1
AFA15les	0.0405	-0.046	0.1447	0.0902	-0.0485	-0.0465	-0.0476	-0.0493	-0.0418	-0.0432	-0.1508	0.026	0.0661	0.1112	0.049	-0.0344	0.0337
AFA1620	0.0874	-0.0426	0.5203	-0.0437	-0.0415	-0.055	-0.0734	-0.0937	-0.0975	-0.1361	-0.3075	0.0852	0.1035	0.1557	0.1824	0.0255	0.1094
AFA2124	0.01	0.0236	-0.1903	0.5247	-0.0935	-0.0664	-0.0663	-0.0877	-0.0983	-0.1194	0.0339	-0.0173	-0.0007	-0.0134	-0.0252	0.0204	0.0022
AFA2529	-0.0161	0.0033	-0.1516	-0.0757	0.4499	-0.0567	-0.0427	-0.0342	-0.0388	-0.0819	0.0546	-0.0115	-0.0185	-0.0258	-0.0417	0.0316	-0.0211
AFA3034	-0.0287	0.0057	-0.1162	-0.1772	0.0068	0.433	-0.0294	-0.0124	0.0012	-0.0325	0.034	0.0138	-0.0076	-0.0343	-0.0455	0.0366	-0.0135
AFA3539	-0.0517	0.012	-0.1025	-0.158	-0.1138	0.0423	0.4459	-0.0264	-0.0071	0.0018	0.0745	-0.0021	-0.0315	-0.0502	-0.0532	-0.0012	-0.0349
AFA4044	-0.0579	0.0153	-0.0947	-0.1452	-0.1047	-0.0882	0.0417	0.4703	-0.0157	0.0023	0.1144	-0.0263	-0.0461	-0.0662	-0.056	-0.0375	-0.0488
AFA4549	-0.0392	0.0136	-0.0817	-0.1248	-0.0906	-0.076	-0.0766	0.0658	0.492	0.0021	0.1335	-0.0476	-0.0546	-0.0655	-0.0489	-0.0528	-0.0439
AFA50up	0.0029	0.0141	-0.0893	-0.1366	-0.0989	-0.0834	-0.0836	-0.0849	0.0235	0.6705	0.1765	-0.0766	-0.0687	-0.0782	-0.055	-0.071	-0.0575
MSFelony	0.0324	-0.0852	0.047	0.0009	0.0108	0.0011	-0.005	-0.0113	-0.0199	-0.0313	-0.0748	-0.0089	0.007	0.0525	0.1052	0.0064	0.0638
MSDUI	-0.0299	0.0701	-0.0482	0.007	0.0003	-0.0058	-0.0035	0.0034	0.0133	0.0366	0.0939	0.0143	-0.0188	-0.0742	-0.1124	-0.0205	-0.0894
Day2Sent	-0.0108	-0.0517	0.0006	-0.0054	0.007	0.023	0.0139	-0.0003	-0.0174	-0.0234	-0.0266	0.0052	0.0153	0.0113	0.0142	0.0114	0.027
DUIDrug	-0.006	-0.0379	0.092	0.0032	-0.0017	-0.0182	-0.0153	-0.0161	-0.0162	-0.0372	-0.0627	0	0.0175	0.0432	0.0591	-0.0369	0.0124
DUI0810	0.0251	-0.0428	0.2627	-0.0698	-0.0434	-0.0244	-0.0304	-0.0239	-0.0228	-0.0324	-0.025	-0.0066	0.0105	0.0236	0.0222	0.0003	0.0176
DUI1016	0.0161	-0.0045	-0.1048	0.08	0.0427	0.0065	-0.0013	-0.0247	-0.0242	-0.0081	0.0252	-0.0028	-0.013	-0.0158	-0.0125	-0.0351	-0.0129
DUI16up	-0.0351	0.0602	-0.1912	-0.0076	0.0032	0.0248	0.0361	0.0512	0.0497	0.0534	0.0278	0.0087	-0.0057	-0.0266	-0.035	0.0469	-0.0103
mcharge	-0.0149	0.0045	0.0345	0.0291	0.003	-0.0087	-0.0009	-0.0199	-0.0236	-0.0309	0.0488	-0.0237	-0.0256	-0.0316	0.0129	-0.0524	0.0091

Appendix B. Correlation Matrix - Independent Variables for Sentencing Model, Continued

	AFA15less	AFA1620	AFA2124	AFA2529	AFA3034	AFA3539	AFA4044	AFA4549	AFA50up	MSFelony	MSDUI	Day2Sent	DUIDrug	DUI0810	DUI1016	DUI16up	mcharge
AFA15less	1																
AFA1620	-0.089	1															
AFA2124	-0.0767	-0.3349	1														
AFA2529	-0.0593	-0.2587	-0.223	1													
AFA3034	-0.0451	-0.197	-0.1699	-0.1312	1												
AFA3539	-0.0401	-0.1752	-0.151	-0.1167	-0.0889	1											
AFA4044	-0.0368	-0.1606	-0.1385	-0.107	-0.0815	-0.0724	1										
AFA4549	-0.0318	-0.1386	-0.1195	-0.0923	-0.0703	-0.0625	-0.0573	1									
AFA50up	-0.0347	-0.1514	-0.1305	-0.1008	-0.0768	-0.0683	-0.0626	-0.054	1								
MSFelony	0.0521	0.0743	-0.0174	-0.0136	-0.0203	-0.0184	-0.0241	-0.0231	-0.0314	1							
MSDUI	-0.0609	-0.0831	0.0178	0.0275	0.0207	0.0178	0.0167	0.0268	0.0364	-0.4938	1						
Day2Sent	-0.0188	-0.0134	0.0001	0.0086	0.0219	0.0171	0.0006	-0.0107	-0.0134	0.0003	0.0287	1					
DUIDrug	0.0466	0.0879	-0.0186	-0.0143	-0.0365	-0.0276	-0.0189	-0.0182	-0.0308	0.1147	-0.097	-0.0117	1				
DUI0810	0.051	0.1629	-0.0666	-0.046	-0.034	-0.0295	-0.0265	-0.0245	-0.0312	0.0571	-0.0794	0.1189	-0.1437	1			
DUI1016	-0.0137	-0.0524	0.0534	0.0189	0.0075	0.001	-0.0133	-0.0131	0.0002	-0.0383	0.0668	0.0123	-0.1297	-0.3806	1		
DUI16up	-0.0554	-0.143	0.0225	0.0323	0.0407	0.0385	0.0447	0.0423	0.0421	-0.0685	0.0563	-0.1168	-0.181	-0.5314	-0.4796	1	
mcharge	0.0125	0.0143	0.0102	-0.0075	-0.0134	-0.0002	-0.0034	-0.0127	-0.0103	0.0997	-0.1351	0.0205	-0.0037	-0.138	0.041	0.0937	1

Appendix C. Level-1 Random Coefficients Logistic HLM Predicting ARD (N=46,823)

Variable	Coef.		SE	Odds Ratio
Intercept	-2.840	***	0.347	0.058
Male	-0.404	***	0.051	0.668
White	0.257	***	0.049	1.292
Age at Offense				
21-25	-0.052		0.075	0.949
26-30	0.145		0.093	1.156
31-35	0.308	**	0.098	1.360
36-40	0.273	**	0.099	1.314
41-45	0.377	**	0.103	1.459
46-50	0.582	***	0.111	1.790
50+	0.803	***	0.112	2.232
Number of Prior Arrests				
1 prior arrest	-0.741	***	0.089	0.476
2 prior arrests	-1.469	***	0.110	0.230
3-5 prior arrests	-2.411	***	0.152	0.090
6+ prior arrests	-3.568	***	0.211	0.028
Prior DUI Arrest	-0.445	***	0.097	0.641
Prior Other Traffic Arrest	-0.529	***	0.064	0.589
Age at first arrest				
< 15	0.648	***	0.091	1.912
16-20	0.413	***	0.056	1.511
21-24	0.337	***	0.055	1.401
Most Serious Offense - Felony	-1.268	***	0.160	0.282
Most Serious Offense - DUI	1.647	***	0.119	5.193
Days to Sentencing	0.000		0.000	1.000
Type of DUI				
Drug	-0.616	***	0.118	0.540
Alcohol - BAC .10-.16	0.223		0.118	1.250
Alcohol - BAC >.16	0.152		0.121	1.164
Multiple Charges Convicted or Diverted	1.878	***	0.296	6.543

*** p < .001 ** p < .01 * p < .05

Appendix D. Full Level-1 Random Coefficients Variance Components

Variable	Error Term	SD	Variance Component	df	Chi2	P-Value
INTRCPT1,	U0	2.489	6.198	51	545.145	0.000
MSFELONY	U1	0.724	0.524	51	90.467	0.001
MSDUI	U2	0.811	0.658	51	283.147	0.000
WHITE	U4	0.296	0.088	51	66.391	0.072
PARREST1	U5	0.629	0.395	51	313.302	0.000
PARREST2	U6	0.771	0.594	51	212.767	0.000
PARR35	U7	1.053	1.110	51	240.066	0.000
PARR6UP	U8	1.355	1.837	51	121.786	0.000
PRIORDUI	U9	0.606	0.367	51	178.688	0.000
POTHTRAF	U10	0.430	0.185	51	70.638	0.035
AFA15LES	U11	0.433	0.187	51	49.882	>.500
AFA1620	U12	0.335	0.112	51	79.451	0.007
AFA2124	U13	0.297	0.088	51	79.368	0.007
AGE2125	U14	0.495	0.245	51	65.087	0.089
AGE2630	U15	0.525	0.276	51	89.292	0.001
AGE3135	U16	0.524	0.274	51	84.159	0.003
AGE3640	U17	0.512	0.262	51	78.242	0.009
AGE4145	U18	0.561	0.315	51	85.508	0.002
AGE4650	U19	0.649	0.421	51	94.813	0.000
AGE50	U20	0.664	0.440	51	106.375	0.000
MALE	U21	0.298	0.089	51	97.479	0.000
DUIDRUG	U22	0.695	0.483	51	93.359	0.000
DUI1016	U23	0.826	0.683	51	242.205	0.000
DUI16UP	U24	0.824	0.678	51	200.406	0.000
MCHARGE	U25	2.224	4.945	51	2673.523	0.000

Appendix E. Full Level-1 Random Coefficients Variance Components

Variable	Error Term	SD	Variance Component	Chi2	P-Value
Intercept	U0	2.546	6.480	1028.323	0.000
Male	U21	0.266	0.071	105.077	0.000
Age 21-25	U14	0.424	0.180	75.251	0.044
Age 26-30	U15	0.494	0.244	98.960	0.001
Age 31-35	U16	0.522	0.273	99.895	0.000
Age 36-40	U17	0.453	0.205	82.177	0.013
Age 41-45	U18	0.518	0.269	92.590	0.002
Age 46-50	U19	0.586	0.343	107.950	0.000
Age 50+	U20	0.563	0.317	111.435	0.000
1 Prior Arrest	U5	0.598	0.357	344.751	0.000
2 prior arrests	U6	0.739	0.547	255.461	0.000
3-5 prior arrests	U7	0.989	0.979	303.395	0.000
6+ prior arrests	U8	1.336	1.785	150.258	0.000
Prior DUI Arrest	U9	0.605	0.366	182.870	0.000
Most Serious Offense - Felony	U1	0.735	0.540	92.488	0.002
Most Serious Offense - DUI	U2	0.798	0.637	290.185	0.000
DUI - Drug	U22	0.684	0.468	99.824	0.000
DUI Alcohol .10-.16	U23	0.827	0.684	267.691	0.000
DUI Alcohol > .16	U24	0.836	0.698	251.476	0.000
Multiple Charges	U25	2.217	4.916	2714.712	0.000

Appendix F. Assessing the Need for Random Coefficients. Logit HLM Model With and Without Robust Standard Errors (N=46,758)

	Model With Normal Standard Errors							Model With Robust Standard Errors							Robust SE > SE, 1 = Yes	Difference
	Coef	SE	T-ratio	df	P-value	Odds Ratio	Coef	SE	T-Ratio	df	P-value	Odds Ratio				
Intercept	0.073	0.081	0.907	59	0.368	1.076	0.073	0.066	1.105	59	0.274	1.076				
ARD	0.013	0.062	0.204	59	0.839	1.013	0.013	0.062	0.206	59	0.838	1.013				
Male	0.064	0.026	2.441	46731	0.015	1.067	0.064	0.027	2.420	46731	0.016	1.067	1	1.009		
White	-0.142	0.037	-3.855	46731	0.000	0.867	-0.142	0.034	-4.145	46731	0.000	0.867	0	0.930		
Age at Offense																
<21	-0.436	0.043	-10.040	46731	0.000	0.646	-0.436	0.057	-7.647	46731	0.000	0.646	1	1.313		
21-25	-0.759	0.051	-14.922	46731	0.000	0.468	-0.759	0.061	-12.508	46731	0.000	0.468	1	1.193		
26-30	-0.849	0.055	-15.395	46731	0.000	0.428	-0.849	0.053	-16.157	46731	0.000	0.428	0			
31-35	-0.912	0.057	-16.094	46731	0.000	0.402	-0.912	0.053	-17.170	46731	0.000	0.402	0			
36-40	-1.170	0.059	-19.931	46731	0.000	0.310	-1.170	0.056	-20.775	46731	0.000	0.310	0			
41-45	-1.280	0.063	-20.246	46731	0.000	0.278	-1.280	0.053	-24.009	46731	0.000	0.278	0			
46-50	-1.752	0.067	-26.184	46731	0.000	0.173	-1.752	0.053	-32.946	46731	0.000	0.173	0			
Number of Prior Arrests																
1 prior arrest	0.168	0.031	5.417	46731	0.000	1.183	0.168	0.100	1.685	46731	0.092	1.183	1	3.214		
2 prior arrests	0.568	0.042	13.381	46731	0.000	1.764	0.568	0.090	6.320	46731	0.000	1.764	1	2.117		
3-5 prior arrests	0.937	0.046	20.509	46731	0.000	2.552	0.937	0.098	9.574	46731	0.000	2.552	1	2.142		
6 prior arrests	1.475	0.063	23.553	46731	0.000	4.371	1.475	0.082	17.980	46731	0.000	4.371	1	1.310		
Prior DUI Arrest	-0.375	0.036	-10.365	46731	0.000	0.687	-0.375	0.039	-9.524	46731	0.000	0.687	1	1.088		
Prior Other Traffic Arrest	0.106	0.044	2.403	46731	0.016	1.112	0.106	0.043	2.474	46731	0.014	1.112	0			
Age at first arrest																
< 15	0.124	0.085	1.453	46731	0.146	1.132	0.124	0.098	1.269	46731	0.205	1.132	1	1.144		
16-20	-0.124	0.040	-3.122	46731	0.002	0.884	-0.124	0.034	-3.674	46731	0.000	0.884	0			
21-24	-0.127	0.035	-3.612	46731	0.001	0.881	-0.127	0.041	-3.090	46731	0.002	0.881	1	1.169		
Most Serious Offense - Felony	0.057	0.063	0.904	46731	0.366	1.059	0.057	0.055	1.048	46731	0.295	1.059	0			
Most Serious Offense - DUI	-0.192	0.036	-5.294	46731	0.000	0.825	-0.192	0.029	-6.700	46731	0.000	0.825	0			
Days to Sentencing	0.000	0.000	-7.871	46731	0.000	1.000	0.000	0.000	-6.639	46731	0.000	1.000	1	1.182		
Type of DUI																
Drug	0.354	0.050	7.079	46731	0.000	1.424	0.354	0.043	8.280	46731	0.000	1.424	0			
Alcohol - BAC .10-.16	-0.051	0.030	-1.693	46731	0.090	0.950	-0.051	0.043	-1.199	46731	0.231	0.950	1	1.413		
Alcohol - BAC >.16	0.001	0.028	0.041	46731	0.967	1.001	0.001	0.036	0.032	46731	0.975	1.001	1	1.291		
Multiple Charges Convicted or Diverted	0.023	0.029	0.793	46731	0.428	1.023	0.023	0.028	0.826	46731	0.409	1.023	0			

Appendix G. Level-1 Random Coefficients Logistic HLM Predicting Recidivism (N=46,758)

Variable	Coef.	SE	Odds Ratio
Intercept	0.015	0.072	1.015
ARD	0.010	0.062	1.010
Male	0.069 *	0.029	1.072
White	-0.091	0.053	0.913
Age at Offense			
21-25	-0.426 ***	0.050	0.653
26-30	-0.743 ***	0.058	0.476
31-35	-0.848 ***	0.048	0.428
36-40	-0.917 ***	0.058	0.400
41-45	-1.165 ***	0.056	0.312
46-50	-1.281 ***	0.054	0.278
50+	-1.786 ***	0.060	0.168
Number of Prior Arrests			
1 prior arrest	0.197 ***	0.051	1.218
2 prior arrests	0.589 ***	0.053	1.802
3-5 prior arrests	0.946 ***	0.060	2.576
6+ prior arrests	1.500 ***	0.067	4.481
Prior DUI Arrest	-0.377 ***	0.046	0.686
Prior Other Traffic Arrest	0.095	0.048	1.099
Age at first arrest			
< 15	0.093	0.101	1.097
16-20	-0.147 ***	0.036	0.863
21-24	-0.141 **	0.040	0.869
Most Serious Offense - Felony	0.026	0.063	1.026
Most Serious Offense - DUI	-0.199 ***	0.031	0.819
Days to Sentencing	0.000 ***	0.000	1.000
Type of DUI			
Drug	0.285	0.055	1.330
Alcohol - BAC .10-.16	-0.014	0.040	0.987
Alcohol - BAC >.16	0.023	0.029	1.023
Multiple Charges Convicted or Divert	0.024	0.026	1.025

*** p < .001 ** p < .01 * p < .05

Appendix H. Full Level-1 Random Coefficients Variance Components

Variable	Error Term	SD	Variance Component	df	Chi2	P-Value
INTRCPT1,	U0	0.36853	0.13581	51	34.51164	>.500
DIVERTED	U1	0.40264	0.16212	51	325.46338	0
MSFELONY	U2	0.26306	0.0692	51	39.43127	>.500
MSDUI	U3	0.12092	0.01462	51	36.81854	>.500
WHITE	U5	0.25951	0.06735	51	73.01656	0.023
PARREST1	U6	0.28287	0.08001	51	190.38123	0
PARREST2	U7	0.27903	0.07786	51	105.60041	0
PARR35	U8	0.28464	0.08102	51	110.89726	0
PARR6UP	U9	0.30746	0.09453	51	68.49149	0.051
PRIORDUI	U10	0.22379	0.05008	51	69.12886	0.046
POTHTRAF	U11	0.21712	0.04714	51	46.19761	>.500
AFA15LES	U12	0.43426	0.18858	51	66.46653	0.072
AFA1620	U13	0.13821	0.0191	51	54.83681	0.331
AFA2124	U14	0.17829	0.03179	51	58.0948	0.23
AGE2125	U15	0.24333	0.05921	51	55.15835	0.32
AGE2630	U16	0.28478	0.0811	51	54.80872	0.332
AGE3135	U17	0.20147	0.04059	51	39.50605	>.500
AGE3640	U18	0.26639	0.07096	51	48.77686	>.500
AGE4145	U19	0.22399	0.05017	51	49.19781	>.500
AGE4650	U20	0.17742	0.03148	51	36.45105	>.500
AGE50	U21	0.24822	0.06161	51	39.06611	>.500
MALE	U22	0.12688	0.0161	51	52.82422	0.403
DUIDRUG	U23	0.26087	0.06805	51	45.04816	>.500
DUI1016	U24	0.18577	0.03451	51	69.34821	0.044
DUI16UP	U25	0.11762	0.01384	51	51.48571	0.455
MCHARGE	U26	0.11148	0.01243	51	52.13687	0.43

Appendix I. Full Level-1 Random Coefficients Variance Components

Variable	Error Term	SD	Variance Component	Chi2	P-Value
Intercept	U0	0.313	0.098	123.655	0.000
ARD	U1	0.402	0.161	370.353	0.000
White	U5	0.209	0.044	75.876	0.032
1 Prior Arrest	U6	0.259	0.067	202.524	0.000
2 prior arrests	U7	0.234	0.055	118.419	0.000
3-5 prior arrests	U8	0.249	0.062	123.710	0.000
6+ prior arrests	U9	0.226	0.051	82.489	0.010