Impaired Drivers and their Risk of Reoffending

Amy Pilon, Lisa M. Jewell, and J. Stephen Wormith

Centre for Forensic Behavioural Science and Justice Studies

University of Saskatchewan

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Abstract

Impaired driving is one of the most costly social, legal, and safety problems in society, both in financial and in human terms (Smith, 1993; Traffic Injury Research Foundation, 2014). In order to effectively manage impaired drivers, it is necessary to accurately assess their risk, and, if possible, provide rehabilitation options targeted toward their criminogenic needs. The current study examined the Level of Service Inventory-Ontario Revision (LSI-OR) and its ability to predict both general recidivism and DWI recidivism with a sample of impaired drivers who are under the responsibility of the province of Ontario. As well, analyses were conducted with both DWI offenders and non-DWI offenders in order to compare the performance of the LSI-OR with DWI offenders to the larger mainstream segment of the offender population for whom the instrument was originally intended. The results from the ROC analyses that examined the LSI-OR total and section scores with general recidivism for the various groups of offenders suggested that the LSI-OR and its subscales were better able to predict general recidivism in the non-DWI sample compared to the DWI sample. In contrast, the LSI-OR and its subscales were better able to predict DWI recidivism in the DWI sample compared to the non-DWI sample, for the community offenders but not for the custody offenders. The LSI-OR has good predictive accuracy for both DWI and non-DWI custody and community offenders thus it is appropriate to continue to use this tool with this population. Future directions in this area of research may include the development of a risk assessment tool designed and validated on this population.

Keywords: impaired driving, DWI offenders, LSI-OR

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Impaired driving is a widespread social problem in society that has serious ramifications, in terms of human injury/loss and financial costs. In Canada, the Canadian Criminal Code prohibits driving while one's ability to operate a vehicle is impaired by drugs or alcohol (Perreault, 2013). Impaired driving has been a recognized criminal act in Canada since 1921, and there are nine offences related to this violation in the Code. The offences include: driving with a blood alcohol concentration (BAC) in excess of 80 mg of alcohol per 100 ml of blood; a failure to comply with a demand for a sample; driving while impaired causing bodily harm; operating a motor vehicle with a BAC that exceeds 80 mg per 100 ml of blood causing bodily harm; failure to comply with a demand for a sample causing bodily harm; driving while impaired causing death; operating a motor vehicle with a BAC that exceeds 80 mg per 100 ml of blood causing death; and failure to comply with a demand for a sample causing death (Hanson, 2009; Perreault, 2013). A violation of any of the above would result in a charge of impaired driving.

Drivers can also be charged with impaired driving if they are driving recklessly with alcohol in their system (even if their BAC is not over the 0.08 limit) or if a car is under their care and control, such as sitting behind the wheel of an unstarted vehicle while impaired (DUI.CA, 2014). In Canada, all provinces have adopted zero BAC levels for young or novice drivers (Hanson, 2009). Levels of impairment are determined by the percentage of a person's bloodstream that is alcohol and can be measured using a breathalyzer or a blood sample (DUI.CA, 2014).

Impaired driving charges, in various jurisdictions, are often referred to using the terms driving while intoxicated (DWI), driving while ability impaired (DWAI), driving under the influence (DUI), impaired care and control, and operating while impaired (OWI; DUI.CA, 2014;

Hanson, 2009). These terms are commonly used interchangeably, including non-legal terms such as drunk driving and drinking and driving. The terms DWI and DUI are commonly used in the United States; however, they are not used in Canada's Criminal Code (Hanson, 2009).

Impaired driving is one of the most costly social, legal, and safety problems in society, both in financial and in human terms (Smith, 1993; Traffic Injury Research Foundation, 2014). For example, Pitel and Solomon (2013) reported that in 2010, impaired driving in Canada resulted in an estimated 1,082 fatalities, 63,821 injuries and damage to 210,932 vehicles in property damage-only crashes, costing an estimated $20.62 billion. Impaired driving causes approximately 4 deaths, 175 injuries, and 578 property damage-only crashes on a daily basis (Mothers Against Drunk Driving [MADD], 2014). As well, impaired driving is the most common criminal offence among adults and is the leading cause of criminal death (Perreault, 2013). In 2010/2011, approximately 3,800 admissions to sentenced provincial custody and 70 admissions to sentenced federal custody were for impaired driving (Perreault, 2013).

There is a considerable portion of Canadians that report driving while impaired, and impaired driving rates have increased over the past decade. For example, the Traffic Injury Research Foundation (2014) found that 17.4% of Canadians self-reported driving after consuming any amount of alcohol in the past month and 6.6% self-reported driving while impaired in the past year. Despite a sizeable decrease in impaired driving rates from the mid-1980s to the mid-2000s, since 2006, the rate of impaired driving in Canada has continually increased (Perreault, 2013). In fact, in 2011, impaired driving rates were higher than they have been in a decade (Perreault, 2013). Thus, impaired driving continues to be an important issue for governments throughout Canada, police services, the justice system, community organizations, and the general public.

For individuals charged with impaired driving, there are various sanctions and penalties used to deter future impaired driving and to protect the public. For example, for indictable offences and summary convictions, the minimum penalty for the first offence is a $1000 fine, while second and subsequent offences include terms of imprisonment (Hanson, 2009). Provinces and territories also have the authority to impose provincial license suspensions (which vary by province, for offence types, and length of time) for first and subsequent offences (Hanson, 2009). In addition, some provinces impound vehicles of repeat impaired drivers and have mandatory educational or rehabilitation programs or courses that must be completed (Hanson, 2009). Courts can also mandate the installation of ignition interlock devices to individuals charged with impaired driving, which prevent intoxicated persons from starting their vehicle (Beck, Rauch, Baker, & Williams, 1999; Hanson, 2009; Weinrath, 1997). In some jurisdictions, specialized DUI/DWI courts are used with repeat offenders to target their alcohol addiction (Hanson, 2009; Lapham, Kapitula, C'de Baca, & McMillan, 2006; MacDonald, Morral, Raymond, & Eibner, 2007).

In recent decades, the federal government has implemented numerous measures, such as increasing the minimum and maximum penalties (which escalate for repeat offenders), to combat impaired driving (Hanson, 2009; Perreault, 2013). As well, there are community organizations, such as MADD (n.d.), and media commercial campaigns that increase awareness of, and advocate against, impaired driving. There are also provincial/territorial (e.g., arrive alive drive sober, reduce impaired driving everywhere [RIDE]) and national initiatives (e.g., SMARTRISK Heroes) that work to address and decrease impaired driving (Change the Conversation, n.d.).

Although there are numerous sanctions (e.g., fines, imprisonment, substance abuse treatment programs) available for impaired drivers, previous research (Hanson, 2009; Ross &

Klette, 1995; Taxman & Piquero, 1998; Yu, 2000) has found that imprisonment and large fines have little to no deterrent effect on repeat impaired drivers. As well, ignition interlock devices and educational or rehabilitation programs only modestly affect recidivism (Beck et al., 1999; MacDonald et al., 2007). However, some studies (e.g., Fulkerson, 2003; Morse & Elliott, 1992; Weinrath, 1997) have found that ignition interlock devices do result in lower recidivism rates among impaired driving offenders. A systematic review on the effectiveness of ignition interlocks found lower recidivism rates when the device is installed in the vehicle, but to eliminate potential selection bias, the authors concluded that more randomized controlled trials are needed so that the effectiveness and efficacy can be ascertained (Willis, Lybrand, & Bellamy, 2004).

Past research about the effectiveness of DUI/DWI courts has also resulted in mixed findings. Some studies (Hanson, 2009; Lapham et al., 2006) have found that DUI/DWI courts have very low failure and recidivism rates. In contrast, other studies (e.g., Bouffard & Richardson, 2007; MacDonald et al., 2007) have found either no difference or higher recidivism rates for offenders who proceeded through DUI/DWI courts. A meta-analysis on the effectiveness of DWI courts found the evidence to be promising, but ambiguous, given the mixed and sometimes null findings from the most rigorous randomized experimental evaluations, and concluded that additional experimental evaluations of DWI courts are needed (Ojmarrh, Wilson, Eggers, & MacKenzie, 2012).

With all of the conflicting evidence that exists on which sanctions are effective, there is no firm evidence on what works in reducing recidivism with these offenders (Weinrath, 1997). In addition, although, there are numerous sanctions available and numerous tactics have been implemented, the injuries, fatalities, property damage, and charges that result from impaired

driving continue to occur (Perreault, 2013). Thus, in order to provide sanctions that are rehabilitative and effective for impaired drivers, it is necessary to accurately assess their risk to provide options that are targeted toward their criminogenic needs (dynamic risk factors). However, little is known about the risk assessment of impaired driving offenders and the risk they present on an individual basis.

Risk Assessment

Risk assessment is focused on predicting whether an offender will reoffend in the future (Andrews & Bonta, 2010). Otherwise, it refers to the probability that an individual will engage in harmful/antisocial behaviour (e.g., drinking and driving) based on known risk factors relating to the individual (Bartol & Bartol, 2011). Risk factors can be classified into static risk factors and criminogenic need/dynamic risk factors. Static risk factors are fixed characteristics of an individual that cannot be changed, such as an offender's criminal history or age (Andrews & Bonta, 2010). In contrast, criminogenic need/dynamic risk factors (e.g., substance abuse) are characteristics of an individual that can be changed over time and, therefore, are targeted through treatment to reduce recidivism. The most important dynamic/criminogenic risk factors to reduce recidivism are known as the "central eight" which include a history of antisocial behaviour, antisocial personality pattern, antisocial cognitions, antisocial associates, family and/or marital, school and/or work, leisure and/or recreation, and substance abuse (Andrews & Bonta, 2010; Andrews, Bonta, & Wormith, 2006). Within the central eight risk factors, a history of antisocial behaviour, antisocial personality pattern, antisocial cognitions, and antisocial associates are considered the "big four". These four risk factors are the strongest predictors of criminal recidivism among the central eight.

Risk assessments provide correctional agencies with the level of risk that an offender poses to the community, as well as appropriate targets for change (Latessa & Lovins, 2010). Indeed, risk assessments are important for numerous reasons: they help identify offenders most at risk for recidivating; identify risk and criminogenic need factors; guide decision making by providing more information in a systematic manner; reduce bias by following objective criteria; improve the placement of offenders and the utilization of resources; and enhance public safety (Latessa & Lovins, 2010).

Risk assessments are used across a wide range of correctional settings including: courts for pretrial decisions, sentencing decisions, and during revocation hearings; probation and parole agencies for determining levels of supervision, placement in programming, and release decisions; and provincial and federal corrections for classifying offenders' risk, placement in programming, and determining which offenders should be granted early release (Latessa & Lovins, 2010). Examples of some commonly used risk assessment tools are the Historical, Clinical, Risk Management Scale (HCR-20; Webster, Douglas, Eaves, & Hart, 1997), the Statistical Information on Recidivism Scale (SIR; Nuffield, 1982), the Correctional Offender Management Profiling for Alternative Sanctions (COMPAS; Brennan & Oliver, 2000), the Level of Service Inventory-Revised (LSI-R; Andrews & Bonta, 1995), and the Level of Service/Case Management Inventory (LS/CMI; Andrews, Bonta, & Wormith, 2004).

Assessment tools in corrections can be categorized into three domains: screening instruments, comprehensive risk/need assessment tools, and specialized tools (Latessa & Lovins, 2010). Screening instruments assess primarily static factors (e.g., criminal history), are quick and easy to use, and are useful for in or out decisions (e.g., detain, release on recognizance) and sorting offenders into risk categories (Latessa & Lovins, 2010). Comprehensive risk/need

assessment tools assess all of the major risk and need factors (e.g., the central eight), take longer to administer, and require more extensive training for those administering such tools (Latessa & Lovins, 2010). These tools produce levels of risk/needs that are correlated with outcome measures (e.g., recidivism) and are useful in case management of offenders, recommending treatments/programming, and reassessing changes in risk overtime (Latessa & Lovins, 2010). Finally, specialized tools are defined as instruments that assess specific domains (e.g., substance abuse) or specialized populations (e.g., sex offenders) and should be used in conjunction with comprehensive risk/need assessment tools (Latessa & Lovins, 2010). We will now discuss the risk factors that have been identified for impaired drivers and the assessment tools that have been used to assess the risk of impaired driving offenders.

Risk Factors for Impaired Drivers

Risk factors increase the chance that an impaired driving offender will reoffend with subsequent impaired driving charges. It is widely accepted (e.g., Cavaiola, Strohmetz, & Abreo, 2007; Cavaiola, Strohmetz, Wolf, & Lavender, 2003; Chang, Lapham, C'de Baca, & Davis, 2001a; Jewell, Hupp, & Segrist, 2008) that the majority of impaired driving offences are committed by a small group of chronic repeat offenders. Further, prior impaired driving behaviour is a useful predictor of future impaired driving behaviour; therefore, all impaired driving offenders are at a relatively high risk of recidivating, regardless of the types of penalties they initially received (Ahlin, Zador, Rauch, Howard & Duncan, 2011; Taxman & Piquero, 1998).

Impaired drivers tend to be aged 25 to 35 years, male, single, and have a history of impaired driving convictions and polydrug abuse (Chang et al., 2001a; Hanson, 2009; Perreault, 2013). Specifically, Perreault (2013) found that the highest impaired driving rates occur among

individuals who are 20 to 24 years of age, with the rate slowly declining with age. Further, approximately 82% of those charged with impaired driving are male; however, since 2005, the impaired driving rates for females have increased and females now account for 1 in every 6 impaired drivers (Perreault, 2013). In addition, race/ethnicity (Nochajski & Stasiewicz, 2006), low educational attainment (i.e., less than Grade 12; Chang et al., 2001a) and having a diagnosed mental disorder (Holt, O'Malley, Rounsaville, & Ball, 2009) have been identified as risk factors for impaired driving recidivism.

Individuals who have prior DWI arrest and criminal histories are also more likely to recidivate with an impaired driving offence (Nochajski & Stasiewicz, 2006). Moreover, specific types of previous criminal offences are more closely linked with recidivism than others. For example, La Brie, Kidman, Albanese, Peller, and Shaffer (2007) found that DWI offenders with a history of both crimes against persons and property crimes were twice as likely to reoffend, generally, and offenders with a history of property crimes were about one and a half times more likely to recidivate, generally, compared to offenders with only impaired driving offences. Further, Nochajski and Stasiewicz (2006) found that repeat impaired driving offenders were more likely to have been involved in other motor vehicle accidents and had more traffic violations compared to first time impaired driving offenders.

Impaired drivers are also characterized by aggression, hostility, or other undesirable attitudes and personality traits (Hanson, 2009). Some researchers (Keane, Maxim, & Teevan, 1993) have suggested that impaired driving recidivism is caused by individuals who lack appropriate levels of self-control to resist drinking and driving.

Screening Instruments and Risk Assessment Tools for Impaired Drivers

Screening Instruments

There are several screening instruments that exist to measure the likelihood of substance abuse disorders and some (e.g., Alcohol Use Inventory) have attempted to predict DWI recidivism (DeMichele & Lowe, 2011). Some of the best-rated screening instruments that have demonstrated predictive validity with DWI recidivism include the Alcohol Use Inventory (AUI; Horn, Wanberg, & Foster, 2015); MacAndrew Alcoholism Scale; Mortimer-Filkins Questionnaire; Michigan Alcoholism Screening Test; Life Activities Inventory; and the RIA Self-Inventory Screening Instrument (Chang, Gregory, & Lapham, 2002). However, past research (e.g., Anderson, Snow, & Wells-Parker, 2000; Chang et al., 2002; Lowe, 2014) has found that the majority of previously existing substance abuse screening methods have not been able to accurately predict general or DWI recidivism. Some of the most common screening instruments used with DWI offenders will be discussed in the following sections.

Alcohol Use Inventory.

The Alcohol Use Inventory (AUI) is a 228-item screening instrument that consists of 24 scales that investigate behaviour, attitudes, and symptoms related to alcohol use of individuals who are 16 years of age or older (Horn et al., 2015). The AUI consists of multiple choice questions and includes 17 primary scales, six second order scales, and a third order broad scale (Chang, Lapham, & Wanberg, 2001b). The 17 primary scales measure: perceived benefits from drinking, styles of drinking, consequences of drinking, and concerns about drinking. Similarly, the six second order scales measure: benefits associated with the use of alcohol, such as drinking to enhance functioning; styles of drinking, such as obsessive, compulsive, and sustained drinking; consequences of drinking, such as uncontrolled life disruption; and concerns and

acknowledgement of drinking problems, such as anxiety. The third order scale measures an individual's broad involvement with alcohol (Chang et al., 2001b).

Chang et al. (2001a) evaluated the predictive validity of the AUI to determine whether DWI offenders, grouped according to their reported alcohol involvement on the AUI, would have differing DWI recidivism rates over a five year follow-up. Based on the six second order scales, a cluster analysis revealed six groups of offenders (in order of least clinical severity to highest): low profile, alcohol preoccupation, enhanced, enhanced-disrupt, anxious-disrupt, and high profile types. Unexpectedly, rates of recidivism did not necessarily increase as the clusters became more severe. The enhanced-disrupt group had the highest recidivism rate and the anxious-disrupt and the high profile groups had the second and third highest rates (Chang et al., 2001a). In particular, offenders in the enhanced-disrupt group had the highest DWI recidivism rate when it was defined as committing one or more further DWIs, while the anxious-disrupt and high profile groups had the highest rates of recidivism among offenders who had two or more DWI offences. On the basis of this study and others (e.g., Chang et al., 2002), it has been accepted that the AUI has positive predictive validity for the enhanced, enhanced-disrupt, and anxious-disrupt offenders; however, it is not able to accurately predict recidivism for high profile offenders. Consequently, much remains to be clarified about the instrument as the low scale score distributions common in the DWI offender population suggest that the instrument may require lower cut off points.

MacAndrew Alcoholism Scale.

The MacAndrew Alcoholism Scale (MAS) is a subscale of the Minnesota Multiphasic Personality Inventory (MMPI) that screens personality characteristics related to alcoholism and has been used for predicting DWI recidivism (Chang et al., 2002). However, the MAS does not

explicitly mention alcohol and, as a result, respondents can be scored as high risk even if they do not have any history of drinking. The MAS can detect about 67% of DWI recidivists and identify an additional 48% as problem drinkers.

The MAS and AUI have both been found to have the best predictive ability to identify DWI recidivism (Chang et al., 2002). However, the MAS's psychometric applicability to DWI screening is not clear as it only assesses alcohol use (Chang et al., 2002). Furthermore, C'de Baca, Miller, and Lapham (2001) found that the AUI and MAS were not accurate in predicting which individuals will and will not be rearrested.

Additional DWI screening instruments.

Additional screening instruments that have been used to predict DWI recidivism include the: Mortimer-Filkins (MF), Michigan Alcoholism Screening Test (MAST), Life Activities Inventory (LAI), and RIA Self-Inventory Screening Instrument (RIASI; Chang et al., 2002). The MF was designed for assessing DWI offenders and is used to collect information on: marital and family problems, recent stress, employment and finances, depression, nervousness, drinking, feelings, and ability to cope (Chang et al., 2002). The MF has three risk categories: social drinker, presumptive problem drinker, and problem drinker. In contrast, the MAST is a 24-item questionnaire that simply detects alcoholism (Chang et al., 2002). The LAI is a more comprehensive instrument that consists of nine life situation scales (i.e., alcohol quantity frequency; alcohol problems; physical health; financial/employment; social interaction/involvement; family status/living situation; marriage; treatment receptivity; and residential stability) and six personality scales (i.e., extroversion/introversion; sanguine; self-confident vs. anxious and depressed; moralistic and conservative vs. non-traditional and unconstrained; improbability; paranoid and suspicious vs. naïve and trustworthy; and conforming

and compliant vs. acting-out and aggressive). It is designed to obtain information on DWI offenders' life activities and personality characteristics prior to and during treatment (Chang et al., 2002). The RIASI was empirically derived from large samples of DWI offenders and provides a problem-drinking score and a recidivism score (Chang et al., 2002).

Chang et al. (2002) found that the predictive validity for the screening instruments in their study varied and the receiver operator characteristic curves demonstrated that none of the instruments met the stringent criteria for predictive validity that would meet the accepted standard in medical practice. In other words, the screening methods discussed cannot accurately predict who will and will not recidivate (Chang et al., 2002). The MF and the MAST are the most widely used tests in the US court system despite the lack of evidence supporting their use with DWI offender populations (Chang et al., 2002).

Risk Assessment Tools

There are three risk assessment tools that have been used to assess the risk to reoffend for impaired drivers: the Driver Risk Inventory (DRI; Behaviour Data Systems, Ltd., 1985); the Impaired Driving Assessment (IDA; DeMichele & Lowe, 2011; Lowe, 2014); and the LSI-OR (Andrews, Bonta, & Wormith, 1995). Previous research (e.g., Anderson et al., 2000; Lowe, 2014) has indicated that there are no widely used risk assessment tools that exist in the field for DWI offenders. Thus, the following sections will review the suitability of all three instruments for predicting DWI recidivism.

Driver Risk Inventory.

The Driver Risk Inventory (DRI; Behaviour Data Systems, Ltd., 1985) is an offender risk/needs assessment tool that was designed for use with DUI/DWI offenders (Behaviour Data Systems, Ltd., 1992). The DRI was released in 1985 and is a 140 item, multidimensional,

empirically-based tool that includes five behavioural risk scales (i.e., the truthfulness scale, alcohol scale, drug scale, driver risk scale, and stress coping abilities scale; Behaviour Data Systems, Ltd., 2005; Bishop, 2011), as well as items that measure demographic and criminal history characteristics. The DRI is easily administered, available in English and Spanish, and consists of true/false and multiple-choice items (Behaviour Data Systems, Ltd., 2005). Risk level classifications can be calculated for each of the five scales and risk level categories include designations of low risk, medium risk, problem risk, and severe problem risk (Behaviour Data Systems, Ltd., 1992). The DRI is useful in identifying problem drinkers, substance abusers, and high risk drivers, and is able to distinguish between first and repeat DWI offenders (Behaviour Data Systems, Ltd., 1992; Behaviour Data Systems, Ltd., 2005; Bishop, 2011). The DRI was updated in 1998 with the addition of a sixth scale (a DSM-IV criteria-based substance abuse/dependency scale) to create the improved DRI-II (Behaviour Data Systems, Ltd., 2005). Substance abuse is a maladaptive pattern of substance use that causes significant impairments in one's life, whereas dependency is a more severe form of abuse, resulting in tolerance and withdrawal of the substance that is being abused (American Psychiatric Association, 2000).

Bishop (2011) conducted a study that used the DRI to identify DWI offenders who recidivated (i.e., DWI re-arrests), within a two year interval, in a sample of Florida DWI offenders who were charged between January 1, 2008 and December 31, 2009. The DRI provided accurate identification of DWI recidivists; in particular, the DRI driver risk scale was the strongest and most consistent predictor of DWI recidivism within 2 years (Bishop, 2011). The DSM-IV substance abuse and dependency scale also was a significant predictor of DWI recidivism, with substance dependency providing a greater risk than substance abuse. Finally,

the DRI alcohol scale proved to be a significant identifier of DWI recidivism and had a predictive capacity similar to other DWI offender screening instruments (Bishop, 2011).

Impaired Driving Assessment.

The Impaired Driving Assessment (IDA) risk assessment tool was developed using statistical techniques to identify the most parsimonious sets of items from the LSI-R (54 items), the Alcohol Severity Use Survey (ASUS; 94 items), and the Adult Substance Use and Driving Survey (ASUDS) on a sample of convicted DWI offenders in the United States (DeMichele & Lowe, 2011; DeMichele & Payne, 2012; Lowe, 2014). The LSI-R measures offender characteristics that inform decisions, with respect to the level of service necessary for each offender, by focusing on their criminogenic needs (Hogg, 2011), while the ASUS is a measure of substance use patterns and consequences (DeMichele & Lowe, 2011) and assesses the DWI offender in the areas of substance use/abuse, alcohol involvement, and other areas of life-adjustment problems (Lowe, 2014).

The IDA consists of two components, a self-report and an evaluator report. The self-report (SR) component is comprised of 33 questions which measure both retrospective and current perceptions of conditions related to mental health and mood adjustment, alcohol and other drug involvement and disruption, social and legal non-conformity, and acknowledgment of problem behaviours and motivation to seek help for these problems (Lowe, 2014). The evaluator (ER) component consists of ten questions that provide information around the client's past DWI and non-DWI involvement in the judicial system, prior education and treatment, past responses to DWI education and/or treatment, and the current status of community supervision and mandated education and/or treatment programs. A total of eight subscales are derived from the

IDA: psychosocial, alcohol and drug involvement, legal non-conformity, acceptance-motivation, defensiveness, DWI risk-supervision estimate (DRSE), SR general, and ER general.

Lowe (2014) examined the predictive validity of the IDA for DWI offenders' future reoffending with a sample of DWI probationers who were tracked for a follow-up period of 12 months from the time they were placed on supervision and administered the IDA. He found that the eight scales of the IDA have statistically significant relationships with probation failure. For example, DWI probationers were more likely to fail probation if they had extensive criminal histories, more mental health and mood adjustment problems, higher levels of alcohol and drug involvement, more acceptance of their problems caused by impaired driving, and less defensiveness. As well, probationers who had higher scores on the DRSE scale were much more likely to fail probation (Lowe, 2014).

Level of Service Inventory-Ontario Revision (LSI-OR).

The Level of Service Inventory-Ontario Revision (LSI-OR) has also been used to assess the risk of DWI offenders and is the risk assessment tool of interest for this study. The Level of Service Inventory (LSI) is a popular actuarial criminogenic risk/need assessment tool that has been adopted by numerous local, state, and provincial jurisdictions in Canada, the United States, the United Kingdom, and elsewhere (Flores, Lowenkamp, Holsinger, & Latessa, 2006; Gendreau, Little, & Goggin, 1996; Girard & Wormith, 2004). The original LSI has generated at least four subsequent versions (e.g., LSI-R, LSI-OR; Girard & Wormith, 2004).

The specific version of the LSI that will be examined in the present study is the Level of Service-Ontario Revision (LSI-OR; Andrews et al., 1995). The LSI-OR is currently used in Ontario's provincial corrections and probation services, and is a theoretically and empirically developed risk/need assessment tool that is used to predict an offender's risk of recidivating

(Girard & Wormith, 2004). The tool consists of: a general risk/need section assessing the central eight dynamic risk factors (43 items); a specific risk/need section used to identify additional risk factors and criminogenic needs (23 items); and three additional sections (i.e., institutional factors [10 items], other client issues [18 items], and special responsivity considerations [8 items]) which facilitate case management (Wormith & Hogg, 2012). The resulting scores determine an offender's initial risk level (Wormith & Hogg, 2012; please refer to the methods section for a detailed description of the LSI-OR).

Wormith, Hogg, and Guzzo (2012) examined the predictive validity of the LSI-OR in assessing impaired driving offenders' recidivism on a sample of DWI offenders under the responsibility of the province of Ontario. Wormith et al. (2012) defined recidivism as any criminal offence that occurred in Ontario for which an offender was returned back into custody. Importantly, the study examined all types of recidivism, not only DWI recidivism. As well, analyses were conducted on both DWI offenders and non-DWI offenders in order to compare the performance of the LSI-OR with DWI offenders to the larger mainstream segment of the offender population for whom the instrument was originally intended. Interestingly, Wormith et al. found that DWI offenders were significantly older than other offenders, did not differ on gender, had a lower offence severity on their index offence, and scored significantly lower on all LSI-OR summary measures (except strengths). Conversely, the non-DWI offenders had a significantly higher rate of general reoffending, violent reoffending, and impaired driving reoffending and reoffended more quickly than DWI offenders. Specifically, the general recidivism rate for the non-DWI offenders compared to the DWI offenders was 35.1% versus 19.1%, the violent recidivism rate was 13% versus 1.7%, and the impaired driving recidivism rate was 5.7% versus 2.2%.

Further, Wormith et al. (2012) found that the mean general risk/needs score was lower for the DWI offenders. The general risk/needs score was highly correlated with general recidivism on the full sample and the non-DWI sample; however, a significant decrease was illustrated for DWI offenders (Wormith et al., 2012). This same pattern of results was also found with respect to violent and DWI recidivism. In addition, correlations for general recidivism with the general risk/need scores were higher for non-DWI offenders and, of the eight subscales, only criminal history, education/employment, companions, procriminal attitudes, and antisocial patterns were significant for DWI offenders.

Similarly, the mean specific risk/needs score was lower for the DWI offenders, while the specific risk/need section and both of its subscales were moderately correlated with general recidivism for the full sample and the non-DWI sample but more weakly correlated for the DWI sample (Wormith et al., 2012). The correlations of the specific risk/need subscales with violent recidivism were also significant, but were substantially lower, particularly for the DWI offenders.

Scope of the Present Study

The present study will examine the predictive accuracy of the Level of Service Inventory-Ontario Revision (LSI-OR) with a sample of impaired drivers who are under the responsibility of the province of Ontario. In order to effectively manage impaired drivers, it is necessary to accurately assess their risk, and, if possible, provide rehabilitation options targeted toward their criminogenic needs. Although impaired drivers are ever present in the criminal justice system, the research on this population of offenders is less advanced than in many other areas of corrections. As such, the current study examined the LSI-OR's ability to predict both general recidivism and DWI recidivism, wherein it was anticipated that DWI recidivism will be

considerably higher for DWI offenders. As well, analyses were conducted with both DWI offenders and non-DWI offenders in order to compare the performance of the LSI-OR with DWI offenders to the larger mainstream segment of the offender population for whom the instrument was originally intended. In addition, differences in the LSI-OR's ability to predict recidivism among DWI offenders who had custody versus community sentences were examined. Thus, the present study provides new empirical information on the predictive accuracy of the LSI-OR and its subscales in relation to predicting general reoffending and DWI recidivism among impaired drivers. Given the lack of consensus in the field about the most appropriate instrument to be used when conducting risk assessments of impaired driving, such evidence is particularly important in establishing whether the LSI-OR should be used with DWI offenders.

Method

Participants

Participants included provincial offenders who were under the responsibility of Ontario's Ministry of Community Safety and Correctional Services (MCSCS). The sample included all male and female offenders who were released from custody, were sentenced to a conditional sentence, or began a probation or intermittent sentence, over two calendar years, 2010 and 2011. All offenders had been administered an LSI-OR in conjunction with their sentence. The original dataset consisted of 90,781 (77,790 community and 12,991 custody) cases. However, many offenders appeared more than once for various reasons (e.g., having more than one LSI-OR assessment, appearing in both custody and community datasets). To reconcile this, an offender's first release from custody or first admission to conditional or probation or intermittent sentence, whichever was earlier, was used to screen out duplicates. In addition, for offenders who had more than one LSI-OR assessment on file, the first assessment was chosen to screen out duplicates, resulting in each offender being represented only once in the final dataset. The total sample included 72,726 offenders, consisting of 64,089 community offenders and 8,637 custody offenders. The community offenders were comprised of 55,976 on probation and 8,113 on conditional sentences. The total sample included both DWI offenders and non-DWI offenders based on their index offence.

The DWI offenders were a cohort of the total sample and were identified by those offenders who were convicted of any DWI index offence(s). These offences included: impaired driving; refuse a breath sample; impaired driving over 80 mg; impaired driving causing bodily harm; and impaired driving causing death. A total of 4,009 (5.5%) of the total sample were DWI offenders, consisting of 3,367 (84%) males and 641 (16%) females. Among the DWI offenders,

3,674 (91.6%) were charged with only one DWI offence; although, 317 (7.9%) offenders were charged with two, 16 (.4%) were charged with three, and 2 (.05%) were charged with four DWI offences. The type of disposition that DWI offenders were serving included: 691 (17.2%) custody sentences; 3,092 (77.1%) probation sentences; and 226 (5.6%) conditional sentences.

The non-DWI offenders were the remaining offenders in the sample who had not been convicted of an index impaired driving offence. There were a total of 68,717 (94.5%) non-DWI offenders in the sample, consisting of 56,720 (82.6%) males and 11,975 (17.4%) females. Data on gender was missing for 22 offenders. The type of disposition the non-DWI offenders were serving included: 7,946 (11.6%) custody sentences; 52,884 (77%) probation sentences; and 7,887 (11.5%) conditional sentences.

Furthermore, in order to determine if select LSI-OR items or demographic variables can be used to enhance the prediction of DWI recidivism, construction and validation samples of the total sample, and DWI and non-DWI offenders were created and prediction models were used to establish and validate computed logistic binary and weighted LSI-OR and computed multiple regression (MR) binary and weighted LSI-OR/demographic DWI recidivism prediction variables. To create the construction and validation samples, the cohort was randomly split into two approximately equal sections, 51% and 49%, respectively. Specifically, the construction sample consisted of 2,045 DWI and 34,224 non-DWI offenders while the validation sample was comprised of 1,964 DWI and 34,493 non-DWI offenders. The computed DWI recidivism prediction variables were developed with the DWI construction sample, and applied to, and validated on, the DWI construction, DWI validation, and non-DWI construction and validation samples, providing information about the predictive validity of the scales for the various groups.

Materials/Measures

Offender Information and Tracking System (OTIS)/LSI-OR.

All data was extracted from Ontario's MCSCS Offender Information and Tracking System (OTIS) through their statistical reporting system. The MCSCS uses the computerized file system of OTIS to maintain all offender records and includes information that is used to manage an offender from the beginning until the end of their sentence. Examples of the type of data collected included: demographic variables (e.g., gender, date of birth, race, Aboriginal status); variables related to the index sentence and admission (e.g., most serious offence, sentence start date); substance abuse variables (e.g., evidence of impairment at admit, history of substance abuse); impaired driving variables (e.g., impaired driving charges, refusing a breath sample, and impaired driving over 80 mg); LSI-OR variables (e.g., total score, risk level, override risk levels); and recidivism variables (please see below).

LSI-OR.

An automated version of the LSI-OR was introduced into the MCSCS in 1997 which allowed staff to enter all details of their assessment into an electronic record for scoring and record keeping (Wormith et al., 2012). The LSI-OR is administered to all adult offenders who are sentenced to custody and to all adult probationers and parolees in Ontario (Andrews et al., 1995). A considerable body of literature (e.g., Andrews & Bonta, 1995; Flores et al., 2006; Gendreau et al., 1996; Girard & Wormith, 2004; Hogg, 2011; Olver, Stockdale, & Wormith, 2014; Wormith, Hogg, & Guzzo, 2015) has demonstrated that the LSI and its subsequent versions are reliable and valid risk assessment tools that demonstrate predictive validity with various offender subgroups (e.g., women, Aboriginal offenders, sex offenders).

The tool includes a general risk/need section which consists of 43 items that are organized into the central eight subscales: criminal history (8 items), procriminal attitude/orientation (4 items), antisocial patterns/cognitions (4 items), companions/associates (4 items), family/marital (4 items), education/employment (9 items), leisure/recreation (2 items), and substance abuse (8 items; Wormith & Hogg, 2012). These items are scored dichotomously (0 = not present; 1 = present) and the information is gathered from file reviews and client interviews, which are totalled to create eight domain scores and a total general risk/need score (Wormith & Hogg, 2012; Girard & Wormith, 2004). Scores are used to determine an offender's initial risk level on a five-point ordinal scale ranging from very low risk to very high risk (Wormith & Hogg, 2012). Specifically, total scores of zero to four correspond with very low risk, five to ten with low risk, 11 to 19 with medium risk, 20 to 29 with high risk, and 30 to 43 with very high risk (Orton, 2014). As well, a strength score (i.e., a strength or protective factor for the offender) can be derived from the simple summation of strengths across the central eight domains (Andrews et al., 2004). Any of the eight subscales where offenders do not have risk factors are considered strength factors and a total strength score can be created for each offender ranging from zero to eight (Orton, 2014). In addition, there are provisions within the instrument that allow for a clinical override of the initial risk level, in either direction, to create a final risk level (Girard & Wormith, 2004; Wormith & Hogg, 2012).

The LSI-OR also has a specific risk/need section that contains two subscales, personal problems with criminogenic potential (14 items) and history of perpetration (9 items), which is scored dichotomously, as described above (Girard & Wormith, 2004). These scales are used to identify additional risk factors and criminogenic needs and guide assessors as to whether they should override the initial risk level (Wormith & Hogg, 2012). There are three additional

sections which facilitate case management: institutional factors (10 items; records problems and management issues during previous incarceration), other client issues (18 items; includes social, health, and mental health issues), and special responsivity considerations (8 items; includes characteristics such as ethnicity, cognitive disabilities, and personality features; Wormith & Hogg, 2012). All electronic LSI-OR variables (e.g., total score, initial risk, override risk) were collected.

Recidivism.

Recidivism was the outcome variable of interest in the current study. An offender qualified for recidivism if he/she was returned to custody or community supervision: 1) for an offence committed following release from custody; and/or 2) for an offence committed during or following a community sentence. Only an offender's first recidivistic event was captured in the study. Recidivism information was collected from OTIS, which documents all criminal offences that occur in Ontario. Thus, any offences committed in other provinces and convictions that resulted in sentences other than incarceration (e.g., alternative measures) were not included. A total of five measures of recidivism were used. A dichotomous variable (0 = no, 1 = yes) which identified those who did or did not recidivate during the follow-up period (on average, approximately 2-3 years) for both general and DWI recidivism (i.e., offenders who received the following charges: impaired driving; refuse a breath sample; impaired driving over 80 mg; impaired driving causing bodily harm; and impaired driving causing death) constituted the first and second recidivism variables employed in the study.

The third recidivism variable was the time to recidivate or lapse time, which was represented by the number of days from an offender's release date until the date of reoffence or re-entry into custody or community supervision (for the custody sample) and the number of days

from an offender's sentence start date until the date of reoffence or re-entry into custody or community supervision (for the community sample) up until the data extraction date. The follow-up period for the custodial offenders could be as early as January 2010 or as late as July 2014, with the follow-up period varying for each offender based on their release date. The follow-up period for the community offenders ranged from January 2010 until December 2013, with the follow-up period varying for each offender based on their community sentence start date.

The fourth recidivism variable was reoffence severity level, which includes 26 categories of offences that are rank ordered according to the mean sentence length for each offence category (Ontario, 1983). These offences were reverse coded so that higher scores represent higher offence severity levels. Finally, the fifth recidivism variable examined the type of disposition sentence (e.g., probation, custody) that the offenders received for recidivating.

University of Saskatchewan Research Ethics Board application and approval.

An application to gain ethical approval for the study was submitted to the University of Saskatchewan's Behavioural Research Ethics Board was granted on February 6, 2015 (see Appendix A).

Procedure

All offenders who had served and were released from a custodial sentence in 2010 and 2011 or who were admitted to a conditional sentence or probation in 2010 and 2011 and had been administered an LSI-OR were identified from MCSCS's OTIS. All personal identifiers were removed before the data was transferred from the Ministry to the principal investigator and all offenders were designated a unique case number. The data was collected for all offenders through OTIS including descriptive information, admission and sentence information, LSI-OR

information, and recidivism information. The data from the custody and the community files were merged by offender case number.

In addition, data that identified offenders who had received impaired driving charges was extracted from OTIS. This data file was merged with the first two data files by case number and sentence start date, creating a single data file for data analysis. Once all three files were merged, the data was screened for outliers, data entry errors, and missing data. Next, offenders that appeared more than once in the database were removed so that an offender only appeared once in analyses. Further, the offence severity category levels were reverse coded so that higher scores corresponded with higher severity levels. As well, the impaired driving variables were used to create DWI and non-DWI offender groups and a dichotomous variable of DWI recidivism was created from a variable that specified recontact impaired driving convictions. The final data file included descriptive information, admission and sentence information, LSI-OR total and item scores, and the five measures of recidivism.

The dataset was randomly divided into two samples (construction and validation) for the development and validation of the computed logistic binary and weighted and the computed MR binary and weighted LSI-OR and LSI-OR/demographic predictor variables. There were a total of eight variables created. To create the first two variables, first, each LSI-OR item was correlated with DWI recidivism and the items that exhibited a significant correlation were entered into a stepwise logistic regression. From here, the variables that emerged as significant predictors were added together to compute the logistic binary and weighted LSI-OR predictor variables. The logistic binary variable was created by summing together the original unweighted data (where possible data points were 0 and 1), while the weighted variable was calculated by applying the unstandardized beta weights to each item and summing together the weighted

figures. To create the next two variables, each LSI-OR item was correlated with DWI recidivism and the items that exhibited a significant correlation were entered into a stepwise MR. From here, the variables that were found to be significant predictors were added together to compute the MR binary and weighted LSI-OR predictor variables in the same fashion as above. The correlations were also assessed between DWI recidivism and the MCSCS substance abuse variables. There were no significant correlations; therefore, these variables were dropped from further analyses.

A similar procedure was carried out to create the next four variables. Specifically, three demographic variables (i.e., age, gender, race), along with the significant items of the LSI-OR that were previously found were entered into a stepwise logistic regression. From here, the variables that emerged as significant predictors were added together to compute the logistic binary and weighted LSI-OR/demographic predictor variables. To create the remaining two variables, the three demographic variables, along with the significant items of the LSI-OR that were previously found were entered into a stepwise MR. Again, the variables that were found to be significant predictors were added together to compute the MR binary and weighted LSI-OR/demographic predictor variables.

Each of the new variables were applied on various occasions (e.g., the DWI construction sample, the DWI validation sample, the non-DWI offender sample). This permitted a comparison of predictive accuracy of offenders by sample type. The construction and validation samples allowed for the predictor variables to be generated and then validated on a second independent sample, where predictive validity coefficients are less likely to capitalize upon chance associations.

Analytic Approach

The statistical analyses for this study were conducted using the IBM Statistical Package for the Social Sciences (SPSS). Descriptive statistics (e.g., frequencies, means, and standard deviations) were obtained to describe characteristics (e.g., gender, marital status, type of sentence) of the DWI and non-DWI offenders (for both the custody and community offenders), as well as the characteristics within the DWI offenders by offence type (i.e., impaired driving; refuse a breath sample; impaired driving over 80 mg; impaired driving causing bodily harm; and impaired driving causing death). Thus, although the focus of the current study was on DWI offenders, many analyses were conducted on both DWI and non-DWI offenders for both the community and custody samples.

T-tests & Chi-Squares.

T-tests and chi-squares were used to measure significant differences between the combinations of the demographic variables (e.g., age, offence severity level, total days served, race), recidivism variables (e.g., DWI and general yes/no recidivism, offence severity level, DWI recidivism charges), LSI-OR variables (e.g., general risk/need factors total score, total strength score, initial risk level, final risk level after override, central eight total scores), and type of offender (e.g., DWI and non-DWI custody and community offenders).

Correlations.

Correlations were utilized to assess relationships between the LSI-OR variables (e.g., general risk/need factors total score, total strength score, initial risk level, final risk level after the override, central eight total scores) and both general and DWI recidivism. This was examined for both custody and community DWI and non-DWI offender groups. In addition, to create the DWI recidivism prediction variables, correlations were conducted between DWI recidivism and:

1) the individual items of the LSI-OR; 2) demographic variables; 3) the MCSCS substance abuse variables; and 4) the number of impaired driving recidivistic events in their follow-up period for the DWI construction sample. Further, correlations between the newly computed logistic binary and weighted and MR binary and weighted LSI-OR and LSI-OR/demographic predictor variables and DWI recidivism were analysed for the construction, validation, and DWI and non-DWI offender samples. These correlations allowed for a determination of how well the new predictor variables predicted DWI recidivism in the samples by identifying the magnitude of the relationship between the new variables and DWI recidivism.

Validity.

Predictive validity was assessed with receiver operator curves (ROC; Hanley & McNeil, 1983) analyses to generate area under the curve (AUC) values to examine how well the LSI-OR variables predict general and DWI recidivism for both the custody and community DWI and non-DWI offender groups. In addition, ROC analyses were used to measure predictive accuracy for the eight predictor variables on DWI recidivism. As previously mentioned, due to the low base rates for DWI recidivism, AUC values are most appropriate for this dependent variable because they are unlikely to be influenced by base rates (but a lack of power may limit their ability to detect an effect).

Item Stepwise Logistic Regression.

In order to determine which items added significantly to the prediction of DWI recidivism, stepwise logistic regression was employed with each of the individual items of the LSI-OR that had a significant correlation with DWI recidivism. Items that emerged as significant predictors were used to create the logistic binary and weighted LSI-OR predictor variables. Stepwise logistic regression was also used with the significant predictors that emerged

from the individual items of the LSI-OR and the three demographic variables (i.e., gender, age, and race) that were significantly correlated with DWI recidivism. Items that emerged as significant predictors were used to create the logistic binary and weighted LSI-OR/demographic predictor variables.

Item Stepwise Multiple Regression (MR).

In order to determine which items added significantly to the prediction of DWI recidivism, an alternative stepwise MR was employed with each of the individual items of the LSI-OR that had a significant correlations with DWI recidivism. Items that emerged as significant predictors were used to create the MR binary and weighted LSI-OR predictor variables. Stepwise MR was also used with the significant predictors that emerged from the individual items of the LSI-OR and the three demographic variables (i.e., gender, age, and race) that were significantly correlated with DWI recidivism. Items that emerged as significant predictors were used to create the MR binary and weighted LSI-OR/demographic predictor variables. While binary stepwise logistic regression is the most appropriate analysis to conduct to establish the predictor variables given the binary DWI recidivism (yes/no) employed as the dependent variable, conducting a stepwise MR allowed for an examination of the strength of each statistical method vis-à-vis the other.

Results

The total sample included 72,726 (4,009 DWI, 68,717 non-DWI) offenders. A majority of the offenders in the sample were serving community sentences, and a large proportion of these offenders had been sentenced to probation. A small minority of offenders were serving intermittent sentences: 68 (1.7%) of the DWI offenders and 405 (0.6%) of the non-DWI offenders. For the purposes of the current study, offenders serving intermittent sentences were included under the umbrella of "community" as they served the majority of their time in that context. Table 1 illustrates the number of offenders in the total sample, as well as in the DWI and non-DWI offender groups, by the type of disposition.

Table 1.
Total number of DWI and non-DWI offenders by disposition type

Disposition Type	**Total Sample (*N*=72726)**	**DWI Offenders (*n*=4009)**	**Non-DWI Offenders (*n*=68717)**
Custody	8637	691	7946
Community:	64089	3318	60771
Probation	55976	3092	52884
Conditional Sentence	8113	226	7887

DWI Offenders

The DWI offender sample consisted of 4,009 offenders. DWI offenders in our sample were convicted of the following index charges: 2,640 for impaired driving; 372 for refusing a breath sample; 1,263 for impaired driving over 80 mg; 33 for impaired driving causing bodily harm; and 10 for impaired driving causing death. There was total of 691 DWI custody offenders; 457 were charged with impaired driving, while 98 refused a breath sample, 210 were charged for impaired driving over 80 mg, 13 were charged with impaired driving causing bodily harm, and six were charged with impaired driving causing death. When examining the 3,318 DWI community offenders, 2,183 were charged with impaired driving, 274 refused a breath

sample, 1,053 were charged for impaired driving over 80 mg, 20 were charged with impaired driving causing bodily harm, and four were charged for impaired driving causing death. Table 2 displays the breakdown of each offence by the number of charges an offender had on file.

Table 2.
Total number of DWI charges by the type of DWI Charge

DWI Charges	**All DWI Offenders (*n*=4009)**	**DWI Custody Offenders (*n*=691)**	**DWI Community Offenders (*n*=3318)**
Type and Number of Charges:			
Impaired driving:			
1	2608	425	2183
2	30	30	--
3	2	2	--
Refuse breath sample:			
1	368	94	274
2	4	4	--
Impaired driving over 80 mg:			
1	1256	203	1053
2	6	6	--
3	1	1	--
Impaired causing bodily harm:			
1	33	13	20
Impaired causing death:			
1	10	6	4

In terms of the number of index impaired driving charges for which offenders were convicted, 3,674 (91.6%) offenders had one charge; 317 (7.9%) had two charges; 16 (0.4%) had three charges; and two (.05%) had four charges. The number of impaired driving charges for which the DWI custody offenders were convicted was as follows: 568 (82.2%) offenders had one charge; 109 (15.8%) had two charges; 12 (1.7%) had three charges; and two (.3%) had four

charges. With respect to the DWI community offenders, 3,106 (93.6%) of the offenders had one charge; 208 (6.3%) had two charges; and 4 (.1%) had three charges.

DWI and Non-DWI Offenders on Demographic Characteristics, Substance Abuse Variables, LSI-OR, and Recidivism

Descriptive and demographic characteristics were calculated for both DWI and non-DWI offenders (see Table 3). On average, DWI offenders were older than non-DWI offenders, with a mean age of 41 years compared to 34 years, respectively. There were more males in both groups; females represented 16% of the DWI sample and 17.4% of the non-DWI sample. A large majority of offenders in both groups were Caucasian (i.e., 75.2% of the DWI sample and 68.8% of the non-DWI sample). There was also a large representation of Aboriginal offenders in both samples. Specifically, 5% of the DWI sample was Aboriginal and 9.3% of the non-DWI sample was Aboriginal. In the DWI group, there was a large representation of South Asian offenders compared to the non-DWI group (5.5% versus 2.7%) and, in the non-DWI group, there was a large representation of Black offenders compared to the DWI sample (9.1% versus 3.6%). The other ethnicities represented in both samples included: East Asian, Hispanic, Southeast Asian, and West Asian/Arabic. Other minority, unknown, and declined to specify categories were also included for offenders in both groups. In addition, the non-DWI offenders had higher index offence severity levels compared to the DWI offenders. The average sentence length was 398.16 days for the DWI offenders and 444.94 days for the non-DWI offenders.

Table 3.
Comparisons of DWI Offenders and non-DWI offenders on demographic characteristics

Demographic Characteristics	**DWI (*n*=4009) Mean (*SD*) or *n* (%)**	**Non-DWI (*n*=68717) Mean (*SD*) or *n* (%)**	**t-tests and Chi Squares**
Age:	40.78 (12.38)	33.59 (11.91)	t (4450.73) = -35.8, $p < .001$
Gender:			
Male	3367 (84%)	56720 (82.6%)	
Female	641 (16%)	11975 (17.4%)	$\chi^2(1) = 5.47, = p = .019$
Race:			
Aboriginal	178 (5%)	5810 (9.3%)	$\chi^2(10) = 330.65, = p < .001$
Black	128 (3.6%)	5713 (9.1%)	
Caucasian	2686 (75.2%)	43130 (68.8%)	
Declined to Specify	6 (0.2%)	246 (0.4%)	
East Asian	71 (2%)	1141 (1.8%)	
Hispanic	57 (1.6%)	840 (1.3%)	
Other Minority	103 (2.9%)	1595 (2.5%)	
South Asian	198 (5.5%)	1665 (2.7%)	
Southeast Asian	49 (1.4%)	815 (1.3%)	
Unknown	61 (1.7%)	740 (1.2%)	
West Asian/Arabic	33 (0.9%)	965 (1.5%)	
Most Serious Offence (MSO) Severity Level	10 (3)	16 (4)	t (5037.15) = 131.41, $p < .001$
Sentence Length	398.16 (219.52)	444.94 (215.50)	t (4470.54) = 13.13, $p < .001$

The MCSCS records information (e.g., alerts, treatment history) on OTIS that is collected at admission to custody for custodial offenders and by probation officers for community offenders. For the purposes of this study, we analyzed five variables of interest: substance abuse alerts; offender history of substance abuse; evidence of impairment at admit; evidence at withdrawal at admit; and history of substance abuse treatment (see Table 4). As expected, the DWI offenders were more likely to present with substance-related problems, a history of

substance abuse and substance abuse treatment, and being impaired at admit. However, the DWI offenders were less likely to show evidence of withdrawal at admit compared to the non-DWI offender group.

Table 4.
Comparisons of DWI Offenders and non-DWI offenders on substance abuse variables

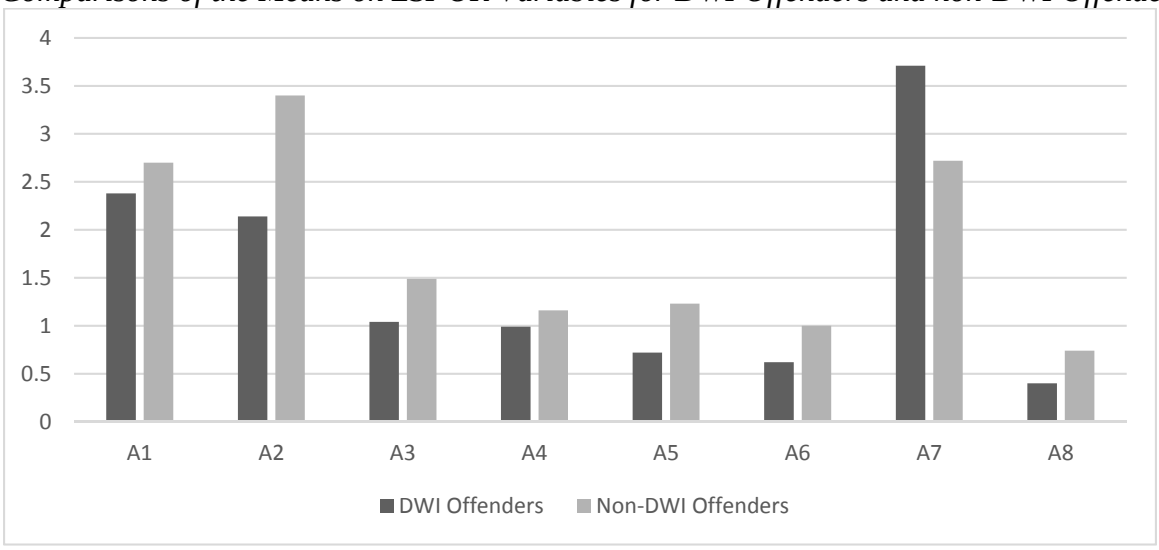
Substance Abuse Variables	**DWI (*n*=4009) *n* (%)**	**Non-DWI (*n*=68717) *n* (%)**	**Chi Squares**
Substance Abuse Alert	1728 (53.4%)	21829 (34.6%)	$\chi^2(1) = 474.85, = p < .001$
History of Substance Abuse	1252 (38.7%)	17839 (28.3%)	$\chi^2(1) = 162.78, = p < .001$
Impairment at Admit	288 (8.9%)	1859 (2.9%)	$\chi^2(1) = 348.24, = p < .001$
Withdrawal at Admit	69 (2.1%)	2433 (3.9%)	$\chi^2(1) = 25.21, = p < .001$
Substance Abuse Treatment	378 (11.7%)	4058 (6.4%)	$\chi^2(1) = 135.86, = p < .001$

LSI-OR variables, including the general risk/need total and strength score, their corresponding risk levels (both before and after the use of the override function), and the eight subscales of the general risk/need section and their corresponding strength scores, were calculated for DWI and non-DWI offenders (Table 5). DWI offenders scored significantly lower on all LSI-OR summary measures, with the exception of most strength scores and substance abuse scores (see Figure 1). As well, DWI offenders scored significantly lower on the measure of risk level change, indicating that the use of the override feature to increase their risk level occurred significantly less often than it did for non-DWI offenders.

Table 5.
Comparisons of DWI Offenders and non-DWI offenders on LSI-OR variables

LSI-OR Variables	**DWI (*n*=4009) Mean (*SD*)**	**Non-DWI (*n*=68717) Mean (*SD*)**	**t-tests**
General Risk/Needs	12.0 (7.2)	14.44 (8.98)	t (4767.66) = 20.56, $p < .001$
Strength	.93 (1.54)	.85 (1.47)	t (4443.4) = -3.38, $p = .001$
Initial Risk Level	2.56 (0.95)	2.82 (1.12)	t (4686.04) = 16.73, $p < .001$
Risk Override	.25 (.88)	.46 (1.17)	t (4879.63) = 14.47, $p < .001$
Final Risk Level (after override)	2.63 (0.95)	2.98 (1.07)	t (4623.42) = 22.23, $p < .001$
A1: Criminal History	2.38 (2.27)	2.7 (2.51)	t (4599.25) = 8.47, $p < .001$
A1: Strength	.13 (.33)	.14 (.35)	t (4530.17) = 2.37, $p = .018$
A2: Education/ Employment	2.14 (2.31)	3.4 (2.79)	t (4714.89) = 33.13, $p < .001$
A2: Strength	.25 (.44)	.19 (.39)	t (4397.22) = -9.04, $p < .001$
A3: Family/Marital	1.04 (1.02)	1.49 (1.14)	t (4608.08) = 26.73, $p < .001$
A3: Strength	.18 (.39)	.15 (.36)	t (4428.99) = -4.32, $p < .001$
A4: Leisure/ Recreation	.99 (.74)	1.16 (.75)	t (4496.81) = 13.84, $p < .001$
A4: Strength	.07 (.25)	.06 (.24)	t (4426.19) = -2.28, $p = .023$
A5: Companions	.72 (.93)	1.23 (1.08)	t (4652.17) = 33.6, $p < .001$
A5: Strength	.1 (.29)	.07 (.26)	t (4380.47) = -4.81, $p < .001$
A6: Procriminal Attitude/Orientation	.62 (.95)	1.0 (1.16)	t (4726.48) = 24.13, $p < .001$
A6: Strength	.11 (.32)	.09 (.29)	t (4417.41) = -3.53, $p < .001$
A7: Substance Abuse	3.71 (1.87)	2.72 (2.45)	t (4843.64) = -31.77, $p < .001$
A7: Strength	.05 (.22)	.1 (.3)	t (4915.83) = 13.21, $p < .001$
A8: Antisocial Pattern	.4 (.67)	.74 (.92)	t (4931.43) = 30.85, $p < .001$
A8: Strength	.04 (.2)	.04 (.19)	t (4433.5) = -1.52, $p = .129$

Figure 1.
Comparisons of the Means on LSI-OR Variables for DWI Offenders and non-DWI Offenders.



The five recidivism variables were also calculated for DWI and non-DWI offenders (see Table 6). In total, 22,198 offender's recidivated; specifically, 788 DWI offenders and 21,410 non-DWI offenders. Non-DWI offenders had a significantly higher rate of general recidivism compared to the DWI offenders; the general recidivism rate for the DWI offenders was 19.7% and 31.2% for the non-DWI offenders. However, the DWI offenders had significantly higher rates of DWI recidivism compared to the non-DWI sample. That is, the DWI recidivism rate for the DWI offenders was 3.6% compared to 0.7% for the non-DWI offenders. Interestingly, the DWI offenders recidivated generally at less than two thirds the rate of the non-DWI offenders while their DWI recidivism rate is five times more than the non-DWI offenders. The average lapse time for the non-DWI offenders was 285 days and 322 days for the DWI offenders, indicating that the non-DWI offender's recidivated significantly quicker. As well, the non-DWI offenders had higher index offence severity levels compared to the DWI offenders. The majority of offenders in both groups received custodial sentences for their recontact offence; although,

121 DWI recidivists and 1, 138 non-DWI recidivists received an intermittent sentence for their new offence.

Table 6.
Comparisons of DWI Offenders and non-DWI offenders on Recidivism variables

Recidivism Variables	**DWI (*n*=4009) Mean (*SD*) or *n* (%)**	**Non-DWI (*n*=68717) Mean (*SD*) or *n* (%)**	**t-tests and Chi Squares**
Recidivism	788 (19.7%)	21410 (31.2%)	$\chi^2(1) = 236.27$, = $p < .001$
DWI Recidivism	146 (3.6%)	464 (.7%)	$\chi^2(1) = 400.81$, = $p < .001$
Lapse Time	322.43 (211.39)	284.55 (202.07)	t (857.49) = -4.99, $p < .001$
New Sentence Type:			
Custody	454 (56.5%)	11786 (54.7%)	$\chi^2(2) = 2.56$, = $p = .278$
Probation	304 (37.9%)	8273 (38.4%)	
Conditional Sentence	45 (5.6%)	1497 (6.9%)	
New Most Serious Offence (MSO) Severity Level	3 (6)	5 (7)	t (4884.76) = 22.57, $p <$ .001
Sentence Length	205.4 (246.66)	208.53 (261.83)	t (869.51) = .35, $p = .725$

DWI and Non-DWI Custody Offenders on Demographic Characteristics, Substance Abuse Variables, LSI-OR, and Recidivism

Descriptive and demographic characteristics were calculated for DWI and non-DWI custody offenders (see Table 7). DWI custody offenders are significantly older compared to the non-DWI custody offenders. The majority in both groups were males, with females representing only 2.9% of the DWI custody sample and 6.6% of the non-DWI custody sample. A large majority of offenders in both groups were Caucasian and there was a large representation of Aboriginal offenders in both samples. Specifically, 9.6% of the DWI custody sample was Aboriginal and 12% of the non-DWI custody sample was Aboriginal. In the non-DWI custody group, there was also a large portion of Black offenders (10.1%). The release dates for the offenders ranged from January 2, 2010 to December 30, 2011 for the DWI custody sample and

from January 1, 2010 to December 31, 2011 for the non-DWI custody sample. Non-DWI custody offenders had significantly higher index offence severity levels compared to the DWI offenders. Correspondingly, the non-DWI custody offenders served significantly more days incarcerated compared to the other group, 166 compared to 126 days, respectively. The total days served for the DWI custody group ranged from 13 days to 1,589 days and from zero to 3,377 days for the non-DWI custody group. The average sentence length was 171.09 days for the DWI custody offenders and 225.34 days for the non-DWI custody offenders.

Table 7.
Comparisons of DWI and non-DWI custody offenders on demographic characteristics

Demographic Variables	**DWI Custody (*n*=691) Mean (SD) or *n* (%)**	**Non-DWI Custody (*n*=7946) Mean (SD) or *n* (%)**	**t-tests and Chi Squares**
Age:	42.99 (11.39)	34.28 (11.37)	t (814.35) = -19.28, $p < .001$
Gender:			
Male	671 (97.1%)	7424 (93.4%)	$\chi^2(1) = 14.53, = p < .001$
Female	20 (2.9%)	521 (6.6%)	
Race:			
Aboriginal	66 (9.6%)	957 (12%)	$\chi^2(10) = 62.21, = p < .001$
Black	15 (2.2%)	806 (10.1%)	
Caucasian	513 (74.2%)	5175 (65.1%)	
Declined to Specify	--	20 (0.3%)	
East Asian	9 (1.3%)	83 (1%)	
Hispanic	7 (1.0%)	76 (1%)	
Other Minority	12 (1.7%)	175 (2.2%)	
South Asian	16 (2.3%)	102 (1.3%)	
Southeast Asian	9 (1.3%)	99 (1.2%)	
Unknown	37 (5.4%)	373 (4.7%)	
West Asian/Arabic	7 (1.0%)	80 (1%)	
Most Serious Offence (MSO) Severity Level	12 (4)	19 (5)	t (863.36) = 39.18, $p < .001$

Total days served	125.62 (111.39)	165.8 (153.71)	t (935.22) = 8.78, $p < .001$
Sentence Length	171.09 (128.76)	225.34 (164.98)	t (899.48) = 10.36, $p < .001$

Compared to the non-DWI custody offenders, the DWI custody offenders were more likely to present with substance abuse problems, have a history of both substance abuse and substance abuse treatment, and be assessed as impaired at admit (see Table 8). However, the DWI custody offenders were less likely to be undergoing withdrawal at admit, compared to the non-DWI custody offenders.

Table 8.
Comparisons of DWI and non-DWI custody offenders on substance abuse variables

Substance Abuse Variables	**DWI Custody (*n*=691) *n* (%)**	**Non-DWI Custody (*n*=7946) *n* (%)**	**Chi Squares**
Substance Abuse Alert	363 (60.7%)	3752 (49.1%)	$\chi2(1) = 30.05, = p < .001$
History of Substance Abuse	298 (49.8%)	3164 (41.4%)	$\chi2(1) = 16.29, = p < .001$
Impairment at Admit	48 (8%)	370 (4.8%)	$\chi2(1) = 11.71, = p = .001$
Withdrawal at Admit	30 (5%)	635 (8.3%)	$\chi2(1) = 8.08, = p = .004$
Substance Abuse Treatment	72 (12%)	724 (9.5%)	$\chi2(1) = 4.21, = p = .040$

DWI custody offenders scored significantly lower on the LSI-OR summary measures, with the exception of most strength scores, criminal history, and substance abuse. Although DWI custody offenders had lower scores on criminal history compared to the non-DWI custody offenders, this difference did not approach significance. Similar to the previous finding, DWI custody offenders scored significantly lower on the measure of risk level change, indicating that the use of the override feature to increase their risk level occurred significantly less often than it did for non-DWI custody offenders (see Table 9).

Table 9.
Comparisons of DWI and non-DWI custody offenders on LSI-OR variables

LSI-OR Variables	DWI Custody (*n*=691) Mean (*SD*)	Non-DWI Custody (*n*=7946) Mean (*SD*)	t-tests
General Risk/Needs	18.93 (7.3)	22.26 (8.97)	t (881.93) = 11.26, $p < .001$
Strength	.4 (.94)	.36 (.93)	t (811.45) = -1.11, $p = .269$
Initial Risk Level	3.39 (0.84)	3.73 (1.0)	t (867.68) = 9.95, $p < .001$
Risk Override	.21 (.9)	.33 (1.09)	t (875.26) = 3.06, $p = .002$
Final Risk Level	3.43 (0.85)	3.8 (.96)	t (849.34) = 10.99, $p < .001$
A1: Criminal History	4.89 (1.7)	4.97 (2.27)	t (920.72) = 1.15, $p = .25$
A1: Strength	.02 (.15)	.03 (.18)	t (883.34) = 1.99, $p = .047$
A2: Education/ Employment	3.12 (2.58)	4.88 (2.7)	t (827.43) = 17.16, $p < .001$
A2: Strength	.14 (.35)	.09 (.29)	t (773.21) = -3.78, $p < .001$
A3: Family/Marital	1.43 (1.11)	1.86 (1.2)	t (836.76) = 9.65, $p < .001$
A3: Strength	.08 (.27)	.08 (.27)	t (820.82) = .387, $p = .699$
A4: Leisure/ Recreation	1.42 (.69)	1.61 (.63)	t (793.39) = 6.75, $p < .001$
A4: Strength	.04 (.19)	.03 (.17)	t (784.19) = -1.23, $p = .22$
A5: Companions	1.32 (1.02)	1.9 (1.0)	t (813.58) = 13.52, $p < .001$
A5: Strength	.04 (.19)	.03 (.17)	t (785.95) = -1.18, $p = .238$
A6: Procriminal Attitude/Orientation	1.22 (1.21)	1.71 (1.29)	t (831.96) = 10.11, $p < .001$
A6: Strength	.04 (.2)	.04 (.18)	t (791.25) = -1.02, $p = .309$
A7: Substance Abuse	4.67 (1.69)	3.93 (2.6)	t (1002.51) = -10.45, $p < .001$
A7: Strength	.03 (.16)	.05 (.21)	t (922.37) = 3.42, $p = .001$
A8: Antisocial Pattern	.85 (.88)	1.43 (1.09)	t (885.02) = 16.24, $p < .001$
A8: Strength	.01 (.11)	.01 (.10)	t (800.69) = -.298, $p = .766$

In total, 5,615 custody offenders recidivated; specifically, 210 DWI custody offenders and 3,505 non-DWI offenders (see Table 10). Non-DWI custody offenders had significantly higher rates of recidivism compared to the DWI custody offenders, 44.1% compared to 30.4%. However, the DWI custody offenders had significantly higher rates of DWI recidivism compared to the non-DWI custody sample (4.3% versus .7%). The recontact sentence start date for the DWI custody offenders ranged from March 11, 2010 to July 7, 2014 and from January 25, 2010 to July 10, 2014 for the non-DWI custody offenders. DWI custody offenders were at risk in the

community for a range of 3 to 1,137 days, while the non-DWI custody offenders' lapse time ranged from 1 to 1,177 days. The average lapse time for the non-DWI custody offenders was 316 days, and 374 days for the DWI custody offenders, indicating that the non-DWI custody offenders recidivated in significantly less time. As well, the non-DWI custody offenders had higher index offence severity levels compared to the DWI custody offenders. A majority of offenders in both groups (74.2% DWI and 79.5% non-DWI custody) received subsequent custodial sentences for their recontact offence; a total of 37 DWI custody and 314 non-DWI custody offenders received an intermittent sentence for their recontact offence.

Table 10.
Comparisons of DWI and non-DWI custody offenders on recidivism variables

Recidivism Variables	**DWI Custody (*n*=691) Mean (*SD*) or *n* (%)**	**Non-DWI Custody (*n*=7946) Mean (*SD*) or *n* (%)**	**t-tests and Chi Squares**
Recidivism	210 (30.4%)	3505 (44.1%)	$\chi^2(1) = 48.82$, = $p < .001$
DWI Recidivism	30 (4.3%)	58 (.7%)	$\chi^2(1) = 82.22$, = $p < .001$
Lapse Time	373.61 (233.78)	316.2 (223.61)	t (249.92) = -3.58, $p < .001$
New Sentence Type:			
Custody	167 (74.2%)	2903 (79.5%)	$\chi^2(2) = 5.33$, = $p = 0.070$
Probation	49 (21.8%)	582 (15.9%)	
Conditional Sentence	9 (4%)	166 (4.5%)	
New Most Serious Offence (MSO) Severity Level	5 (7)	7 (8)	t (881.38) = 9.61, $p < .001$
Sentence Length	206.63 (215.16)	205.27 (291.57)	t (275.86) = -.09, $p = .928$

DWI and Non-DWI Community Offenders on Demographic Characteristics, Substance Abuse Variables, LSI-OR, and Recidivism

Descriptive and demographic characteristics were also calculated for DWI and non-DWI community offenders (see Table 11). There were a total of 3,318 DWI community offenders and 60,771 non-DWI community offenders. The DWI community offenders were significantly older compared to the non-DWI community offenders, and there were more males than females present in both offender groups. A large majority of offenders in both groups were Caucasian. There was also a large representation of Aboriginal and Black offenders in the non-DWI community sample (8.9% and 9%, respectively), but only 3.9% of the DWI community offenders were Aboriginal, while another 3.9% were Black. However, the DWI community sample had a large representation of South Asian offenders (6.3%). The sentence start dates for the DWI community offenders ranged from January 4, 2010 to December 30, 2011, and from January 4, 2010 to December 31, 2011 for the non-DWI community sample. The average sentence length was 445.45 days for the DWI community offenders and 473.65 days for the non-DWI community offenders. Similar to the previous findings, the non-DWI community offenders had significantly higher index offence severity levels than the DWI offenders.

Table 11.
Comparisons of DWI and non-DWI community offenders on demographic characteristics

Demographic Variables	**DWI Community (*n*=3318) Mean (*SD*) or *n* (%)**	**Non-DWI Community (*n*=60771) Mean (*SD*) or *n* (%)**	**t-tests and Chi Squares**
Age:	40.39 (12.55)	33.56 (11.98)	t (3653.91) = -30.6, $p < .001$
Gender:			
Male	2696 (81.3%)	49296 (81.1%)	$\chi^2(1) = .036$, = $p = .849$
Female	621 (18.7%)	11454 (18.9%)	
Race:			
Aboriginal	112 (3.9%)	4853 (8.9%)	$\chi^2(10) = 300.64$, = $p < .001$
Black	113 (3.9%)	4907 (9%)	
Caucasian	2173 (75.5%)	37955 (69.4%)	
Declined to Specify	6 (.2%)	226 (.4%)	
East Asian	62 (2.2%)	1058 (1.9%)	
Hispanic	50 (1.7%)	764 (1.4%)	
Other Minority	91 (3.2%)	1420 (2.6%)	
South Asian	182 (6.3%)	1563 (2.9%)	
Southeast Asian	40 (1.4%)	716 (1.3%)	
Unknown	24 (.8%)	367 (.7%)	
West Asian/Arabic	26 (.9%)	885 (1.6%)	
Most Serious Offence (MSO) Severity Level	10 (2)	16 (4)	t (4457.24) = 149.44, $p < .001$
Sentence Length	445.45 (204.45)	473.65 (204.51)	t (3688.71) = 7.74, $p < .001$

The DWI community offenders were more likely to present with substance abuse problems, have a history of substance abuse and substance abuse treatment, or be assessed as impaired at admit (see Table 12). However, the DWI community offenders were less likely than non-DWI community offenders to show evidence of withdrawal at admit. Further, DWI community offenders scored significantly lower on the LSI-OR variables, with the exception of most strength scores and the substance abuse scale. Similar to the previous sections, the use of

the override feature to increase the risk level occurred significantly less often for the DWI community offenders than it did for the non-DWI community offenders (see Table 13).

Table 12.
Comparisons of DWI and non-DWI community offenders on substance abuse variables

Substance Abuse Variables	**DWI Community (*n*=3318) *n* (%)**	**Non-DWI Community (*n*=60771) *n* (%)**	**Chi Squares**
Substance Abuse Alert	1365 (51.7%)	18077 (32.6%)	$\chi^2(1) = 414.07$, = $p < .001$
History of Substance Abuse	954 (36.2%)	14675 (26.5%)	$\chi^2(1) = 120.28$, = $p < .001$
Impairment at Admit	240 (9.1%)	1489 (2.7%)	$\chi^2(1) = 358.42$, = $p < .001$
Withdrawal at Admit	39 (1.5%)	1798 (3.2%)	$\chi^2(1) = 25.61$, = $p < .001$
Substance Abuse Treatment	306 (11.6%)	3334 (6%)	$\chi^2(1) = 133.74$, = $p < .001$

Table 13.
Comparisons of DWI and non-DWI community offenders on LSI-OR variables

LSI-OR Variables	**DWI Community (*n*=3318) Mean (*SD*)**	**Non-DWI Community (*n*=60771) Mean (*SD*)**	**t-tests**
General Risk/Needs	10.55 (6.28)	13.41 (8.47)	t (4006.92) = 25.06, $p < .001$
Strength	1.05 (1.62)	.91 (1.52)	t (3641.69) = -4.58, $p < .001$
Initial Risk Level	2.39 (0.88)	2.7 (1.08)	t (3891.45) = 19.92, $p < .001$
Risk Override	.26 (.87)	.48 (1.18)	t (4009.83) = 13.91, $p < .001$
Final Risk Level	2.47 (.89)	2.87 (1.04)	t (3833.9) = 25.32, $p < .001$
A1: Criminal History	1.86 (2.01)	2.4 (2.39)	t (3844.42) = 14.87, $p < .001$
A1: Strength	.15(.36)	.15 (.36)	t (3698.46) = .76, $p = .447$
A2: Education/ Employment	1.93 (2.2)	3.2 (2.74)	t (3902.02) = 31.97, $p < .001$
A2: Strength	.28 (.45)	.2 (.4)	t (3616.27) = -9.29, $p < .001$
A3: Family/Marital	.96 (.98)	1.44 (1.12)	t (3803.53) = 27.14, $p < .001$
A3: Strength	.2 (.4)	.16 (.37)	t (3630.35) = -5.47, $p < .001$
A4: Leisure/ Recreation	.9 (.72)	1.1 (.74)	t (3712.37) = 15.4, $p < .001$
A4: Strength	.08 (.27)	.06 (.25)	t (3633.27) = -2.53, $p = .012$
A5: Companions	.59 (.86)	1.15 (1.06)	t (3880.28) = 35.77, $p < .001$
A5: Strength	.11 (.31)	.08 (.27)	t (3594.98) = -5.29, $p < .001$
A6: Procriminal Attitude/Orientation	.49 (.84)	.9 (1.1)	t (3978.81) = 27.02, $p < .001$
A6: Strength	.13 (.33)	.1 (.3)	t (3622.93) = -4.17, $p < .001$
A7: Substance Abuse	3.51 (1.85)	2.57 (2.38)	t (3943.86) = -28.16, $p < .001$

A7: Strength	.06 (.23)	.11 (.31)	t (3933.76) = 11.88, p < .001
A8: Antisocial Pattern	.31 (.58)	.66 (.86)	t (4157.8) = 32.86, p < .001
A8: Strength	.05 (.22)	.04 (.2)	t (3630.47) = -2.05, p = .04

In total, 18,483 community offenders recidivated; specifically, 578 DWI community offenders and 17,905 non-DWI community offenders were charged with another offence (see Table 14). Non-DWI community offenders had a general recidivism rate of 29.5%, which is significantly higher than the 17.4% recidivism rate of the DWI community offenders. However, the DWI community offenders had significantly higher rates of DWI recidivism compared to the non-DWI community sample (3.5% versus .7%). The recontact sentence start date for the DWI community offenders ranged from January 12, 2010 to November 7, 2013, and it ranged from January 5, 2010 to December 17, 2014 for the non-DWI community offenders. The average lapse time for the non-DWI community offenders was 278 days compared to 303 days for the DWI community offenders, indicating that the non-DWI community offenders recidivated in significantly less time. As well, the non-DWI community offenders had significantly higher index offence severity levels for their recontact offense. In terms of sentence type, the majority of offenders in both groups received subsequent custodial sentences (followed closely by probation) for their recontact offence.

Table 14.
Comparisons of DWI and non-DWI community offenders on recidivism variables

Recidivism Variables	**DWI Community (*n*=3318) Mean (*SD*) or *n* (%)**	**Non-DWI Community (*n*=60771) Mean (*SD*) or *n* (%)**	**t-tests and Chi Squares**
Recidivism	578 (17.4%)	17905 (29.5%)	$\chi^2(1) = 222.35$, = $p < .001$
DWI Recidivism	116 (3.5%)	406 (.7%)	$\chi^2(1) = 311.47$, = $p < .001$
Lapse Time	302.51 (198.68)	278.09 (196.77)	t (614.1) = -2.91, p = .004
New Sentence Type:			
Custody	287 (49.7%)	8883 (49.6%)	$\chi^2(2) = 1.28$, = p = .528
Probation	255 (44.1%)	7691 (43%)	
Conditional Sentence	36 (6.2%)	1331 (7.4%)	
New Most Serious Offence (MSO) Severity Level	2 (5)	4 (7)	t (4062.22) = 22.77, p < .001
Sentence Length	204.92 (258.00)	209.19 (255.35)	t (614.05) = 0.392, p = .695

DWI Recidivism

Of the total sample, 610 (.8%) received a new DWI index offence. Of these, 545 were charged with one new DWI charge, 62 were charged with two, and three were charged with three new DWI charges. Focusing specifically on DWI offenders, 146 of these offenders recidivated with new DWI charges: 126 received one new charge and 20 received two charges. In turn, a total of 464 non-DWI offenders' recidivated with DWI charges: 419 received one new DWI charge, 42 received two new DWI charges, and three received three new DWI charges. Compared to DWI offenders, the non-DWI offenders incurred significantly more DWI recontact charges (see Table 15); however, both groups had an equivalent number of individuals who were charged with impaired driving causing bodily harm.

Table 15.
The number of DWI and non-DWI offenders by type and number of DWI recidivism offences

Type of DWI Recontact Offences	**Number of Offenders Charged with Recontact Offences**		**t-tests Between DWI Recontact Offences by Offender Group**
	DWI (*n*)	**Non-DWI (*n*)**	
Impaired driving:	94	293	t (4095.14) = -7.98, $p < .001$
Refuse breath sample:	25	61	t (4075.18) = -4.28, $p < .001$
Impaired driving over 80 mg:	45	156	t (4103.95) = -5.35, $p < .001$
Impaired driving causing bodily harm:	2	2	t (4035.33) = -1.33, $p = .184$
Recontact Total Impaired Driving Offences	146	464	t (4092) = -9.6, $p < .001$

Examining the DWI custody sample, a total of 30 DWI offenders recidivated wherein 24 received one new DWI charge and six received two new DWI charges. In contrast, 58 non-DWI custody offenders' recidivated: 53 received one new DWI charge, four received two new DWI charges, and one received three DWI charges. Compared to DWI custody offenders, non-DWI custody offenders received significantly more DWI recontact charges (see Table 16).

Table 16.
The number of DWI and non-DWI custody offenders by type and number of DWI recidivism charges

Type of DWI Recontact Offences	**Number of Offenders Charged with Recontact Offences**		**t-tests Between DWI Recontact Offences by Offender Group**
	DWI (*n*)	**Non-DWI (*n*)**	
Impaired driving:	23	33	t (705.48) = -4.24, $p < .001$
Refuse breath sample:	8	8	t (700.57) = -2.59, $p = .01$
Impaired driving over 80 mg:	4	23	t (751.29) = -9.81, $p = .327$
Impaired driving causing bodily harm:	1	--	t (690) = -1.0, $p = .318$
Recontact Total Impaired Driving Offences	30	58	t (707.61) = -4.45, $p < .001$

Finally, 116 of the DWI community offenders recidivated: 102 received one new DWI charge and 14 received two new DWI charges. Conversely, 406 non-DWI community offenders recidivated wherein 366 received one new DWI charge, 38 acquired two new DWI charges, and two incurred three new DWI charges. In fact, the non-DWI community offender group had significantly more DWI recontact charges than the DWI community offenders (see Table 17).

Table 17.
The number of DWI and non-DWI community offenders by type and number of DWI recidivism charges

Type of DWI Recontact Offences	**Number of Offenders Charged with Recontact Offences**		**t-tests Between DWI Recontact Offences by Offender Group**
	DWI (*n*)	**Non-DWI (*n*)**	
Impaired driving:	71	260	t (3391.05) = -6.78, $p < .001$
Refuse breath sample:	17	53	t (3379.17) = -3.41, $p = .001$
Impaired driving over 80 mg:	41	133	t (3382.09) = -5.28, $p < .001$
Impaired driving causing bodily harm:	1	2	t (3356.66) = -.89, $p = .375$
Recontact Total Impaired Driving Charges	116	406	t (3386.21) = -8.49, $p < .001$

General and DWI Recidivism

The two recidivism variables, general and DWI recidivism were analyzed by the type of offender group (i.e., DWI and non-DWI offenders; DWI and non-DWI custody offenders; and DWI and non-DWI community offenders; see Tables 18 to 23). Among all offenders captured in the total sample, the general recidivism rate was 30.5%, while the DWI recidivism rate was 0.8%. When examining both the custody and community offenders separately, the general recidivism rate for the total custody sample was 43% and the DWI recidivism rate was 1%. For the community offender sample, the overall general recidivism rate and DWI recidivism rate were 28.8% and 0.8%, respectively.

Table 18.
Comparisons of DWI Offenders and non-DWI offenders on General Recidivism

Recidivism	**DWI Offender**	**Non-DWI Offender**	**Total**
No Recontact:			
Count	3221	47307	50528
% of Total	4.4%	65%	69.5%
Recontact:			
Count	788	21410	22198
% of Total	1.1%	29.4%	30.5%
Total:			
Count	4009	68717	72726
% of Total	5.5%	94.5%	100%

Table 19.
Comparisons of DWI Offenders and non-DWI offenders on DWI Recidivism

DWI Recidivism	**DWI Offender**	**Non-DWI Offender**	**Total**
No Recontact:			
Count	3863	68253	72116
% of Total	5.3%	93.8%	99.2%
Recontact:			
Count	146	464	610
% of Total	0.2%	.6%	0.8%
Total:			
Count	4009	68717	72726
% of Total	5.5%	94.5%	100%

Table 20.
Comparisons of DWI and non-DWI Custody offenders on Recidivism

Recidivism	**DWI Custody Offenders**	**Non-DWI Custody Offenders**	**Total**
No Recontact			
Count	481	4441	4922
% of Total	5.6%	51.4%	57%
Recontact			
Count	210	3505	3715
% of Total	2.4%	40.6%	43%
Total			
Count	691	7946	8637
% of Total	8%	92%	100%

Table 21.
Comparisons of DWI and non-DWI custody offenders on DWI Recidivism

DWI Recidivism	DWI Custody Offenders	Non-DWI Custody Offenders	Total
No Recontact			
Count	661	7888	8549
% of Total	7.7%	91.3%	99%
Recontact			
Count	30	58	88
% of Total	0.3%	0.7%	1%
Total			
Count	691	7946	8637
% of Total	8%	92%	100%

Table 22.
Comparisons of DWI and non-DWI community offenders on Recidivism

Recidivism	DWI Community Offenders	Non-DWI Community Offenders	Total
No Recontact			
Count	2740	42866	45606
% of Total	4.3%	66.9%	71.2%
Recontact			
Count	17905	578	18483
% of Total	27.9%	0.9%	28.8%
Total			
Count	3318	60771	64089
% of Total	5.2%	94.8%	100%

Table 23.
Comparisons of DWI and non-DWI community offenders on DWI Recidivism

DWI Recidivism	DWI Community Offenders	Non-DWI Community Offenders	Total
No Recontact			
Count	3202	60365	63567
% of Total	5%	94.2%	99.2%
Recontact			
Count	116	406	522
% of Total	0.2%	0.6%	0.8%
Total			
Count	3318	60771	64089
% of Total	5.2%	94.8%	100%

Use of the Override

An analysis of the initial risk level and the resulting final risk level, after accounting for the use of the override, was conducted for the DWI and non-DWI offender groups, as well as for both custody and community groups within each offender group, using chi square tests. It was found that the override feature was used with 314 (7.8%) DWI offenders and 9,607 (14%) non-DWI offenders. The use of the override feature to increase or decrease an offender's risk level was examined between DWI and non-DWI offenders, and it was found that overrides were used significantly less often with DWI offenders, t (4879.63) = 14.47, $p < .001$.

These results for the difference between the initial and final risk level were significant for the DWI offenders ($\chi^2(16) = 13463.7$, $p < .001$). A common pattern of significant results were found between the initial and final risk level for the non-DWI offenders ($\chi^2(16) = 201695.38$, $p < .001$), the DWI custody offenders ($\chi^2(16) = 2476.56$, $p < .001$), the DWI community offenders ($\chi^2(16) = 11025.08$, $p < .001$), the non-DWI custody offenders ($\chi^2(16) = 24332.89$, $p < .001$), and the non-DWI community offenders ($\chi^2(16) = 176434.82$, $p < .001$). The contingency tables which display the frequency distribution of these variables for this analysis are displayed in Tables 24 to 29.

Table 24.
Initial risk level by final risk level for DWI offenders

	Final Risk After Override					
Initial Risk Level	**Very Low**	**Low**	**Medium**	**High**	**Very High**	**Total**
Very Low						
Count	471	13	21	0	0	505
% of Total	11.7%	0.3%	0.5%	0.0%	0.0%	12.6%
Low						
Count	1	1271	184	5	1	1462
% of Total	0.0%	31.7%	4.6%	0.1%	0.0%	36.5%
Medium						
Count	1	6	1378	51	0	1436
% of Total	0.0%	0.1%	34.4%	1.3%	0.0%	35.8%

High						
Count	0	0	10	483	13	506
% of Total	0.0%	0.0%	0.2%	12%	0.3%	12.6%
Very High						
Count	0	0	0	1	99	100
% of Total	0.0%	0.0%	0.0%	0.0%	2.5%	2.5%
Total						
Count	473	1290	1593	540	113	4009
% of Total	11.8%	32.2%	39.7%	13.5%	2.8%	100%

Table 25.
Initial risk level by final risk level for Non-DWI offenders

	Final Risk After Override					
Initial Risk Level	**Very Low**	**Low**	**Medium**	**High**	**Very High**	**Total**
Very Low						
Count	7238	408	1621	162	10	9439
% of Total	10.5%	0.6%	2.4%	0.2%	0.0%	13.7%
Low						
Count	6	12804	4047	488	31	17376
% of Total	0.0%	18.6%	5.9%	0.7%	0.0%	25.3%
Medium						
Count	6	117	20869	1700	128	22820
% of Total	0.0%	0.2%	30.4%	2.5%	0.2%	33.2%
High						
Count	0	8	348	13562	344	14262
% of Total	0.0%	0.0%	0.5%	19.7%	0.5%	20.8%
Very High						
Count	0	0	42	39	4739	4820
% of Total	0.0%	0.0%	0.1%	0.1%	6.9%	7.0%
Total						
Count	7250	13337	26927	15951	5252	68717
% of Total	10.6%	19.4%	39.2%	23.2%	7.6%	100%

Table 26.
Initial risk level by final risk level for DWI custody offenders

	Final Risk After Override					
Initial Risk Level	**Very Low**	**Low**	**Medium**	**High**	**Very High**	**Total**
Very Low						
Count	8	0	0	0	0	8
% of Total	1.2%	0.0%	0.0%	0.0%	0.0%	1.2%
Low						
Count	0	76	6	0	0	82
% of Total	0.0%	11%	0.9%	0.0%	0.0%	11.9%

Medium						
Count	0	0	273	17	0	290
% of Total	0.0%	0.0%	39.5%	2.5%	0.0%	42%
High						
Count	0	0	5	241	8	254
% of Total	0.0%	0.0%	0.7%	34.9%	1.2%	36.8%
Very High						
Count	0	0	0	1	56	57
% of Total	0.0%	0.0%	0.0%	0.1%	8.1%	8.2%
Total						
Count	8	76	284	259	64	691
% of Total	1.2%	11%	41.1%	37.5%	9.3%	100%

Table 27.
Initial risk level by final risk level for non-DWI custody offenders

	Final Risk After Override					
Initial Risk Level	**Very Low**	**Low**	**Medium**	**High**	**Very High**	**Total**
Very Low						
Count	126	2	22	17	4	171
% of Total	1.6%	0.0%	0.3%	0.2%	0.1%	2.2%
Low						
Count	0	579	91	74	15	759
% of Total	0.0%	7.3%	1.1%	0.9%	0.2%	9.6%
Medium						
Count	0	7	1809	179	37	2032
% of Total	0.0%	0.1%	22.8%	2.3%	0.5%	25.6%
High						
Count	0	0	103	2885	88	3076
% of Total	0.0%	0.0%	1.3%	36.3%	1.1%	38.7%
Very High						
Count	0	0	25	5	1878	1908
% of Total	0.0%	0.0%	0.3%	0.1%	23.6%	24%
Total						
Count	126	588	2050	3160	2022	7946
% of Total	1.6%	7.4%	25.8%	39.8%	25.4%	100%

Table 28.
Initial risk level by final risk level for DWI community offenders

Initial Risk Level	Final Risk After Override: Very Low	Low	Medium	High	Very High	Total
Very Low						
Count	463	13	21	0	0	497
% of Total	14%	0.4%	0.6%	0.0%	0.0%	15%
Low						
Count	1	1195	178	5	1	1380
% of Total	0.0%	36%	5.4%	0.2%	0.0%	41.6%
Medium						
Count	1	6	1105	34	0	1146
% of Total	0.0%	0.2%	33.3%	1%	0.0%	34.5%
High						
Count	0	0	5	242	5	252
% of Total	0.0%	0.0%	0.2%	7.3%	0.2%	7.6%
Very High						
Count	0	0	0	0	43	43
% of Total	0.0%	0.0%	0.0%	0.0%	1.3%	1.3%
Total						
Count	465	1214	1309	281	49	3318
% of Total	14%	36.6%	39.5%	8.5%	1.5%	100%

Table 29.
Initial risk level by final risk level for non-DWI community offenders

Initial Risk Level	Final Risk After Override: Very Low	Low	Medium	High	Very High	Total
Very Low						
Count	7112	406	1599	145	6	9268
% of Total	11.7%	0.7%	2.6%	0.2%	0.0%	15.3%
Low						
Count	6	12225	3956	414	16	16617
% of Total	0.0%	20.1%	6.5 %	0.7%	0.0%	27.3%
Medium						
Count	6	110	19060	1521	91	20788
% of Total	0.0%	0.2%	31.4%	2.5%	0.1%	34.2%
High						
Count	0	8	245	10677	256	11186
% of Total	0.0%	0.0%	0.4%	17.6%	0.4%	18.4%
Very High						
Count	0	0	17	34	2861	2912
% of Total	0.0%	0.0%	0.0%	0.1%	4.7%	4.8%

Total						
Count	7124	12749	24877	12791	3230	60771
% of Total	11.7%	21%	40.9%	21%	5.3%	100%

Correlations between LSI-OR Variables with General and DWI Recidivism

The correlations between various aspects of the LSI-OR and both general and DWI recidivism were examined for DWI offenders and non-DWI offenders, as well for each offender group within the custody and community subsamples, to assess the applicability of the LSI-OR to a DWI population. These correlations were calculated for the: general risk/need total score, total strength score, initial risk level, final risk level after the override use, and the eight domain scores.

All of the correlations for general recidivism among the DWI and non-DWI offenders were significant (Table 30). Interestingly, the non-DWI offenders had a higher correlation between general recidivism and the substance abuse subscale of the LSI-OR. Given that the DWI offenders had a higher mean score than the non-DWI offenders on this subscale (M = 3.71 [SD = 1.87] compared to M = 2.72 [SD = 2.45]), a lack of variance for the DWI offenders may be contributing to the lower correlation between the substance abuse variable and general recidivism. In addition, all of the correlations for general recidivism for the DWI community and non-DWI custody and community offenders were significant (Tables 31 and 32). For DWI custody offenders, with the exception of the total strength score (r = -.016, *ns*; Table 31), all of the correlations among the LSI-OR variables and general recidivism were significant. Overall, the general risk/needs score was correlated with general recidivism among DWI and non-DWI offenders, both in the total sample and within the custody and community subsamples; however, it was not correlated as strongly for the DWI offenders as it was for the non-DWI offenders (Tables 30 to 32).

Table 30.
Correlations between LSI-OR Variables with General Recidivism for DWI Offenders and non-DWI Offenders

	Recidivism	
	DWI Offender (*n* = 4009)	**Non-DWI Offender (*n* = 68717)**
General Risk/Needs	.325**	.424**
Strength	-.054**	-.112**
Initial Risk Level	.286**	.402**
Final Risk Level	.281**	.376**
A1: Criminal History	.305**	.371**
A2: Education/ Employment	.204**	.303**
A3: Family/Marital	.162**	.191**
A4: Leisure/ Recreation	.146**	.237**
A5: Companions	.229**	.296**
A6: Procriminal Attitude/Orientation	.206**	.253**
A7: Substance Abuse	.164**	.294**
A8: Antisocial Pattern	.269**	.328**

**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Table 31.
Correlations between LSI-OR Variables with General Recidivism for DWI and non-DWI Custody Offenders

	Recidivism	
	DWI Custody Offenders (*n* = 691)	**Non-DWI Custody Offenders (*n* = 7946)**
General Risk/Needs	.249**	.411**
Strength	-.016	-.051**
Initial Risk Level	.205**	.394**
Final Risk Level	.183**	.355**
A1: Criminal History	.234**	.383**
A2: Education/ Employment	.202**	.271**
A3: Family/Marital	.161**	.193**
A4: Leisure/ Recreation	.124**	.218**
A5: Companions	.211**	.292**
A6: Procriminal Attitude/Orientation	.083*	.214**
A7: Substance Abuse	.075*	.311**
A8: Antisocial Pattern	.220**	.302**

**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Table 32.
Correlations between LSI-OR Variables with General Recidivism for DWI and non-DWI Community Offenders

	Recidivism	
	DWI Community Offenders (*n* = 3318)	**Non-DWI Community Offenders (*n* = 60771)**
General Risk/Needs	.320**	.415**
Strength	-.039*	-.107**
Initial Risk Level	.275**	.392**
Final Risk Level	.274**	.366**
A1: Criminal History	.298**	.356**
A2: Education/ Employment	.181**	.294**
A3: Family/Marital	.139**	.179**
A4: Leisure/ Recreation	.117**	.222**
A5: Companions	.2**	.282**
A6: Procriminal Attitude/Orientation	.216**	.242**
A7: Substance Abuse	.156**	.277**
A8: Antisocial Pattern	.255**	.317**

**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Turning to DWI recidivism, AUC analyses would have been the most appropriate statistical test to use between the LSI-OR variables and DWI recidivism due to the low base rate (i.e., below 10%); however, correlations were used. Many of the same correlations were significant for both the DWI and non-DWI offenders: general risk/needs score, initial risk level, final risk level, criminal history, and substance abuse (see Table 33). Two additional correlations were significant for the DWI offenders (i.e., companions and anti-social patterns), while one additional correlation was significant for the non-DWI offenders (i.e., education/employment). There were no significant correlations among the LSI-OR variables and DWI recidivism for the DWI custody offenders. However, there were a handful of significant correlations for the non-DWI custody offenders: general risk/needs score, criminal history, and substance abuse (see Table 34).

Table 33.
Correlations between LSI-OR Variables with DWI Recidivism for DWI Offenders and non-DWI offenders

	DWI Recidivism	
	DWI Offender (*n*=4009)	**Non-DWI Offender (*n*=68717)**
General Risk/Needs	.056**	.015**
Strength	-.019	-.003
Initial Risk Level	.057**	.015**
Final Risk Level	.054**	.013**
A1: Criminal History	.071**	.024**
A2: Education/ Employment	.014	-.012**
A3: Family/Marital	.028	-.003
A4: Leisure/ Recreation	.031	-.002
A5: Companions	.035*	-.006
A6: Procriminal Attitude/Orientation	.022	.002
A7: Substance Abuse	.041**	.045**
A8: Antisocial Pattern	.037**	.002

**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Table 34.
Correlations between LSI-OR Variables with DWI Recidivism for DWI and non-DWI Custody Offenders

	DWI Recidivism	
	DWI Custody Offenders (*n*=691)	**Non-DWI Custody Offenders (*n*=7946)**
General Risk/Needs	.007	.029*
Strength	-.007	.007
Initial Risk Level	.011	.022
Final Risk Level	.018	.016
A1: Criminal History	.01	.041**
A2: Education/ Employment	.-.007	-.003
A3: Family/Marital	.058	.015
A4: Leisure/ Recreation	.055	.014
A5: Companions	-.019	-.002
A6: Procriminal Attitude/Orientation	-.027	.008
A7: Substance Abuse	-.013	.044**
A8: Antisocial Pattern	.028	.019

**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

In the community sample, for both DWI and non-DWI offenders, the correlations among the LSI-OR and DWI recidivism variables that were significant included: general risk/needs score, initial risk level, final risk level, criminal history, and substance abuse (see Table 35). For DWI community offenders, significant correlations also emerged for companions and antisocial patterns and, for non-DWI community offenders, there was a significant correlation between education/employment and DWI recidivism.

Table 35.
Correlations between LSI-OR Variables with DWI Recidivism for DWI and non-DWI Community Offenders

	DWI Recidivism	
	DWI Community Offenders (*n* = 3318)	**Non-DWI Community Offenders (*n* = 60771)**
General Risk/Needs	.066**	.012**
Strength	-.018	-.003
Initial Risk Level	.064**	.014**
Final Risk Level	.059**	.012**
A1: Criminal History	.085**	.022**
A2: Education/ Employment	.016	-.014**
A3: Family/Marital	.017	-.006
A4: Leisure/ Recreation	.021	-.004
A5: Companions	.045**	-.008
A6: Procriminal Attitude/Orientation	.033	.001
A7: Substance Abuse	.05**	.045**
A8: Antisocial Pattern	.036*	-.001

**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

ROC Coefficients for LSI-OR Total and Section Scores with Recidivism

A series of ROC analyses were conducted to examine the LSI-OR total and section scores with general and DWI recidivism for all DWI and non-DWI offender groups.

General Recidivism.

The AUC values for the overall DWI and non-DWI offender groups are presented in Table 36. An analysis of the general risk/need total score on general recidivism produced a ROC of AUC = .707 for DWI offenders and an AUC = .757 for non-DWI offenders. The lower AUC value for DWI offenders indicates that there is a decrease in predictive accuracy for the DWI offenders compared to the non-DWI offenders. The majority of the remaining AUC coefficients for the domain scores and other section scores ranged from .726 to .741 for the non-DWI offenders and from .684 to .685 for the DWI offenders. This again indicated that the LSI-OR and its subscales were better able to predict recidivism in the non-DWI sample than the DWI sample. Figures 2 and 3 illustrate the ROC curves for the DWI and non-DWI offender groups.

Table 36.
AUC Values for the DWI and non-DWI offender groups on Recidivism

LSI-OR Variables	**DWI Offender** ***AUC*** **(95% *CI*)**	**Non-DWI Offender** ***AUC*** **(95% *CI*)**
General Risk/Needs	.707 (.686, .727)	.757 (.754, .761)
Initial Risk Level	.684 (.663, .705)	.741 (.737, .745)
Final Risk Level After Override	.685 (.664, .706)	.726 (.722, .73)

Figure 2.
ROC Curve on General Recidivism for the DWI Offenders.

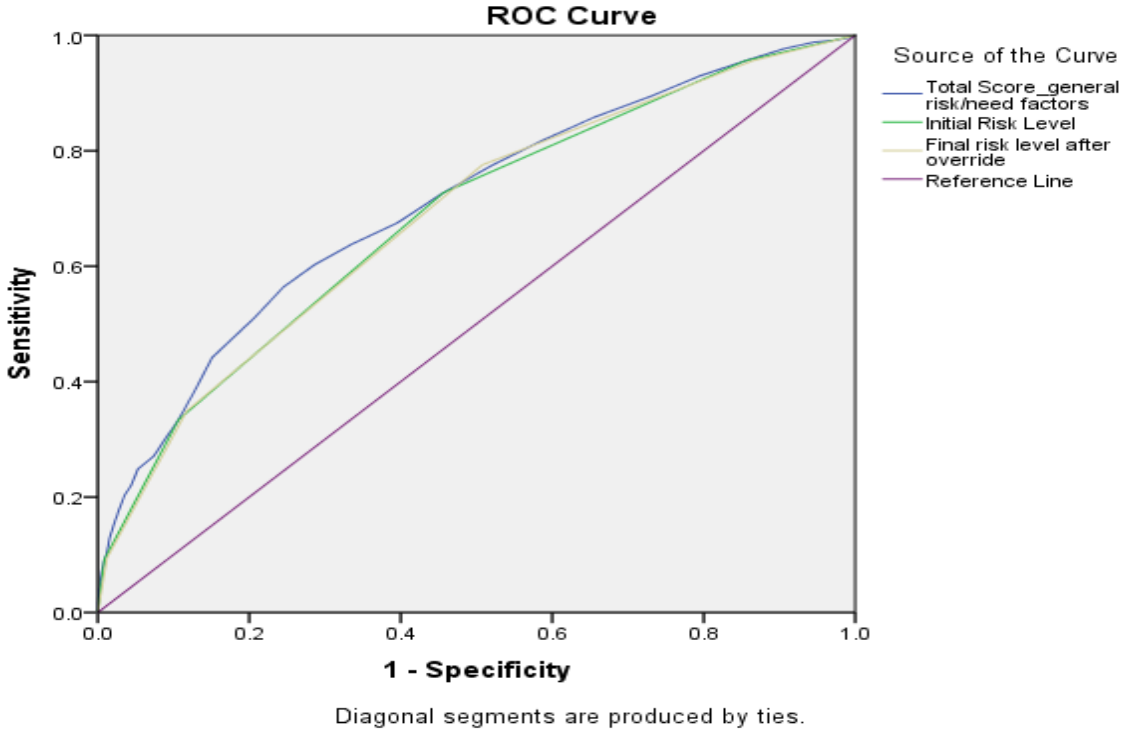
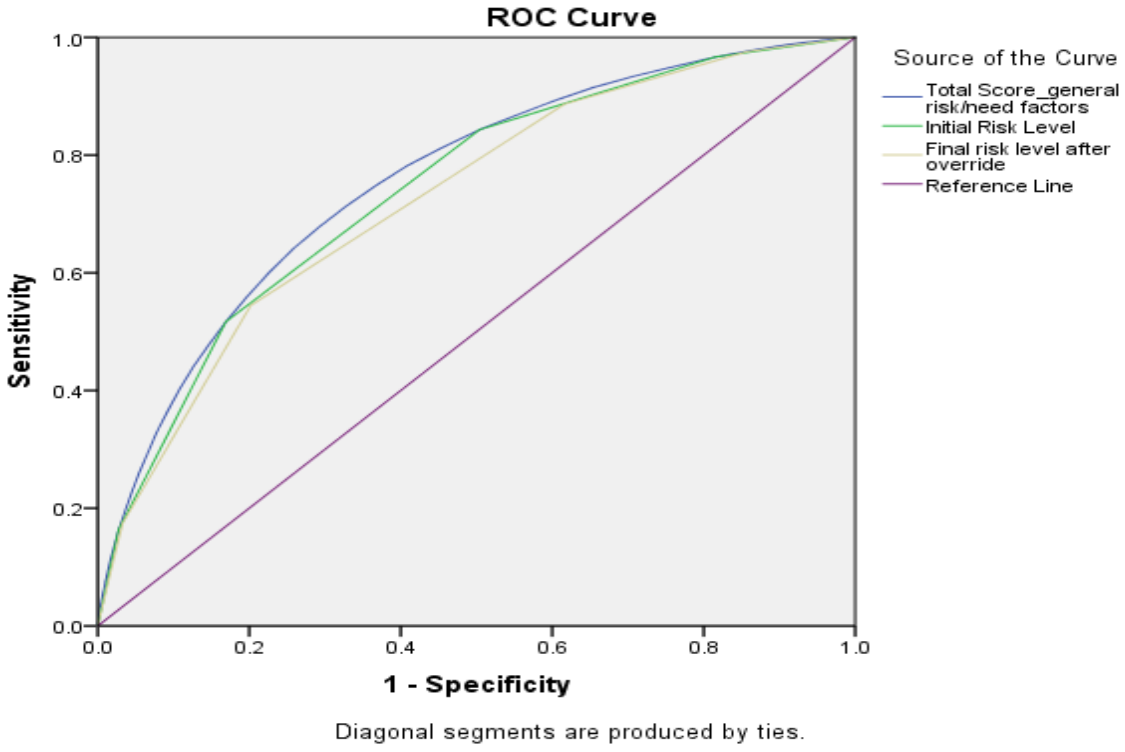


Figure 3.
ROC Curve on General Recidivism for the Non-DWI Offenders.



The AUC values for the DWI and non-DWI custody offender groups are presented in Table 37. An analysis of the general risk/need total score in relation to general recidivism produced a ROC of AUC = .642 for the DWI custody offenders and an AUC = .738 for non-DWI custody offenders. This demonstrated that there was a decrease in predictive accuracy for the DWI custody offenders. The majority of the remaining AUC coefficients for the domain scores and other section scores ranged from .695 to .719 for the non-DWI custody offenders and from .600 to .612 for the DWI custody offenders. Thus, the LSI-OR and its subscales were better able to predict recidivism in the non-DWI custody sample than the DWI custody sample. Figures 3 and 4 portray the ROC curves for the DWI and non-DWI custody offender groups.

Table 37.
AUC Values for the DWI and non-DWI custody offenders on Recidivism

LSI-OR Variables	**DWI Custody Offender *AUC* (95% *CI*)**	**Non-DWI Custody Offender *AUC* (95% *CI*)**
General Risk/Needs	.642 (.597, .687)	.738 (.727, .748)
Initial Risk Level	.612 (.566, .658)	.719 (.708, .730)
Final Risk Level After Override	.600 (.554, .646)	.695 (.684, .707)

Figure 4.
ROC Curve on General Recidivism for the DWI Custody Offenders.

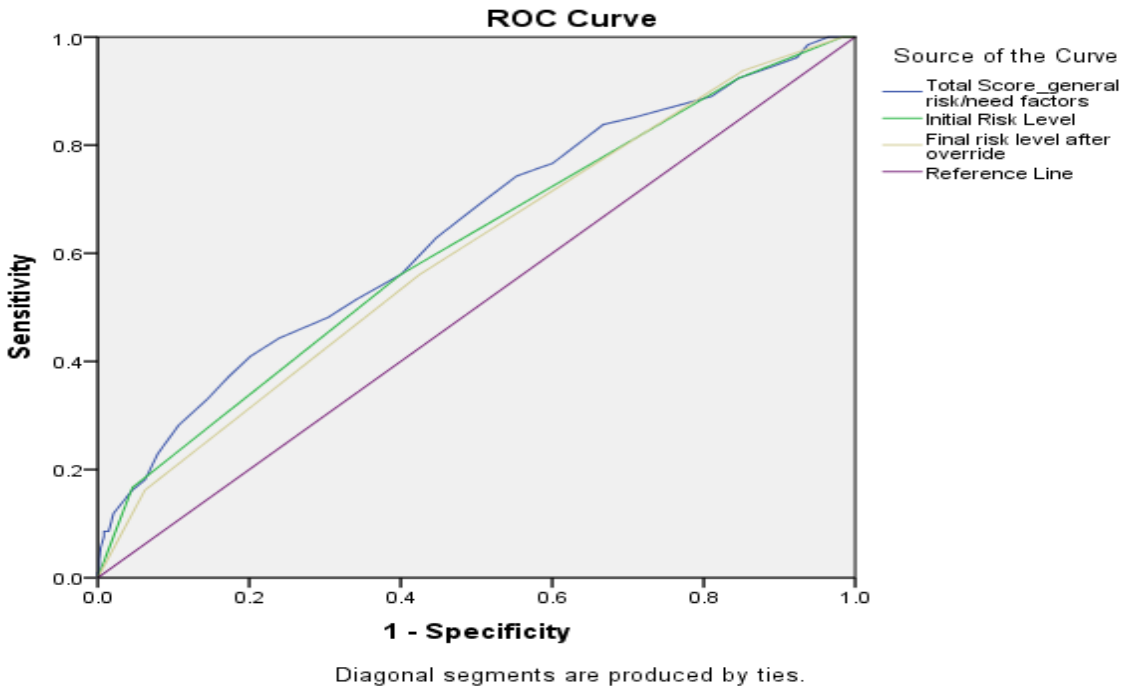
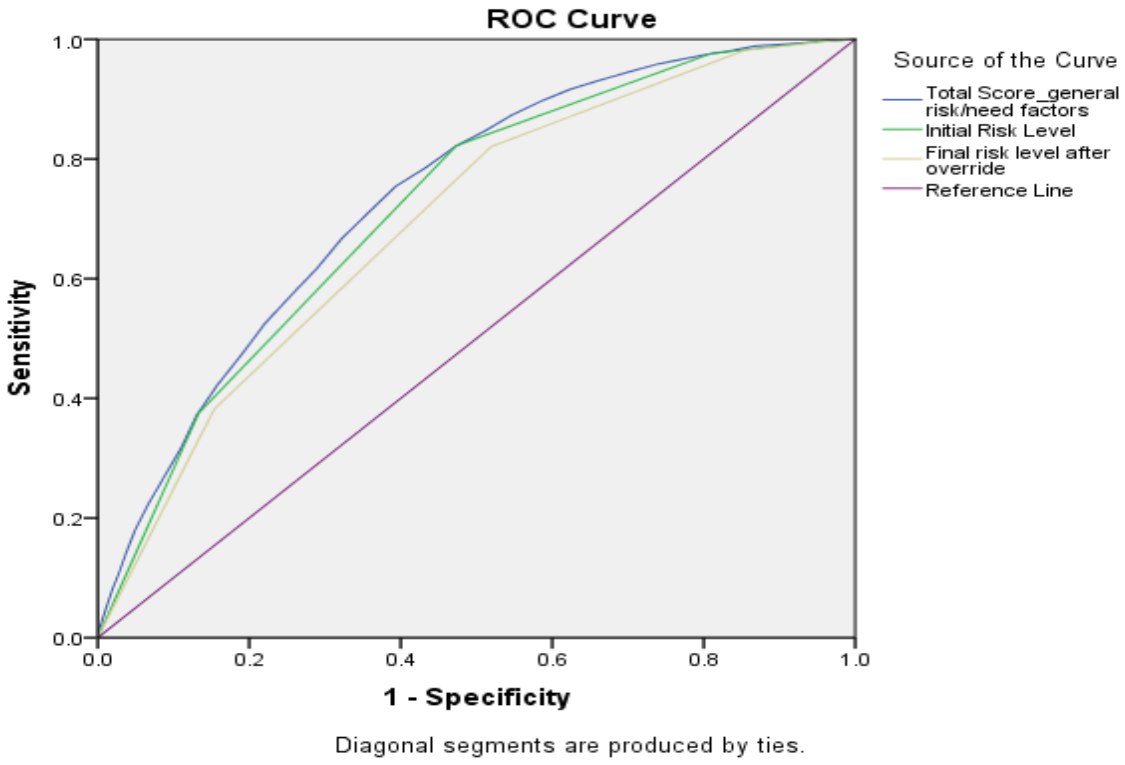


Figure 5.
ROC Curve on General Recidivism for the Non-DWI Custody Offenders.



The AUC values for the DWI and non-DWI community offender groups are presented in Table 38. The analysis of general risk/need total score on general recidivism resulted in a ROC of AUC =.699 for DWI community offenders and an AUC = .754 for non-DWI community offenders. The majority of the remaining AUC coefficients for the domain scores and other section scores ranged from .721 to .737 for the non-DWI community offenders and from .677 to .68 for the DWI community offenders, indicating that the LSI-OR and its subscales were better able to predict recidivism in the non-DWI community sample than the DWI community sample. Figures 5 and 6 portray the ROC curves for the DWI and non-DWI community offender groups.

Table 38.
AUC Values for the DWI and non-DWI community offenders on Recidivism

LSI-OR Variables	**DWI Community Offender** ***AUC* (95% *CI*)**	**Non-DWI Community Offender** ***AUC* (95% *CI*)**
General Risk/Needs	.699 (.674, .723)	.754 (.749, .758)
Initial Risk Level	.677 (.652, .702)	.737 (.732, .741)
Final Risk Level After Override	.68 (.655, .705)	.721 (.716, .725)

Figure 6.
ROC Curve on General Recidivism for the DWI Community Offenders.

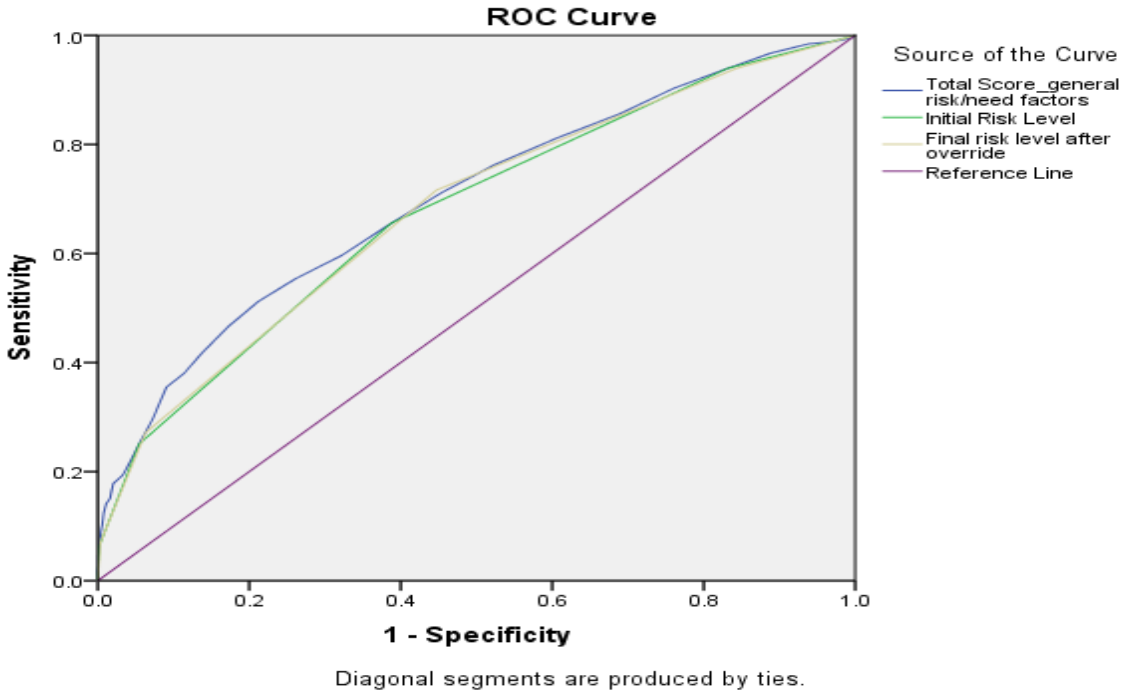
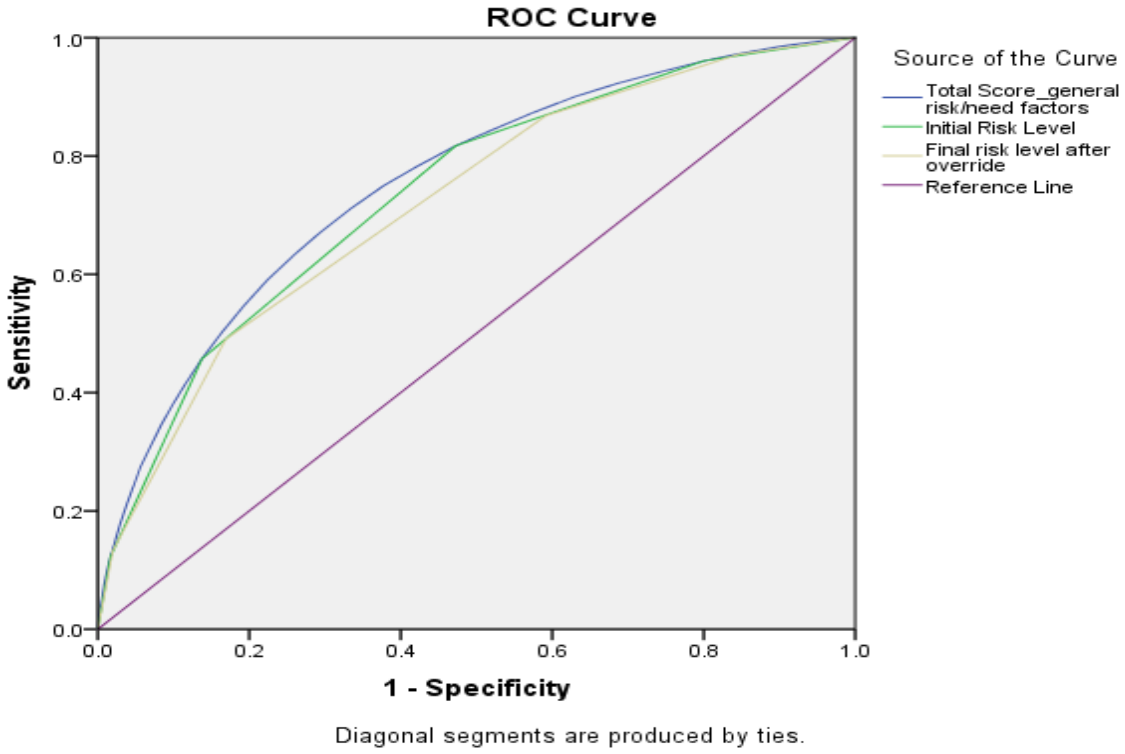


Figure 7.
ROC Curve on General Recidivism for the Non-DWI Community Offenders.



DWI Recidivism.

ROC analyses were also performed where DWI recidivism was examined rather than general recidivism. The AUC values for the DWI and non-DWI offender groups are presented in Table 39. The analysis of general risk/need total score on DWI recidivism produced a ROC of AUC = .582 for DWI offenders and an AUC = .561 for non-DWI offenders. Most of the remaining AUC coefficients for the domain scores and other section scores ranged from .544 to .554 for the non-DWI offenders and from .578 to .581 for the DWI offenders. Interestingly, this indicated that the LSI-OR and its subscales were better able to predict DWI recidivism in the DWI sample than in the non-DWI sample. Figures 8 and 9 illustrate the ROC curves for the DWI and non-DWI offender groups.

Table 39.
AUC Values for the DWI and non-DWI offenders on DWI Recidivism

LSI-OR Variables	**DWI Offender** ***AUC*** **(95%** ***CI*****)**	**Non-DWI Offender** ***AUC*** **(95%** ***CI*****)**
General Risk/Needs	.582 (.535, .629)	.561 (.537, .584)
Initial Risk Level	.581 (.536, .627)	.554 (.530, .578)
Final Risk Level After Override	.578 (.533, .624)	.544 (.519, .568)

Figure 8.
ROC Curve on DWI Recidivism for the DWI Offenders.

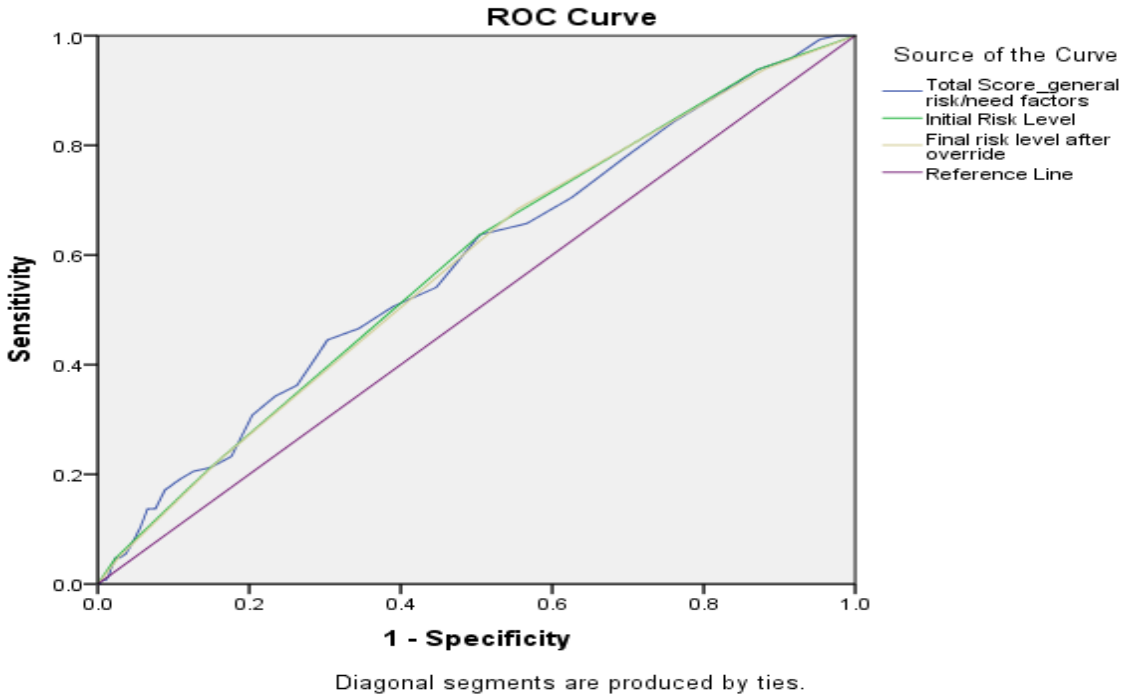
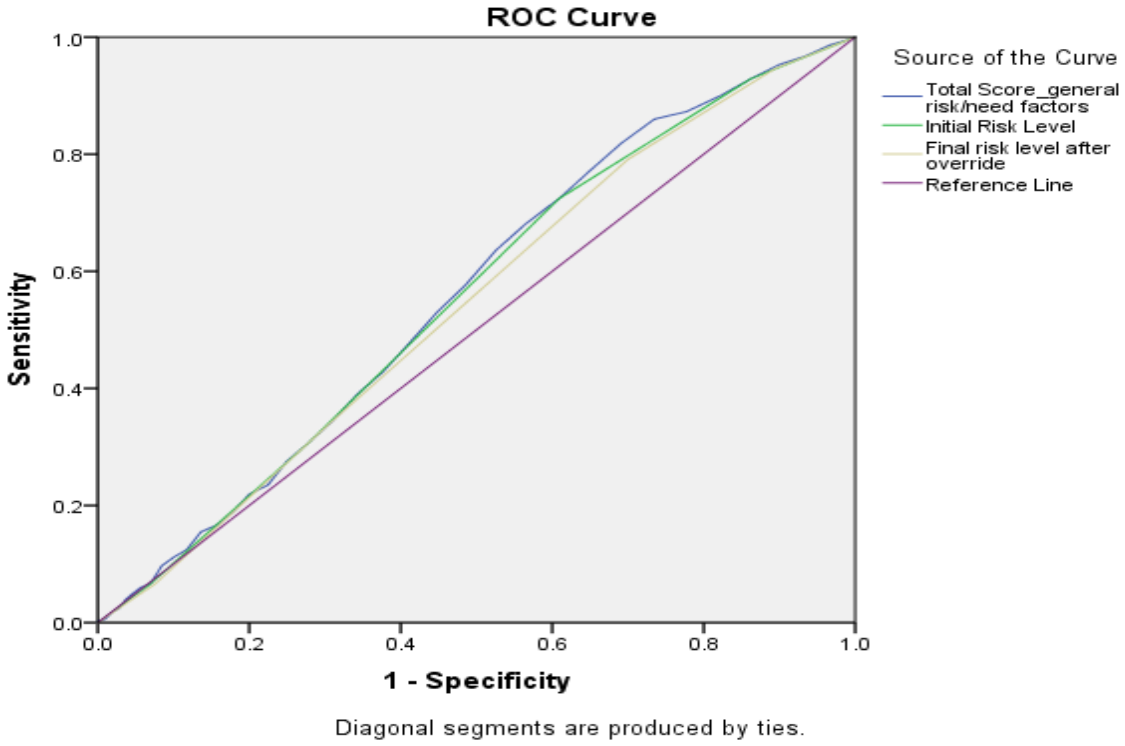


Figure 9.
ROC Curve on DWI Recidivism for the Non-DWI Offenders.



The AUC values for the DWI and non-DWI custody offender groups are presented in Table 40. Here, the general risk/need total score on DWI recidivism resulted in a ROC of AUC = .508 for DWI custody offenders and an AUC = .593 for non-DWI custody offenders. The majority of the remaining AUC coefficients for the domain scores and other section scores ranged from .549 to .567 for the non-DWI custody offenders and from .502 to .513 for the DWI custody offenders. As with the overall sample, the LSI-OR and its subscales were better able to predict DWI recidivism in the non-DWI custody sample than in the DWI custody sample. Figures 10 and 11 illustrate the ROC curves for the DWI and non-DWI custody offender groups.

Table 40.
AUC Values for the DWI and non-DWI custody offenders on DWI Recidivism

LSI-OR Variables	**DWI Custody Offender** ***AUC* (95% *CI*)**	**Non-DWI Custody Offender** ***AUC* (95% *CI*)**
General Risk/Needs	.508 (.410, .606)	.593 (.530, .657)
Initial Risk Level	.502 (.402, .603)	.567 (.503, .631)
Final Risk Level After Override	.513 (.415, .610)	.549 (.484, .615)

Figure 10.
ROC Curve on DWI Recidivism for the DWI Custody Offenders.

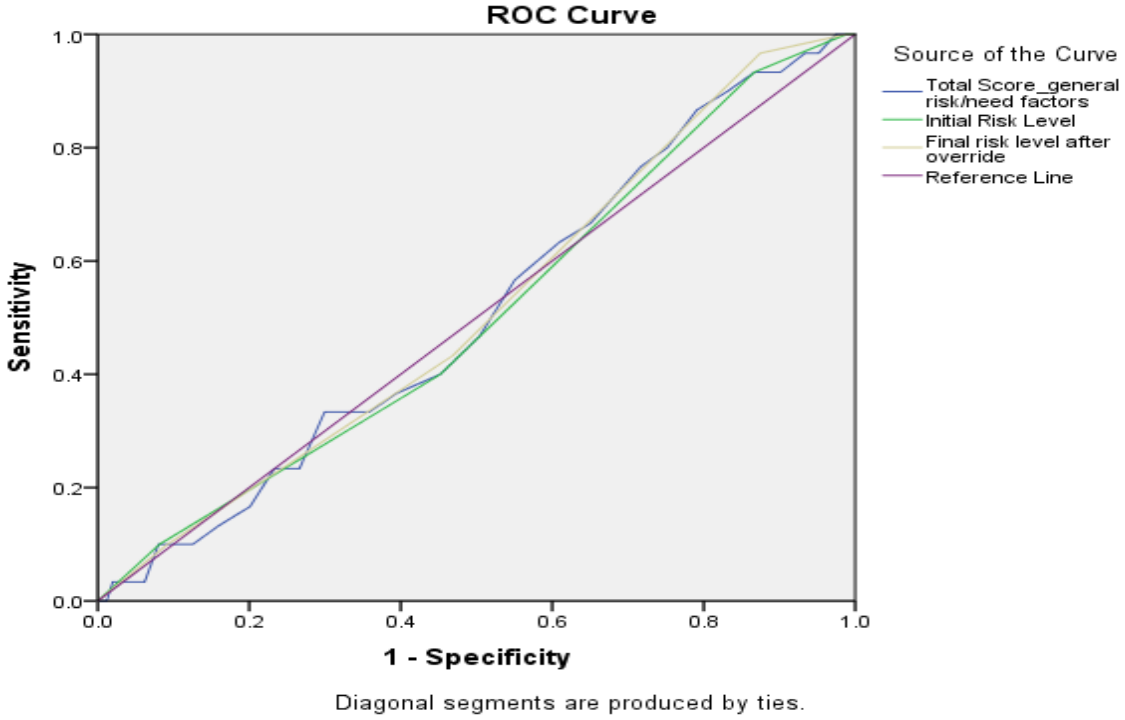
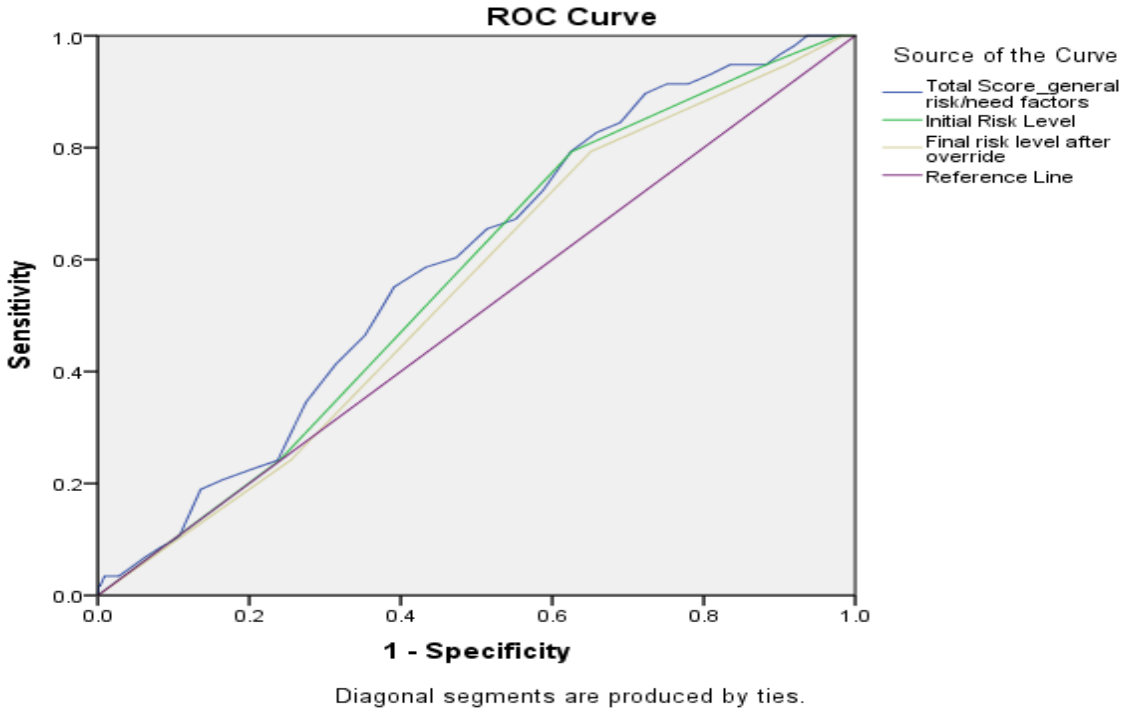


Figure 11.
ROC Curve on DWI Recidivism for the Non-DWI Custody Offenders.



The AUC values for the DWI and non-DWI community offender groups are presented in Table 41. The analysis of general risk/need total score on DWI recidivism produced a ROC of AUC = .585 for DWI community offenders and an AUC = .558 for non-DWI community offenders. The remaining AUC coefficients for the domain scores and other section scores ranged from .542 to .552 for the non-DWI community offenders and from .582 to .588 for the DWI community offenders. Again, the LSI-OR and its subscales were better able to predict DWI recidivism in the DWI community sample than in the non-DWI community sample. Figures 12 and 13 illustrate the ROC curves for the DWI and non-DWI community offender groups.

Table 41.
AUC Values for the DWI and non-DWI community offenders on DWI Recidivism

LSI-OR Variables	**DWI Community Offender** ***AUC* (95% *CI*)**	**Non-DWI Community Offender** ***AUC* (95% *CI*)**
General Risk/Needs	.585 (.531, .638)	.558 (.533, .583)
Initial Risk Level	.588 (.536, .641)	.552 (.527, .578)
Final Risk Level After Override	.582 (.529, .635)	.542 (.516, .568)

Figure 12.
ROC Curve on DWI Recidivism for the DWI Community Offenders.

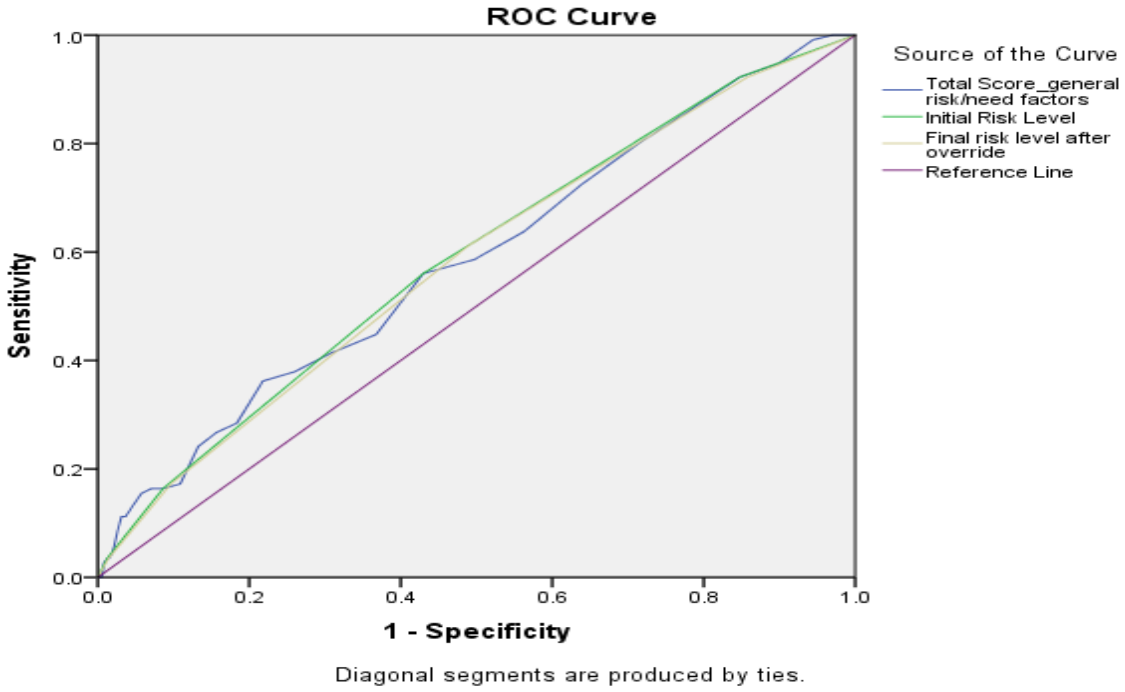
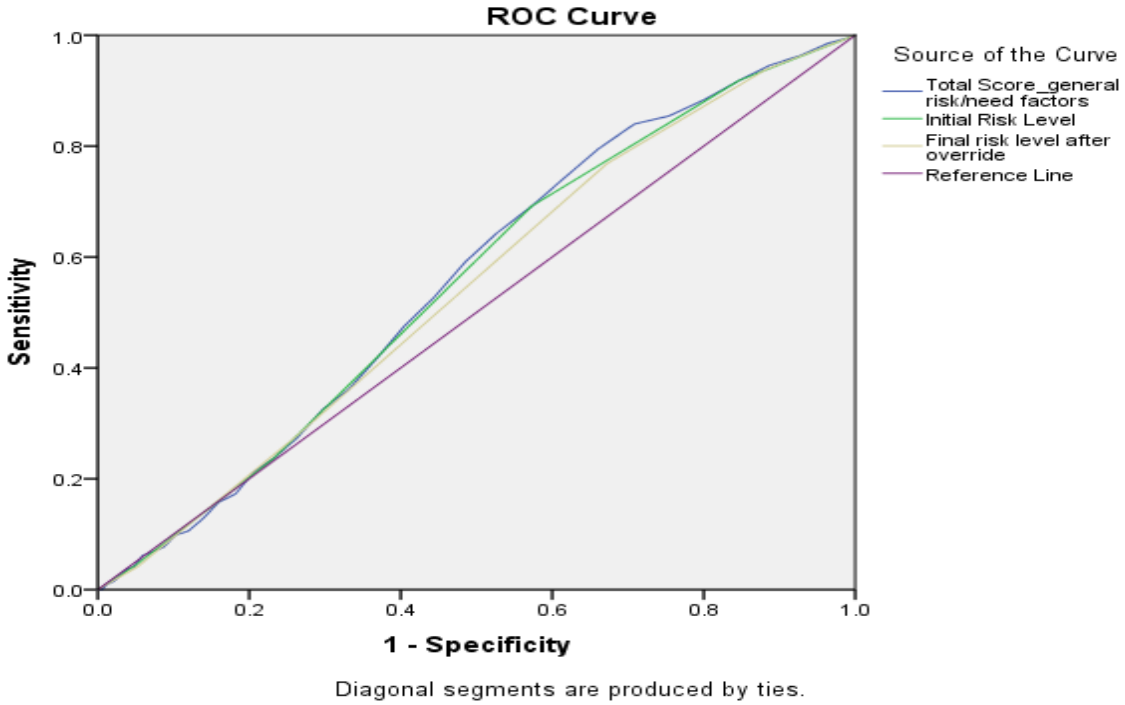


Figure 13.
ROC Curve on DWI Recidivism for the Non-DWI Community Offenders.



Additional ROC Analyses.

Finally, a series of ROC analyses were conducted to examine the number of impaired driving charges received by offenders in their initial sentence on both general and DWI recidivism for all of the DWI and non-DWI offender groups. The AUC values for the offender groups are presented in Table 42. The AUC values were higher or equivalent for general recidivism compared to DWI recidivism for all offender groups, with the exception of the DWI community offenders, indicating that initial impaired driving charges tends to be better able to predict general recidivism. Further, higher AUC values were produced for DWI offenders compared to non-DWI offenders (both overall and in relation to custody- and community-only samples), which suggests that the initial number of impaired driving charges is more effective at predicting recidivism among DWI offenders than non-DWI offenders.

Table 42.
AUC Values for all DWI and non-DWI offender groups on Recidivism

Initial Total Impaired Driving Charges	**Recidivism** ***AUC* (95% *CI*)**	**DWI Recidivism** ***AUC* (95% *CI*)**
DWI Offenders	.525 (.502, .548)	.520 (.471, .569)
Non-DWI Offenders	.500 (.495, .505)	.500 (.474, .526)
DWI Custody Offenders	.522 (.475, .569)	.509 (.403, .615)
Non-DWI Custody Offenders	.500 (.487, .513)	.500 (.425, .575)
DWI Community Offenders	.517 (.49, .543)	.520 (.465, .576)
Non-DWI Community Offenders	.500 (.495, .505)	.500 (.472, .528)

Prediction Models Based on LSI-OR Item Correlations

The DWI offender sample was split using an SPSS function that generates random samples from within the dataset. A random selection of approximately 50% of the sample yielded a construction sample, on which predictor variables were generated and a validation sample, on which the predictor variables were assessed for their predictive validity. A total of eight new variables were created: logistic binary and weighted LSI-OR, MR binary and weighted

LSI-OR, logistic binary and weighted LSI-OR/demographic, and MR binary and weighted LSI-OR/demographic predictor variables, which will be discussed in turn.

An analysis to examine the correlations between the individual items on the LSI-OR and DWI recidivism was conducted on the DWI construction sample. Table 43 presents all of the LSI-OR items that had significant correlations with DWI recidivism in the DWI construction sample. In addition, the correlations between the MCSCS substance abuse variables and DWI recidivism were examined in the construction sample; there were no significant correlations and these variables were dropped from further analyses. As well, correlations between the three demographic variables and DWI recidivism were examined (see Table 43).

Table 43.
LSI-OR Item Correlations and Demographics for the DWI Construction Sample on DWI Recidivism

LSI-OR Item and Demographics	**DWI Recidivism**
A1_1: Any prior y.o. or adult dispositions	.063, p =.004
A1_2: Two or more prior adult/youth dispositions	.052, p = .019
A1_4: Three or more present offences	.080, p < .001
A1_8: Charge laid, probation breached or parole suspended during prior community supervision	.084, p < .001
A7_36: Law violations	.045, p = .040
A7_38: School/work	.049, p = .025
B1_1: Clear problems of compliance (specific conditions)	.091, p < .001
B1_13: Outstanding charges	.116, p < .001
F1_1: Financial problems	.054, p = .015
F1_13: Immigration issues	.066, p = .003
Age	-.029, p = .191
Gender	.005, p = .820
Race	.085, p < .001

LSI-OR Predictor Variables: Stepwise Logistic Regression.

The next analysis to create the logistic binary and weighted LSI-OR predictor variables utilized stepwise logistic regression to identify items that are predictive of DWI recidivism. The four steps and items that were identified as significantly contributing to explaining the variance of DWI recidivism are illustrated in Table 44. These four significant variables were used to compute the two logistic LSI-OR variables.

Table 44.
Stepwise Logistic Regression for LSI-OR Items for the DWI Construction Sample

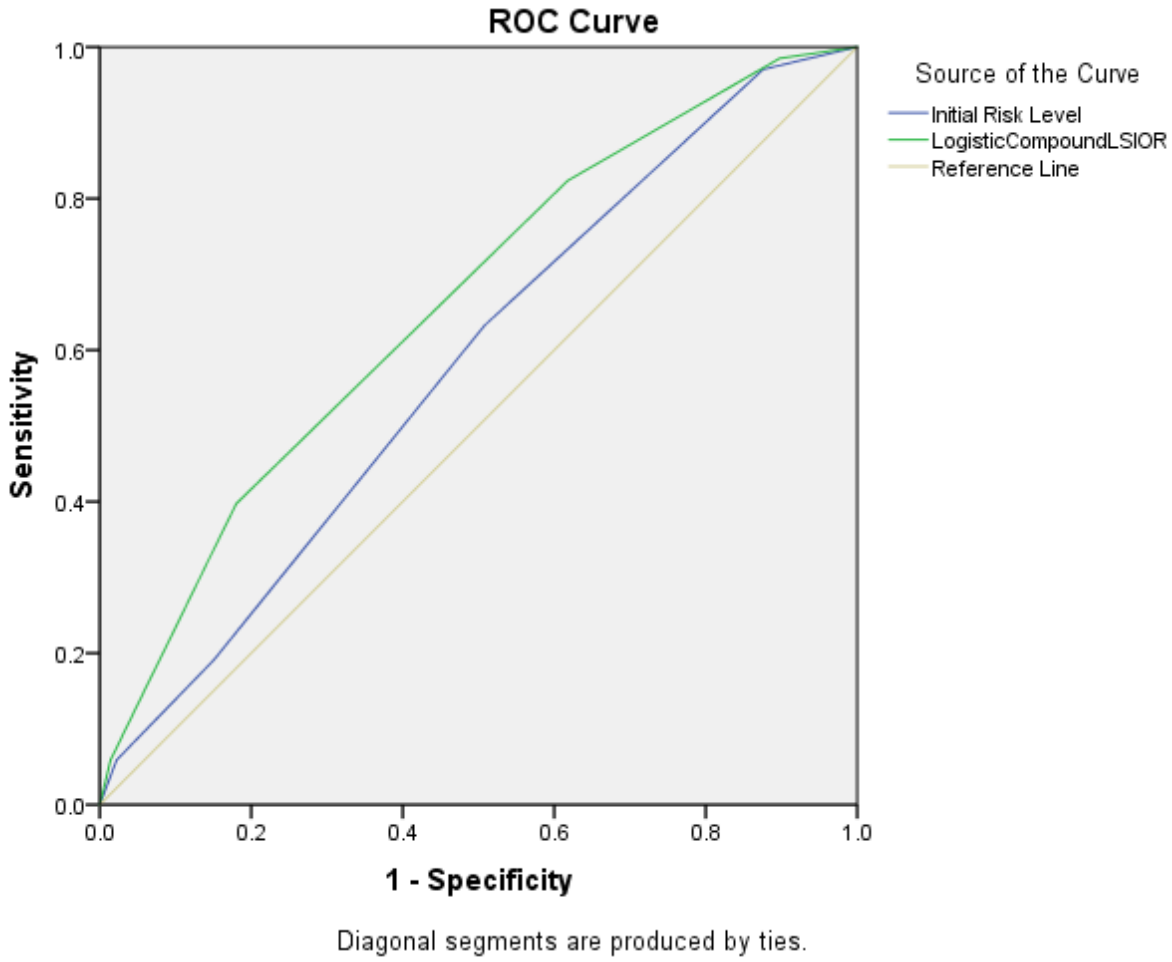
Step Number	LSI-OR Item	*b*	Standard Error (SE)	Wald χ^2	*p*-value	Exp *(β)*
1	A7_36: Law violations	1.131	.101	125.297	.000	3.099
	Constant	-5.626	.084	4478.388	.000	.004
2	B1_13: Outstanding charges	.826	.118	49.011	.000	2.284
	Constant	-5.707	.086	4441.058	.000	.003
3	A1_1: Any prior y.o. or adult dispositions	.547	.119	21.118	.000	1.729
	Constant	-6.021	.115	2753.287	.000	.002
4	A1_1	.591	.12	24.401	.000	1.805
	A7_36	.978	.105	87.358	.000	2.659
	B1_13	.815	.118	47.441	.000	2.259
	F1_1: Financial Problems	-.344	.102	11.403	.001	.709
	Constant	-5.96	.116	2640.457	.000	.003

Correlations and ROC Analyses with the Logistic Binary LSI-OR Predictor Variable.

A correlational analysis between the computed logistic binary LSI-OR variable and DWI recidivism among the DWI construction sample was significant, $r = .109$, $p < .001$. Further, ROC analyses were conducted for the logistic binary LSI-OR variable, LSI-OR initial risk levels,

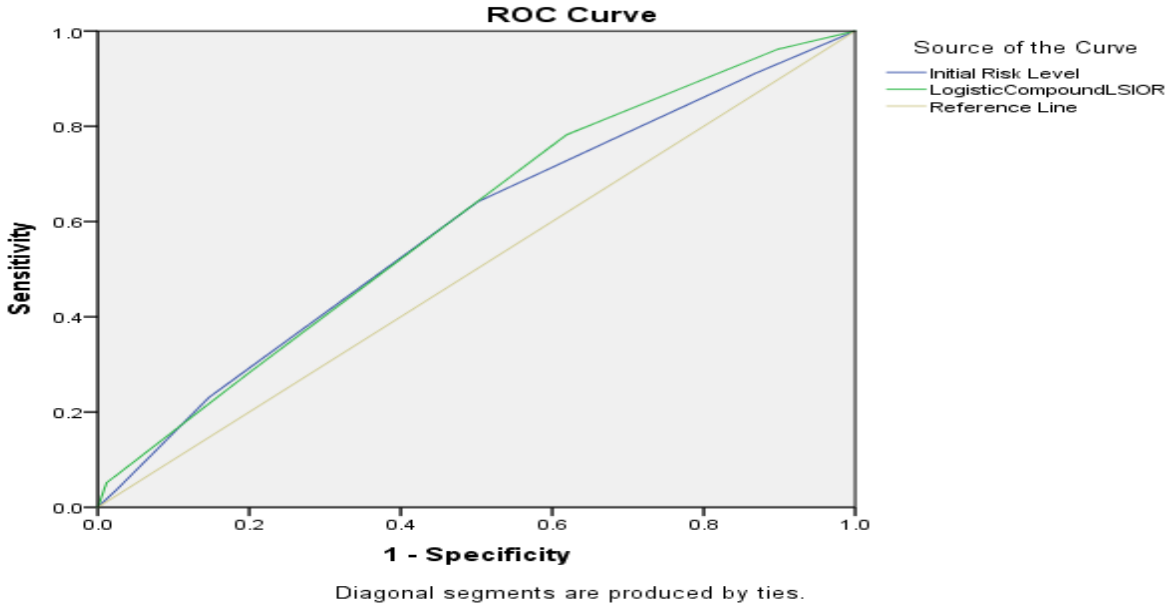
and DWI recidivism. The analysis of the logistic binary LSI-OR variable on DWI recidivism produced a ROC of AUC = .660 (95% *CI* = .596, .724) and a ROC of AUC = .581 (95% *CI* = .517, .645) for the initial risk levels on DWI recidivism for the DWI construction sample. This indicates that the logistic binary LSI-OR variable was better able to predict DWI recidivism in the DWI construction sample than the initial risk levels generated from the LSI-OR. Figure 14 illustrates the ROC curve for the logistic binary LSI-OR variable and the initial risk levels on DWI recidivism.

Figure 14.
ROC Curve on DWI Recidivism for the Logistic Binary LSI-OR Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the logistic binary LSI-OR variable and DWI recidivism among the DWI validation sample was also conducted and was significant, $r = .074$, $p = .001$. ROC analyses were also conducted for the logistic binary LSI-OR variable, initial risk levels, and DWI recidivism. The analysis of the logistic binary variable on DWI recidivism produced a ROC of AUC = .598 (95% *CI* = .537, .659) and a ROC of AUC = .582 (95% *CI* = .517, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The logistic binary LSI-OR variable was slightly better able to predict DWI recidivism in the validation sample than the initial risk levels generated from the LSI-OR. However, the AUC for the logistic binary variable was not as high for the validation sample as it was for the construction sample. Figure 15 presents the ROC curve for the logistic binary variable and the initial risk levels on DWI recidivism.

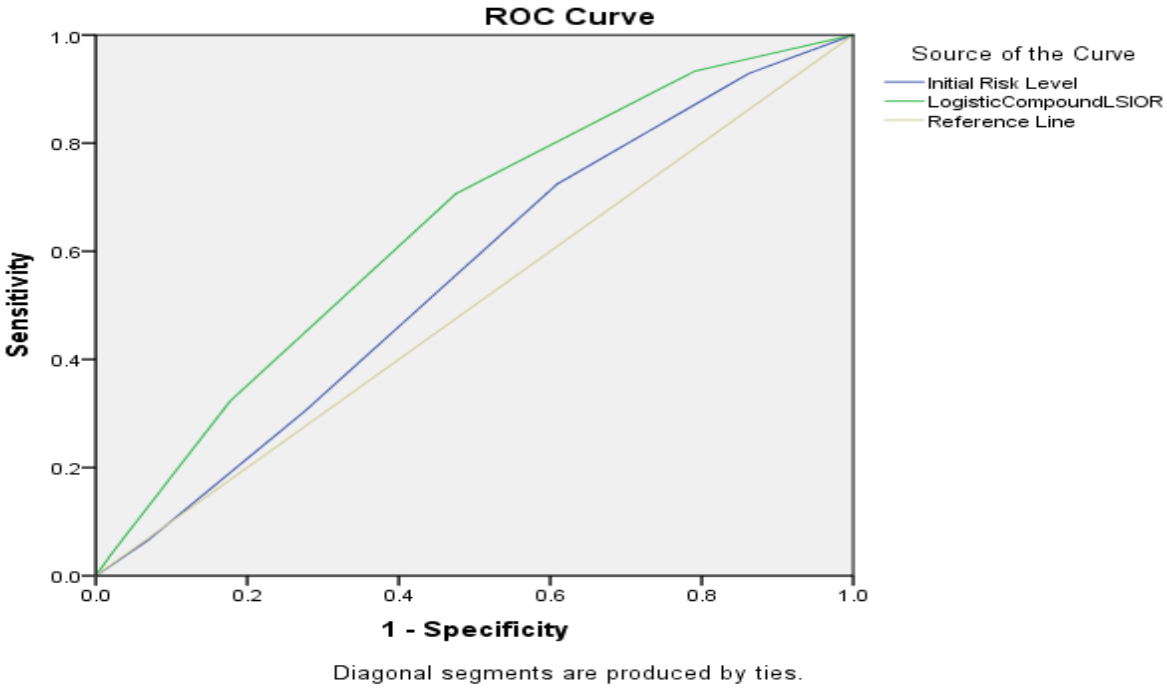
Figure 15.
ROC Curve on DWI Recidivism for the Logistic Binary LSI-OR Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the logistic binary LSI-OR variable and DWI recidivism among the non-DWI sample and was significant, $r = .042$, $p < .001$. As well,

ROC analyses were conducted for the logistic binary variable, initial risk levels, and DWI recidivism. The analysis of the logistic binary variable on DWI recidivism produced a ROC of AUC = .643 (95% *CI* = .619, .667) and a ROC of AUC = .554 (95% *CI* = .53, .578) for the initial risk levels on DWI recidivism for the non-DWI sample. The logistic binary LSI-OR variable was better able to predict DWI recidivism in the non-DWI sample than the initial risk levels generated from the LSI-OR. Figure 16 presents the ROC curve for the logistic binary variable and the initial risk levels on DWI recidivism.

Figure 16.
ROC Curve on DWI Recidivism for the Logistic Binary LSI-OR Variable and Initial Risk Levels – Non-DWI Sample.

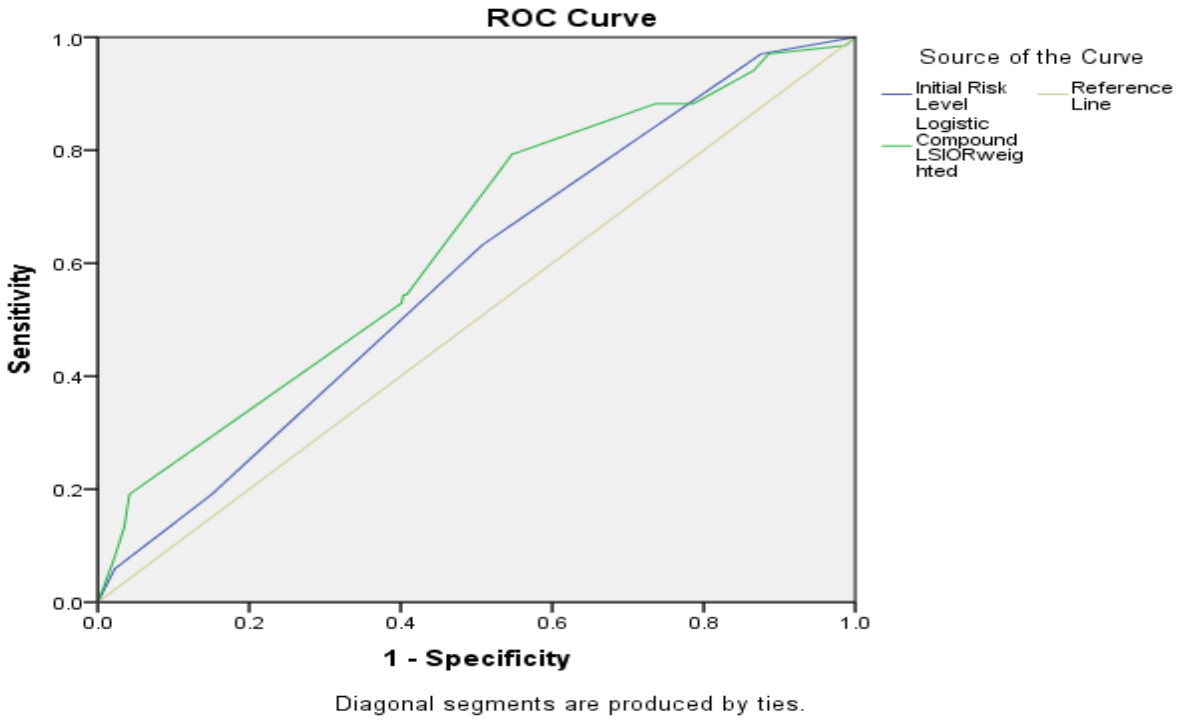


Correlations and ROC Analyses with the Logistic Weighted LSI-OR Predictor Variable.

The weighted version of the logistic LSI-OR predictor variable was also computed. It was weighted using the unstandardized beta coefficients. A correlation between the logistic weighted LSI-OR variable and DWI recidivism among the DWI construction sample was

significant, $r = .088$, $p < .001$. Further, ROC analyses were conducted for the logistic weighted LSI-OR variable, LSI-OR initial risk levels, and DWI recidivism. The analysis of the logistic weighted LSI-OR variable on DWI recidivism produced a ROC of AUC = .636 (95% *CI* = .57, .702) and a ROC of AUC = .581 (95% *CI* = .517, .645) for the initial risk levels on DWI recidivism for the DWI construction sample. The logistic weighted LSI-OR variable was better able to predict DWI recidivism in the construction sample than the initial risk levels generated from the LSI-OR. However, it was slightly less able to predict DWI recidivism than the logistic binary LSI-OR variable. Figure 17 illustrates the ROC curve for the logistic weighted variable and the initial risk levels on DWI recidivism.

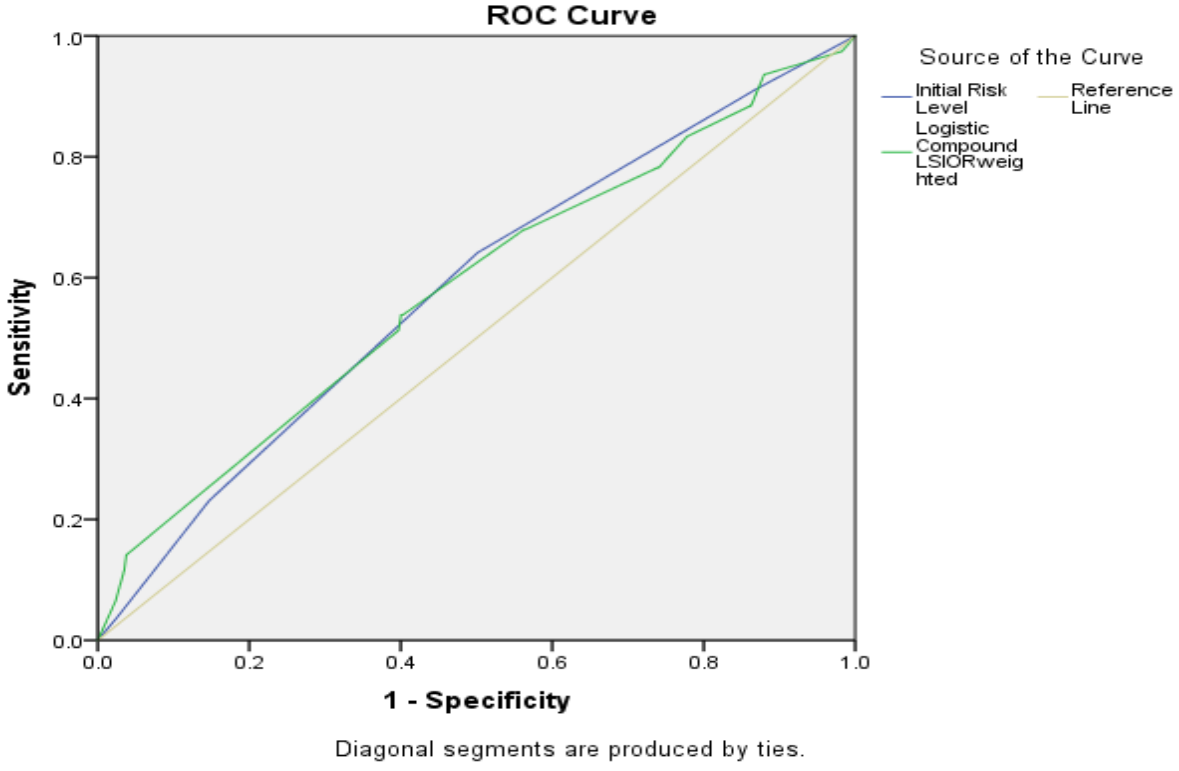
Figure 17.
ROC Curve on DWI Recidivism for the Logistic Weighted LSI-OR Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the logistic weighted LSI-OR variable and DWI recidivism among the DWI validation sample was also found to be significant, $r = .055$, $p = .014$.

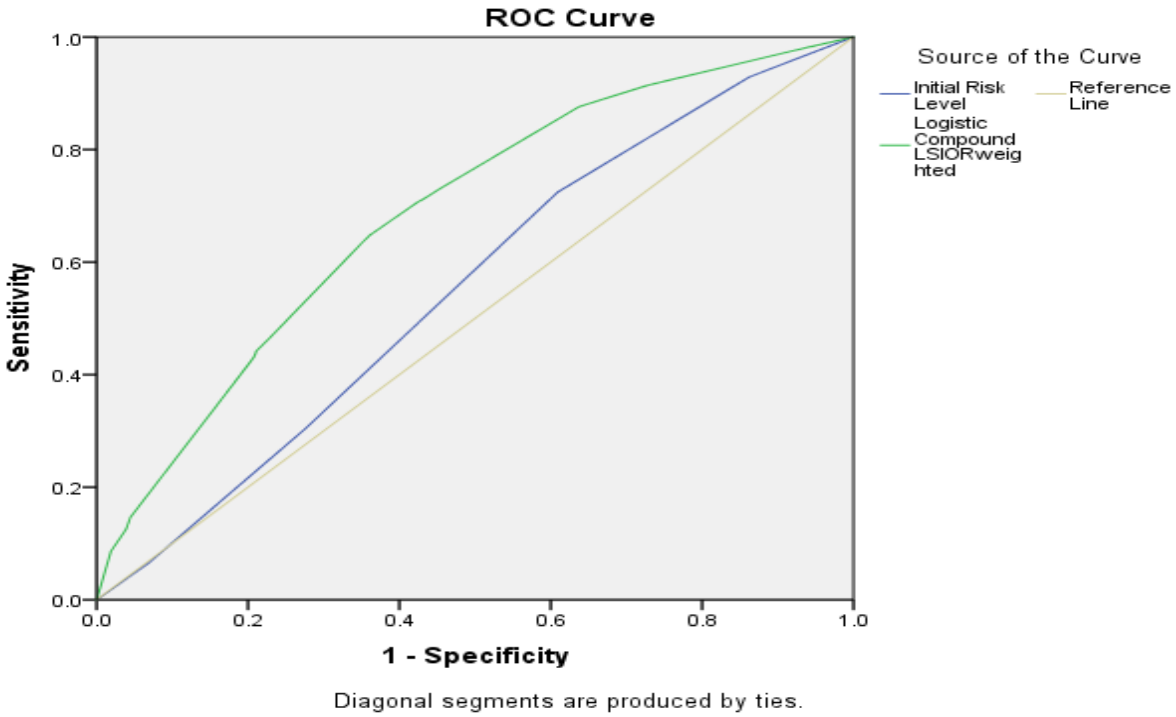
ROC analyses were conducted for the logistic weighted variable, initial risk levels, and DWI recidivism. The analysis of the logistic weighted LSI-OR variable on DWI recidivism produced a ROC of AUC = .584 (95% *CI* = .516, .652) and a ROC of AUC = .582 (95% *CI* = .517, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The logistic weighted LSI-OR variable was nearly equivalent in predicting DWI recidivism in the DWI validation sample as the initial risk levels generated from the LSI-OR. Further, the logistic weighted LSI-OR variable in the validation sample was a poorer predictor of DWI recidivism compared to the DWI construction sample (AUC = .636). It was also a poorer predictor than the logistic binary LSI-OR variable when it was applied to the DWI validation sample (AUC = .598). Figure 18 presents the ROC curve for the logistic weighted LSI-OR variable and the initial risk levels on DWI recidivism.

Figure 18.
ROC Curve on DWI Recidivism for the Logistic Weighted LSI-OR Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the logistic weighted LSI-OR variable and DWI recidivism among the non-DWI sample and was significant, $r = .056$, $p < .001$. As well, ROC analyses were conducted for the logistic weighted LSI-OR variable, initial risk levels, and DWI recidivism. The analysis of the logistic weighted LSI-OR variable on DWI recidivism produced a ROC of AUC = .687 (95% *CI* = .664, .710) and a ROC of AUC = .554 (95% *CI* = .53, .578) for the initial risk levels on DWI recidivism for the non-DWI sample. Again, the logistic weighted LSI-OR variable was better able to predict DWI recidivism in the non-DWI sample than the initial risk levels generated from the LSI-OR. In addition, the logistic weighted variable was better able to predict DWI recidivism than the logistic binary LSI-OR variable and exhibited the strongest predictive power with the non-DWI sample. Figure 19 presents the ROC curve for the logistic weighted LSI-OR variable and the initial risk levels on DWI recidivism.

Figure 19.
ROC Curve on DWI Recidivism for the Logistic Weighted LSI-OR Variable and Initial Risk Levels – Non-DWI Sample.



LSI-OR Predictor Variables: Stepwise Multiple Regression (MR).

An analysis to create the MR binary and weighted LSI-OR predictor variables utilized stepwise MR to identify items that are predictive of DWI recidivism. The four steps and items that were identified as significantly contributing to explaining the variance of DWI recidivism are illustrated in Table 45. These four significant variables were used to compute the two MR LSI-OR variables.

Table 45.
Stepwise Multiple Regression for LSI-OR Items for the DWI Construction Sample

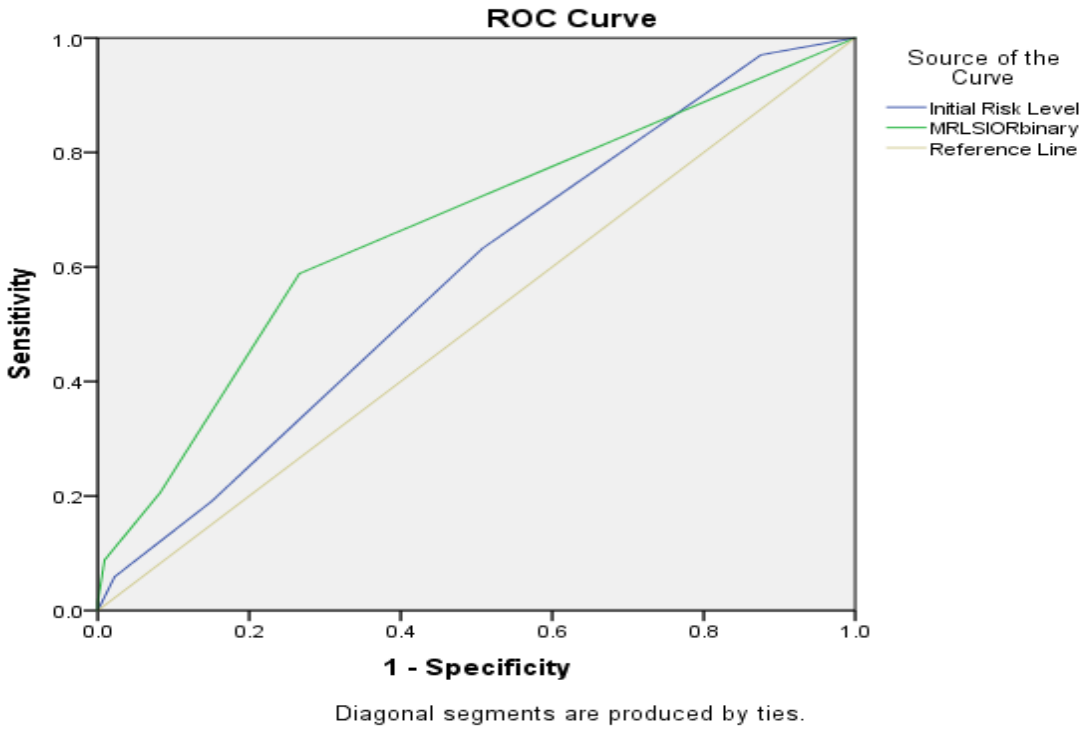
Step Number	LSI-OR Item	*b*	R	Cumulative R Square	R Square Change	Significant F Change
1	B1_13: Outstanding charges	.089	.116	.013	.013	.000
2	B1_1: Clear problems of compliance	.040	.140	.020	.006	.000
3	F1_13: Immigration issues	.088	.153	.023	.004	.006
4	A1_4: Three or more present offences	.024	.159	.025	.002	.041
	Constant	.019				

Correlations and ROC Analyses with the Multiple Regression (MR) Binary LSI-OR Predictor Variable.

A correlational analysis between the computed MR binary LSI-OR variable and DWI recidivism among the DWI construction sample was significant, $r = .143$, $p < .001$. Further, ROC analyses were conducted for the MR binary LSI-OR variable, initial risk levels, and DWI recidivism. The analysis of the MR binary LSI-OR variable on DWI recidivism produced a ROC of AUC = .667 (95% *CI* = .597, .737) and a ROC of AUC = .581 (95% *CI* = .517, .645) for the initial risk levels on DWI recidivism for the DWI construction sample. The MR binary LSI-

OR variable predicted DWI recidivism better than the initial risk levels and slightly better than the alternative logistic binary LSI-OR variable (AUC = .660). Figure 20 illustrates the ROC curve for the MR binary LSI-OR variable and initial risk levels on DWI recidivism.

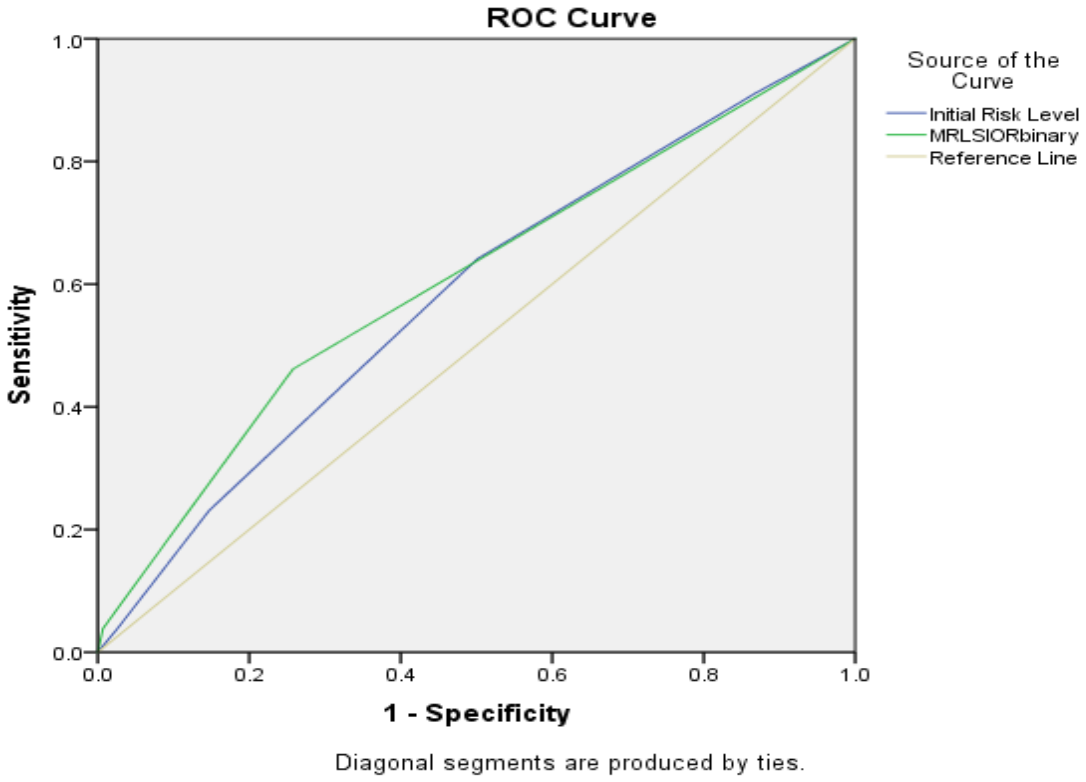
Figure 20.
ROC Curve on DWI Recidivism for the MR Binary LSI-OR Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the MR binary LSI-OR variable and DWI recidivism among the DWI validation sample was also conducted and was significant, $r = .094$, $p < .001$. ROC analyses were also conducted for the MR binary LSI-OR variable, initial risk levels, and DWI recidivism. The analysis of the MR binary variable on DWI recidivism produced a ROC of AUC = .605 (95% *CI* = .537, .674) and a ROC of AUC = .582 (95% *CI* = .517, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The MR binary LSI-OR variable was better able to predict DWI recidivism compared to the initial risk levels. As well, it

was better able to predict DWI recidivism in the DWI construction sample compared to the DWI validation sample and was a better predictor compared to the logistic binary LSI-OR variable. Figure 21 presents the ROC curve for the MR binary variable and initial risk levels on DWI recidivism.

Figure 21.
ROC Curve on DWI Recidivism for the MR Binary LSI-OR Variable and Initial Risk Levels – DWI Validation Sample.

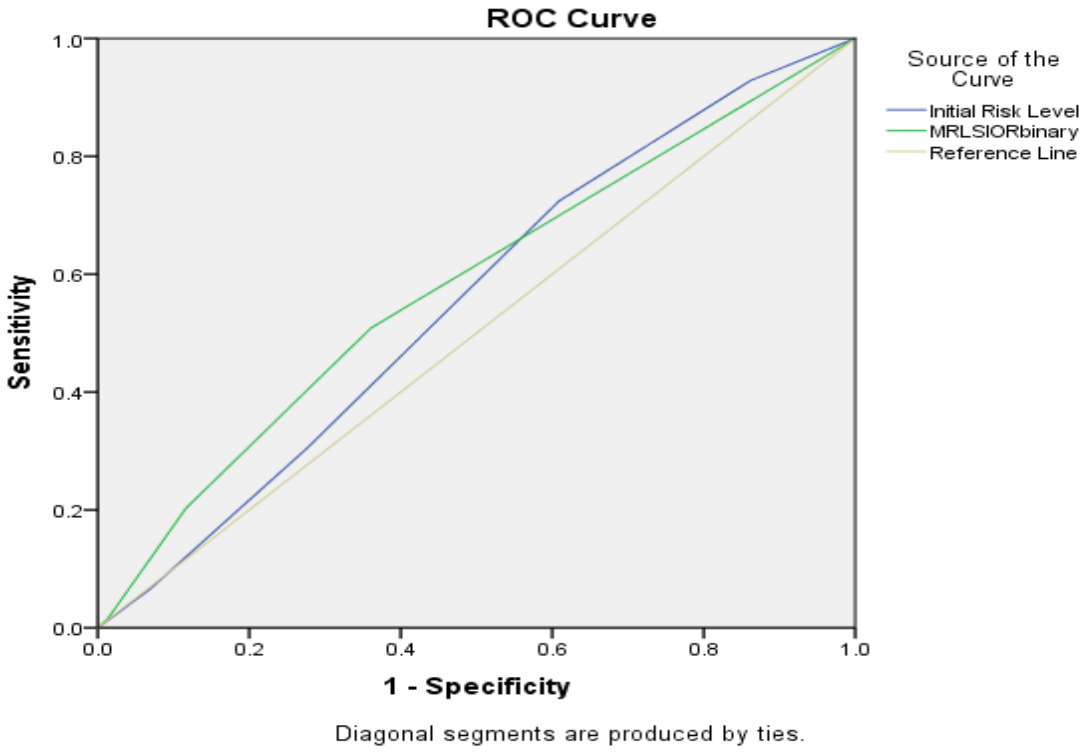


Finally, a correlation was generated between the MR binary LSI-OR variable and DWI recidivism among the non-DWI sample and was significant, $r = .026$, $p < .001$. As well, ROC analyses were conducted for the MR binary LSI-OR variable, initial risk levels, and DWI recidivism. The analysis of the MR binary LSI-OR variable on DWI recidivism produced a ROC of AUC = .580 (95% *CI* = .553, .608) and a ROC of AUC = .554 (95% *CI* = .530, .578) for the initial risk levels on DWI recidivism for the non-DWI sample. The MR binary LSI-OR variable was better able to predict DWI recidivism compared to the initial risk levels. However,

it was worse at predicting DWI recidivism in the non-DWI sample compared to the DWI construction and validation samples. Further, the MR binary variable was a poorer predictor of DWI recidivism than the logistic binary LSI-OR. Figure 22 presents the ROC curve for the MR binary variable and initial risk levels on DWI recidivism.

Figure 22.

Figure 22.
ROC Curve on DWI Recidivism for the MR Binary LSI-OR Variable and Initial Risk Levels – Non-DWI Sample.

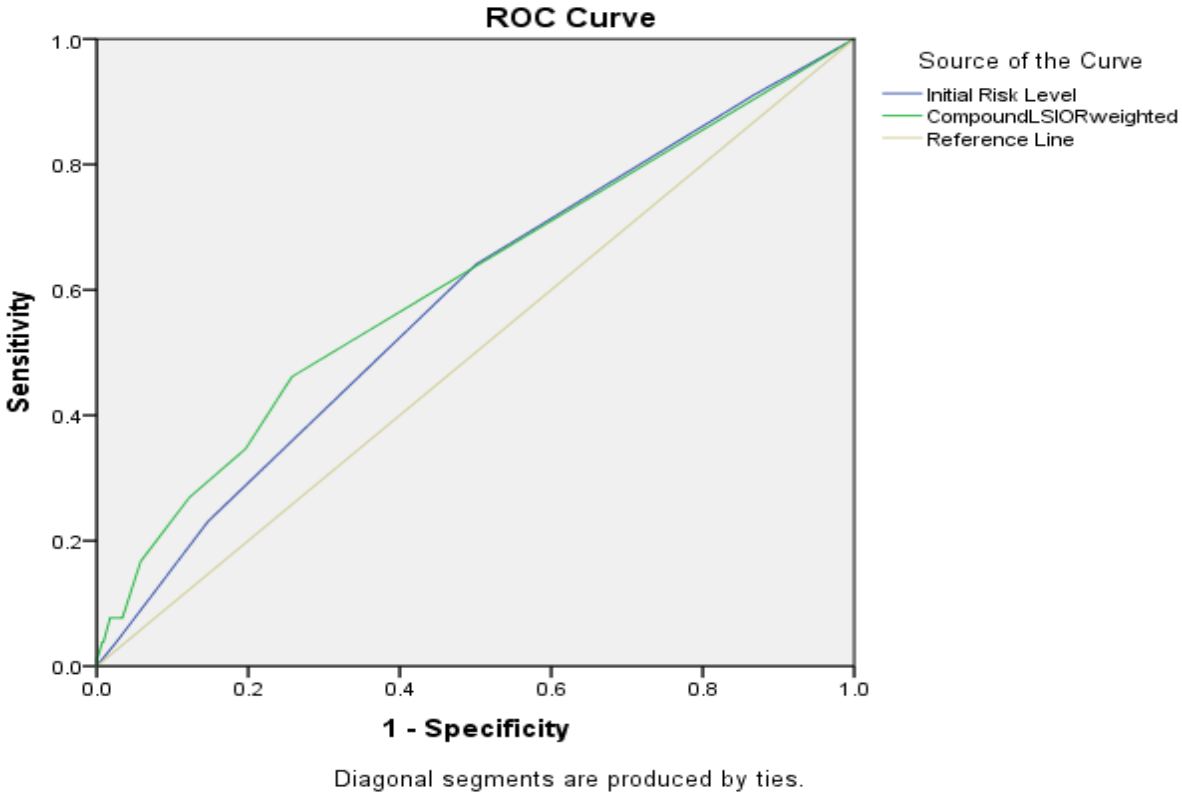


Correlations and ROC Analyses with the MR Weighted LSI-OR Predictor Variable.

The weighted version of the MR LSI-OR predictor variable was also computed. It was weighted using the unstandardized beta coefficients. A correlation between the MR weighted LSI-OR variable and DWI recidivism among the DWI construction sample was significant, r = .109, $p < .001$. Further, ROC analyses were conducted for the MR weighted LSI-OR variable, LSI-OR initial risk levels, and DWI recidivism. The analysis of the MR weighted LSI-OR

variable on DWI recidivism produced a ROC of AUC = .609 (95% *CI* = .540, .678) and a ROC of AUC = .582 (95% *CI* = .517, .647) for the initial risk levels on DWI recidivism for the DWI construction sample. Thus, the MR weighted LSI-OR variable was better able to predict DWI recidivism in the DWI construction sample than the initial risk levels generated from the LSI-OR. However, it was worse at predicting DWI recidivism than the MR binary LSI-OR variable. Figure 23 illustrates the ROC curve for the MR weighted LSI-OR variable and the initial risk levels on DWI recidivism.

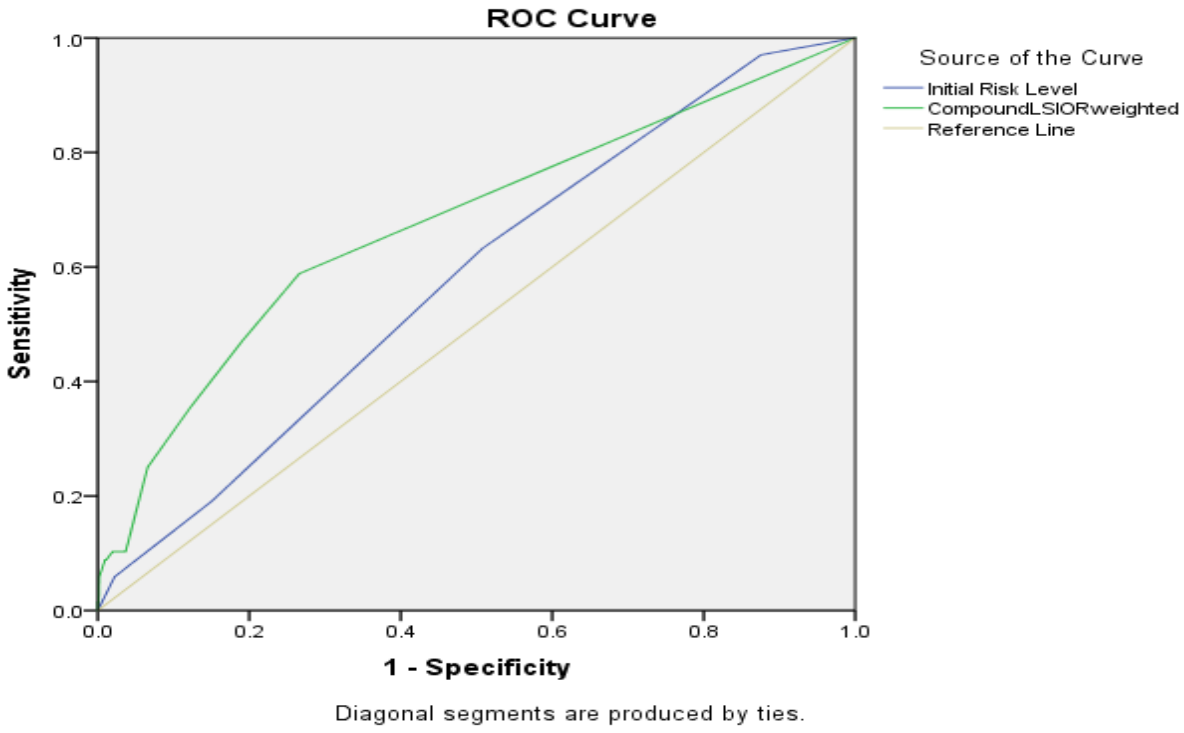
Figure 23.
ROC Curve on DWI Recidivism for the MR Weighted LSI-OR Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the MR weighted LSI-OR variable and DWI recidivism among the DWI validation sample was also found to be significant, $r = .159$, $p < .001$. ROC analyses were conducted for the MR weighted variable, initial risk levels, and DWI recidivism.

The analysis of the MR weighted LSI-OR variable on DWI recidivism produced a ROC of AUC = .676 (95% *CI* = .605, .748) and a ROC of AUC = .581 (95% *CI* = .517, .645) for the initial risk levels on DWI recidivism for the DWI validation sample. The MR weighted LSI-OR variable was much better at predicting DWI recidivism in the validation sample compared to the initial risk levels generated from the LSI-OR. As well, it was better able to predict DWI recidivism than the MR weighted variable for the DWI construction sample (AUC = .609) and the MR binary LSI-OR variable in the DWI validation sample (AUC = .605). Figure 24 presents the ROC curve for the MR weighted LSI-OR variable and the initial risk levels on DWI recidivism.

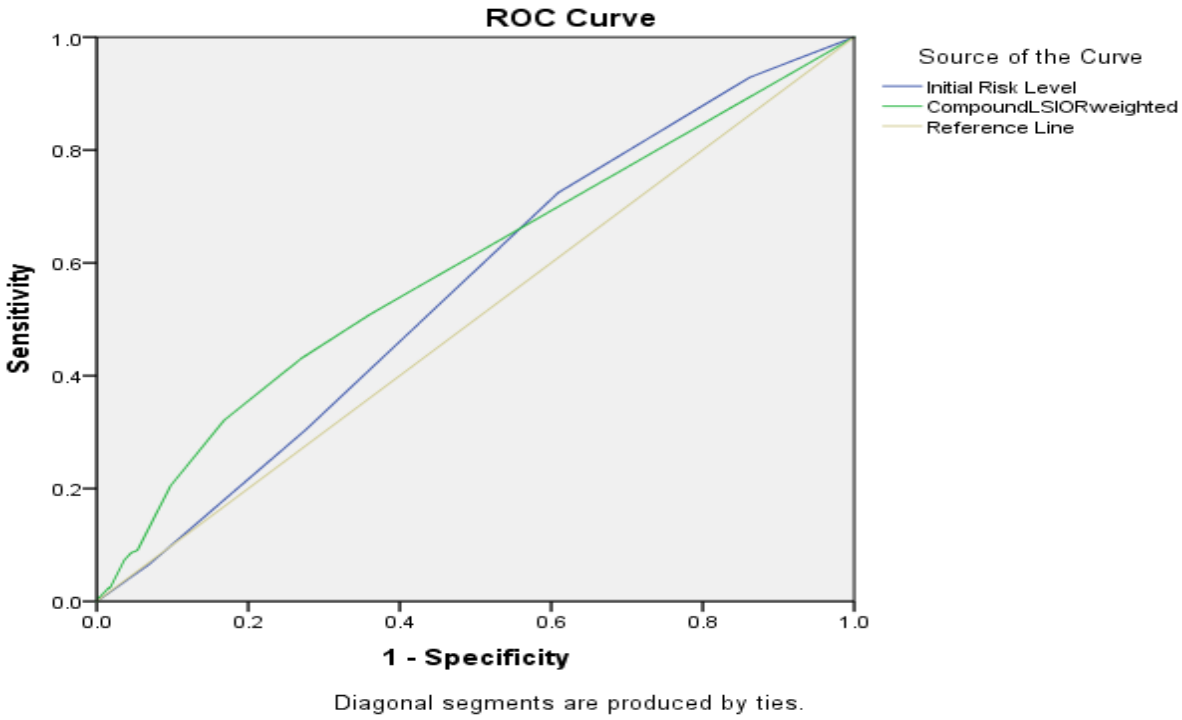
Figure 24.
ROC Curve on DWI Recidivism for the MR Weighted LSI-OR Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the MR weighted LSI-OR variable and DWI recidivism among the non-DWI sample and was significant, $r = .032$, $p < .001$. As well, ROC analyses were conducted for the MR weighted LSI-OR variable, initial risk levels, and DWI

recidivism. The analysis of the MR weighted LSI-OR variable on DWI recidivism produced a ROC of AUC = .591 (95% *CI* = .563, .619) and a ROC of AUC = .554 (95% *CI* = .53, .578) for the initial risk levels on DWI recidivism for the non-DWI sample. The MR weighted LSI-OR variable was slightly better able to predict DWI recidivism in the non-DWI sample than the initial risk levels generated from the LSI-OR. In addition, the MR weighted variable was better able to predict DWI recidivism than the MR binary LSI-OR variable. Figure 25 presents the ROC curve for the MR weighted LSI-OR variable and the initial risk levels on DWI recidivism.

Figure 25.
ROC Curve on DWI Recidivism for the MR Weighted LSI-OR Variable and Initial Risk Levels – Non-DWI Sample.



LSI-OR/Demographic Predictor Variables: Stepwise Logistic Regression.

Analyses to create logistic binary and weighted LSI-OR/demographic variables utilizing stepwise logistic regression to identify LSI-OR items and demographic variables that are predictive of DWI recidivism were also performed. The previously mentioned significant LSI-

OR items (i.e., A1_1: Any prior y.o. or adult dispositions; A7_36: Law violations; B1_13: Outstanding charges; F1_1: Financial problems) were used along with three demographic variables (i.e., gender, age, and race). The three steps and items that were identified as significantly contributing to explaining the variance of DWI recidivism are illustrated in Table 46. The significant variables that emerged in the equation included outstanding charges, any prior dispositions, and race. These three significant variables were used to compute logistic binary and weighted LSI-OR/demographic variables.

Table 46.
Stepwise Logistic Regression for LSI-OR/Demographic Variables for the DWI Construction Sample

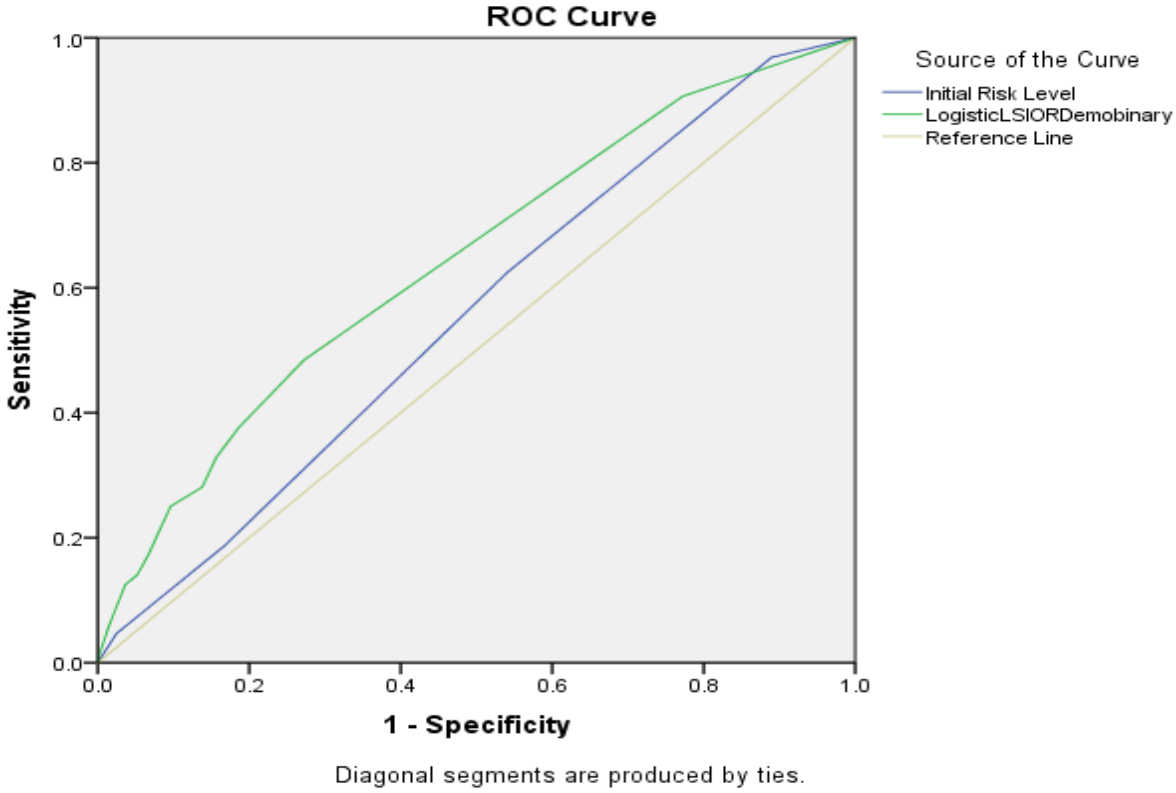
Step Number	LSI-OR Item	*b*	Standard Error (SE)	Wald χ^2	*p*-value	Exp *(β)*
1	B1_13: Outstanding charges	1.353	.337	16.15	.000	3.867
	Constant	-3.463	.141	604.555	.000	.031
2	Race	.141	.042	11.134	.001	1.151
	Constant	-3.815	.19	405.289	.000	.022
3	A1_1: Any prior y.o. or adult dispositions	.829	.338	6.025	.014	2.291
	B1_13	1.243	.342	13.239	.000	3.467
	Race	.144	.042	11.823	.001	1.155
	Constant	-4.441	.336	174.336	.000	.012

Correlations and ROC Analyses with the Logistic Binary LSI-OR/Demographic Predictor Variable.

A correlational analysis between the logistic binary LSI-OR/demographic variable and DWI recidivism among the DWI construction sample was significant, $r = .105$, $p < .001$. Further, ROC analyses were conducted for the logistic binary LSI-OR/demographic variable, LSI-OR initial risk levels, and DWI recidivism. The analysis of the logistic binary LSI-

OR/demographic variable on DWI recidivism produced a ROC of AUC = .642 (95% *CI* = .572, .712) and a ROC of AUC = .555 (95% *CI* = .488, .622) for the initial risk levels on DWI recidivism for the DWI construction sample. This indicates that the logistic binary LSI-OR/demographic variable was better able to predict DWI recidivism in the construction sample than the initial risk levels generated from the LSI-OR. Figure 26 illustrates the ROC curve for the logistic binary LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

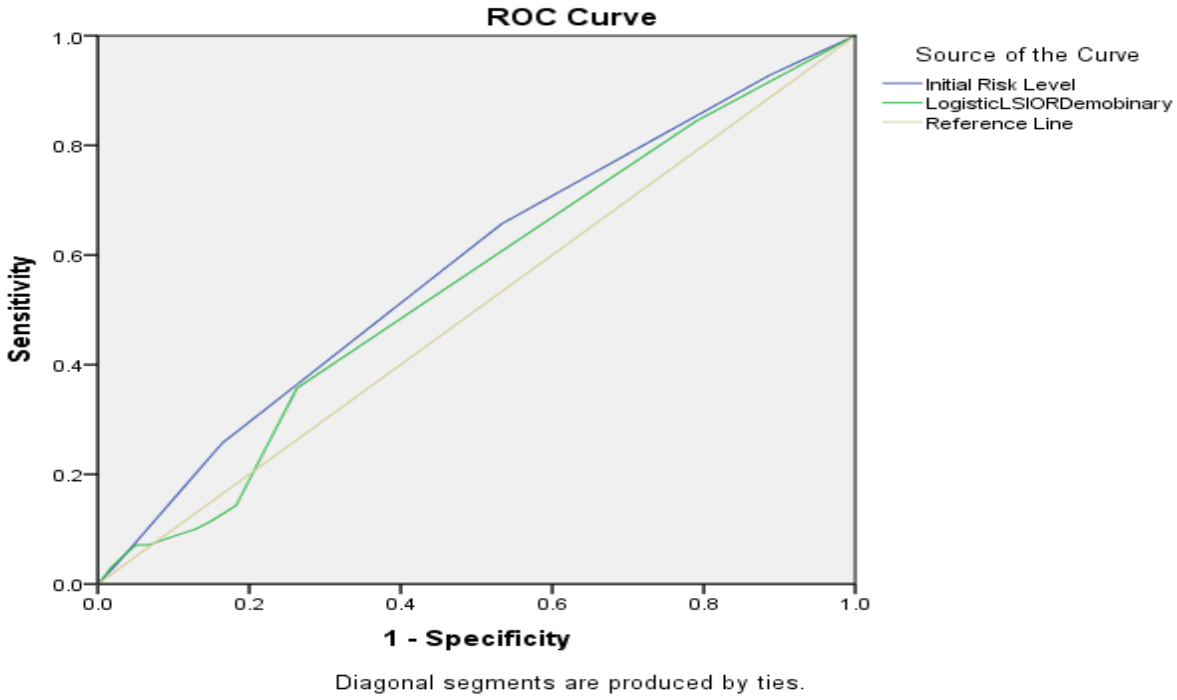
Figure 26.
ROC Curve on DWI Recidivism for the Logistic Binary LSI-OR/Demographic Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the logistic binary LSI-OR/demographic variable and DWI recidivism among the DWI validation sample was also conducted. This was not significant, $r = .007$, $p = .756$. ROC analyses were also conducted for the logistic binary LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the logistic

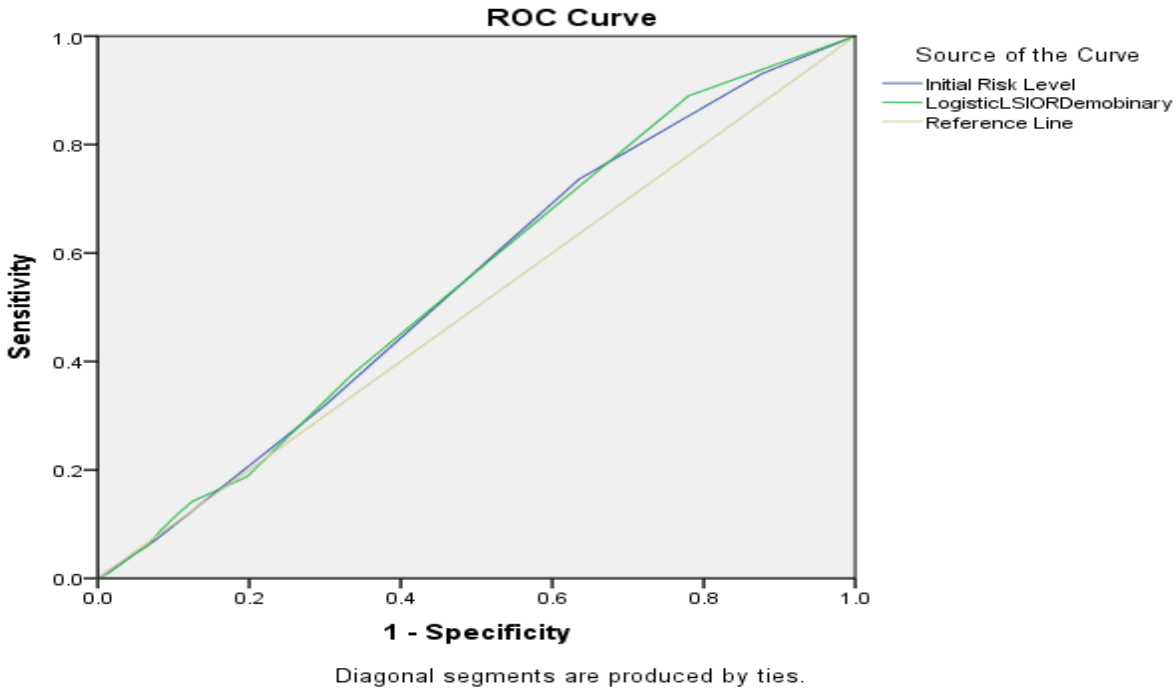
binary LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .545 (95% *CI* = .479, .612) and a ROC of AUC = .579 (95% *CI* = .510, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The initial risk levels generated from the LSI-OR were slightly better able to predict DWI recidivism in the DWI validation sample than the logistic binary LSI-OR/demographic variable. In fact, the logistic binary LSI-OR/demographic variable had a confidence level that was below .5 and, therefore, it is not a significant predictor of DWI recidivism. Figure 27 presents the ROC curve for the logistic binary LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

Figure 27.
ROC Curve on DWI Recidivism for the Logistic Binary LSI-OR/Demographic Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the logistic binary LSI-OR/demographic variable and DWI recidivism among the non-DWI sample and was found to be non-significant, r = .006, p = .135. As well, ROC analyses were conducted for the logistic binary LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the logistic binary LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .548 (95% *CI* = .524, .573) and a ROC of AUC = .543 (95% *CI* = .518, .568) for the initial risk levels on DWI recidivism for the non-DWI sample. The logistic binary LSI-OR/demographic variable was only slightly better able to predict DWI recidivism in the non-DWI sample than the initial risk levels generated from the LSI-OR. However, both were weak predictors. Figure 28 presents the ROC curve for the logistic binary LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

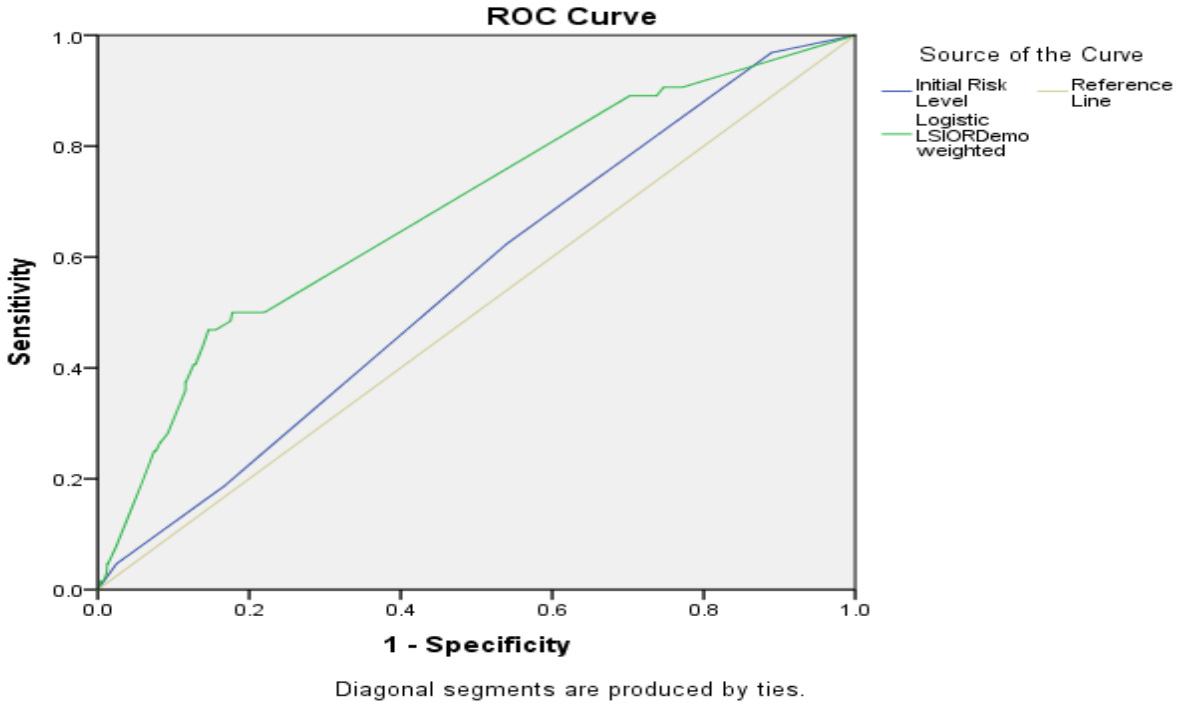
Figure 28.
ROC Curve on DWI Recidivism for the Logistic Binary LSI-OR/Demographic Variable and Initial Risk Levels – Non-DWI Sample.



Correlations and ROC Analyses with the Logistic Weighted LSI-OR/ Demographic Predictor Variable.

The weighted version of the LSI-OR/demographic predictor variable was also computed. It was weighted using the unstandardized beta coefficients. A correlation between the logistic weighted LSI-OR/demographic variable and DWI recidivism among the DWI construction sample was significant, $r = .137$, $p < .001$. Further, ROC analyses were conducted for the logistic weighted LSI-OR/demographic variable, LSI-OR initial risk levels, and DWI recidivism. The analysis of the logistic weighted LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .685 (95% *CI* = .616, .755) and a ROC of AUC = .555 (95% *CI* = .488, .622) for the initial risk levels on DWI recidivism for the DWI construction sample. This indicates that the logistic weighted LSI-OR/demographic variable was much better at predicting DWI recidivism in the DWI construction sample than the initial risk levels generated from the LSI-OR. Further, the logistic weighted LSI-OR/demographic variable was better able to predict DWI recidivism compared to the logistic binary LSI-OR/demographic variable. Figure 29 illustrates the ROC curve for the logistic weighted LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

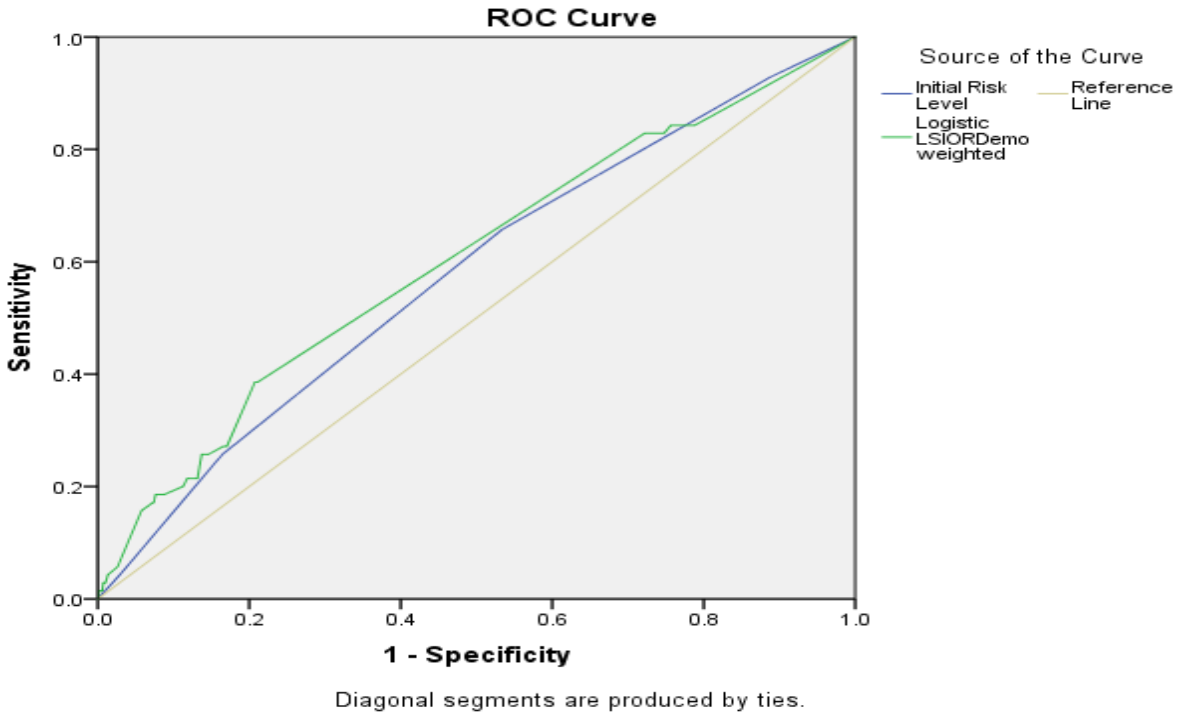
Figure 29.
ROC Curve on DWI Recidivism for the Logistic Weighted LSI-OR/Demographic Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the logistic weighted LSI-OR/demographic variable and DWI recidivism among the DWI validation sample was also conducted and found to be significant, $r = .074$, $p = .002$. In addition, ROC analyses were conducted for the logistic weighted LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the logistic weighted LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .603 (95% *CI* = .532, .673) and a ROC of AUC = .579 (95% *CI* = .51, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The logistic weighted LSI-OR/demographic variable was better at predicting DWI recidivism in the DWI validation sample compared to the initial risk levels generated from the LSI-OR. It also outperformed the logistic binary LSI-OR/demographic variable; however, it did not predict as well for the DWI validation

sample as it did for the DWI construction sample. Figure 30 presents the ROC curve for the logistic weighted LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

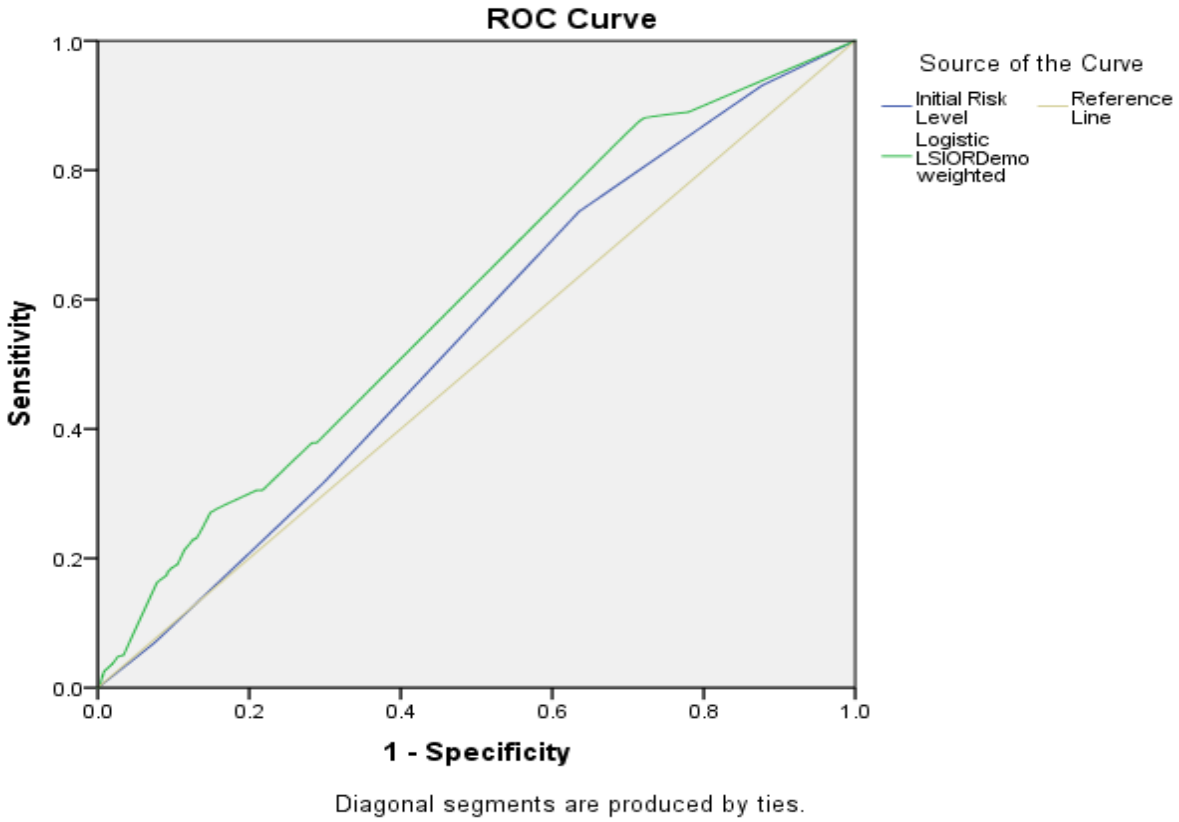
Figure 30.
ROC Curve on DWI Recidivism for the Logistic Weighted LSI-OR/Demographic Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the logistic weighted LSI-OR/demographic variable and DWI recidivism among the non-DWI sample and was significant, $r = .034$, $p < .001$. ROC analyses were also conducted for the logistic weighted LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the logistic weighted LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .598 (95% *CI* = .572, .624) and a ROC of AUC = .543 (95% *CI* = .518, .568) for the initial risk levels on DWI recidivism for the non-DWI sample. Again, the logistic weighted LSI-OR/demographic variable was only slightly better able to predict DWI recidivism in the non-DWI sample than the initial

risk levels generated from the LSI-OR. Figures 31 presents the ROC curve for the logistic weighted LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

Figure 31.
ROC Curve on DWI Recidivism for the Logistic Weighted LSI-OR/Demographic Variable and Initial Risk Levels – Non-DWI Sample.



LSI-OR/Demographic Predictor Variables: Stepwise Multiple Regression.

An analysis to create the MR binary and weighted LSI-OR/demographic predictor variables utilized stepwise MR to identify items that are predictive of DWI recidivism. The four steps and items that were identified as significantly contributing to explaining the variance of DWI recidivism are illustrated in Table 47. These four significant variables were used to compute the two MR LSI-OR/demographic variables.

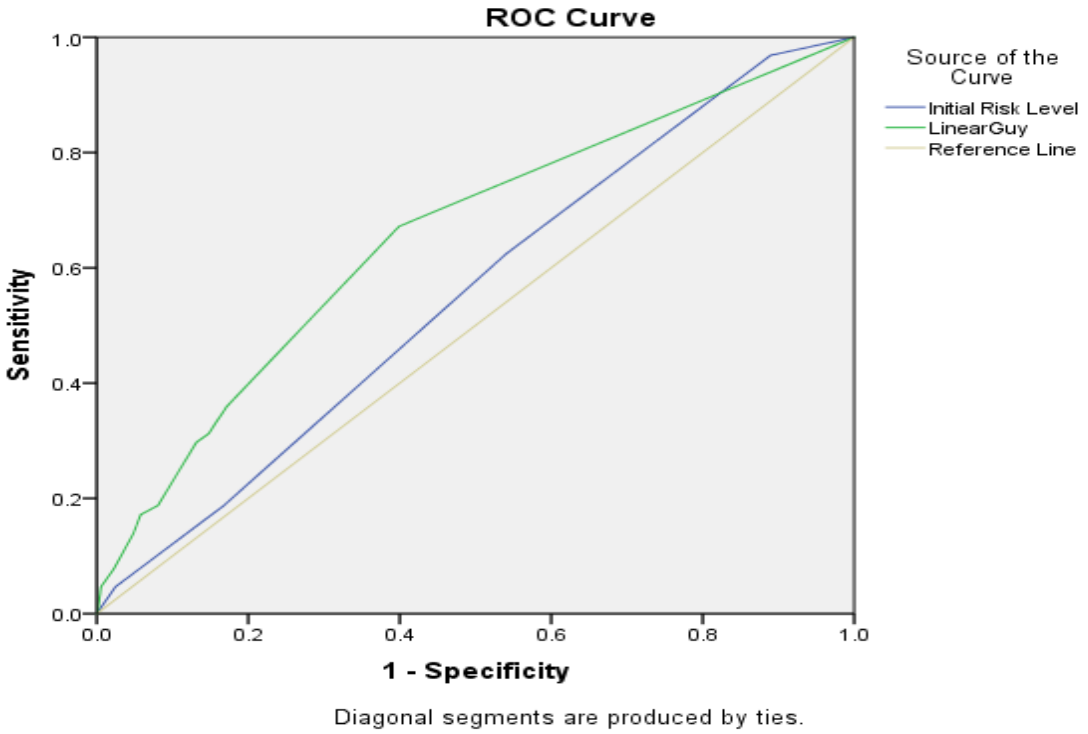
Table 47.
Stepwise Multiple Regression for LSI-OR/Demographic Items for the DWI Construction Sample

Step Number	LSI-OR Item	*b*	R	Cumulative R Square	R Square Change	Significant F Change
1	B1_13: Outstanding charges	.078	.101	.010	.010	.000
2	Race	.007	.130	.017	.007	.000
3	B1_1: Clear problems of compliance	.037	.150	.022	.006	.001
4	F1_13: Immigration issues	.088	.160	.026	.003	.012
	Constant	.011				

Correlations and ROC Analyses with the Multiple Regression (MR) Binary LSI-OR/Demographic Predictor Variable.

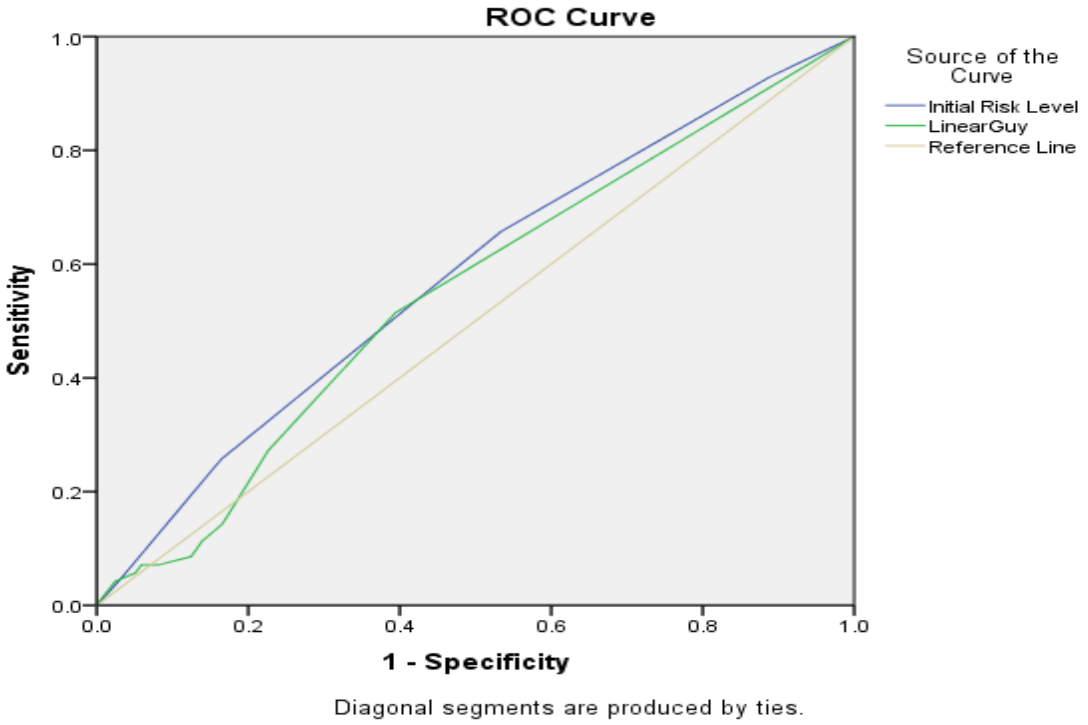
A correlational analysis between the computed MR binary LSI-OR/demographic variable and DWI recidivism among the DWI construction sample was significant, $r = .109$, $p < .001$. Further, ROC analyses were conducted for the MR binary LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the MR binary LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .654 (95% *CI* = .584, .725) and a ROC of AUC = .555 (95% *CI* = .488, .622) of the initial risk levels on DWI recidivism for the DWI construction sample. The MR binary LSI-OR/demographic variable predicted DWI recidivism much better than the initial risk levels and slightly better than the logistic binary LSI-OR/demographic variable (AUC = .642). Figure 32 illustrates the ROC curve for the MR binary LSI-OR/demographic variable and initial risk levels on DWI recidivism.

Figure 32.
ROC Curve on DWI Recidivism for the MR Binary LSI-OR/Demographic Variable and Initial Risk Levels – DWI Construction Sample.



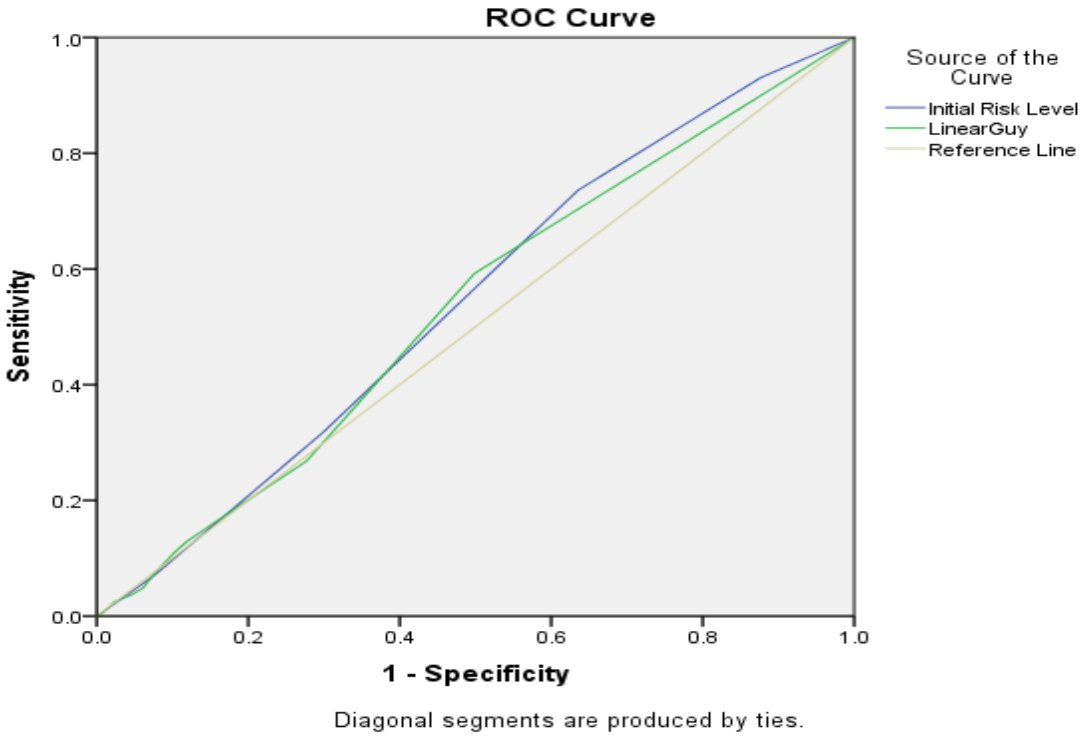
A correlational analysis between the MR binary LSI-OR/demographic variable and DWI recidivism among the DWI validation sample was also conducted and was not significant, r = .009, p = .699. ROC analyses were also conducted for the MR binary LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the MR binary LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .549 (95% *CI* = .482, .616) and a ROC of AUC = .579 (95% *CI* = .510, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The MR binary LSI-OR/demographic variable was worse at predicting DWI recidivism compared to the initial risk levels and the MR binary LSI-OR/demographic variable in the DWI construction sample. Figure 33 presents the ROC curve for the MR binary LSI-OR/demographic variable and initial risk levels on DWI recidivism.

Figure 33.
ROC Curve on DWI Recidivism for the MR Binary LSI-OR/Demographic Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the MR binary LSI-OR/demographic variable and DWI recidivism among the non-DWI sample and was not significant, $r = .003$, $p = .447$. As well, ROC analyses were conducted for the MR binary LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the MR binary LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .533 (95% *CI* = .507, .559) and a ROC of AUC = .543 (95% *CI* = .518, .568) for the initials risk levels on DWI recidivism for the non-DWI sample. The initial risk levels were slightly better at predicting DWI recidivism in the non-DWI sample compared to the MR binary LSI-OR/demographic variable. Also, the logistic binary LSI-OR/demographic variable was slightly better able to predict DWI recidivism compared to the MR binary LSI-OR/demographic variable. Figure 34 portrays the ROC curve for the MR binary LSI-OR/demographic variable and initial risk levels on DWI recidivism.

Figure 34.
ROC Curve on DWI Recidivism for the MR Binary LSI-OR/Demographic Variable and Initial Risk Levels – Non-DWI Sample.

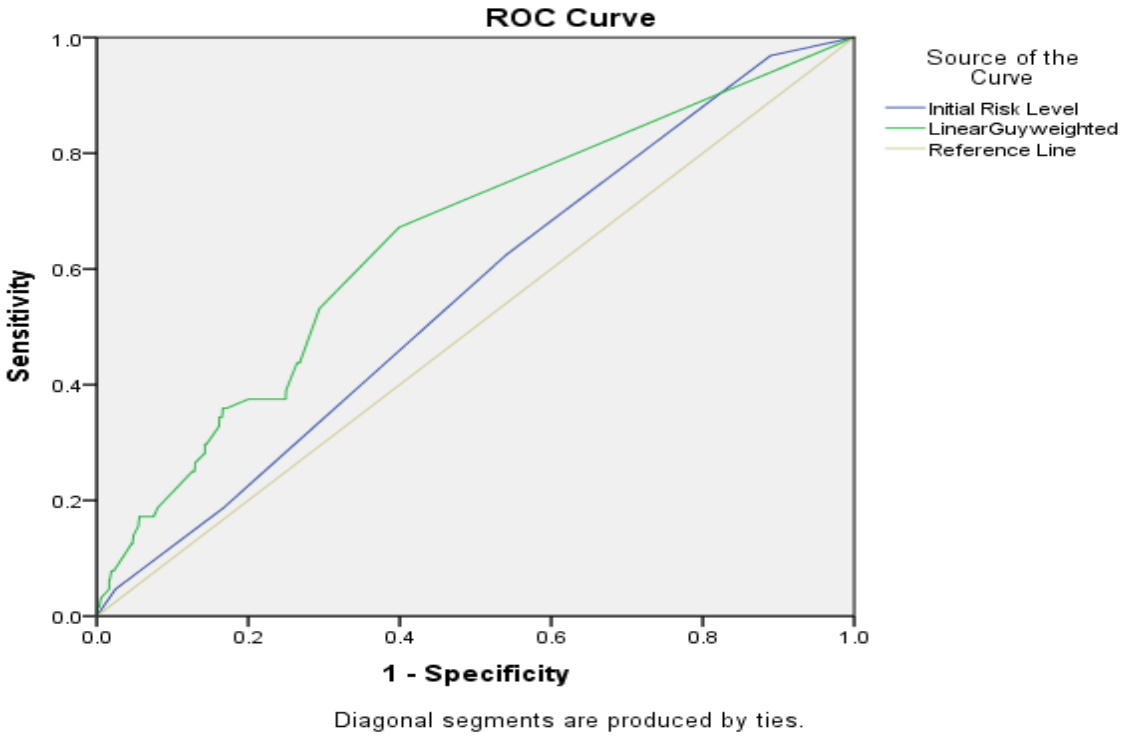


Correlations and ROC Analyses with the MR Weighted LSI-OR/Demographic Predictor Variable.

The weighted version of the MR LSI-OR/demographic predictor variable was also computed. It was weighted using the unstandardized beta coefficients. A correlation between the MR weighted LSI-OR/demographic variable and DWI recidivism among the DWI construction sample was significant, $r = .086$, $p < .001$. Further, ROC analyses were conducted for the MR weighted LSI-OR/demographic variable, LSI-OR initial risk levels, and DWI recidivism. The analysis of the MR weighted LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .648 (95% *CI* = .578, .718) and a ROC of AUC = .555 (95% *CI* = .488, .622) for the initial risk levels on DWI recidivism for the DWI construction sample. This portrays that the MR weighted LSI-OR/demographic variable was much better able to predict

DWI recidivism in the DWI construction sample than the initial risk levels generated from the LSI-OR. However, it was a slightly poorer predictor of DWI recidivism than the MR binary LSI-OR/demographic variable. Figure 35 illustrates the ROC curve for the MR weighted LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

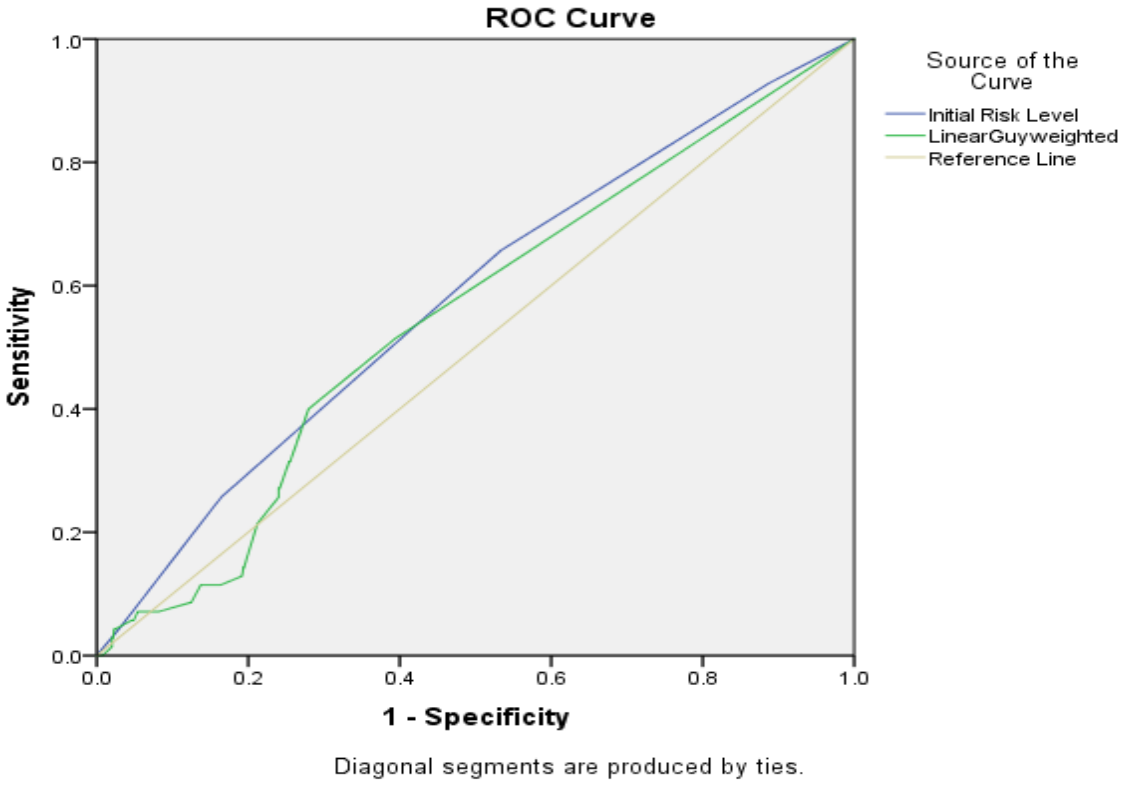
Figure 35.
ROC Curve on DWI Recidivism for the MR Weighted LSI-OR/Demographic Variable and Initial Risk Levels – DWI Construction Sample.



A correlational analysis between the MR weighted LSI-OR/demographic variable and DWI recidivism among the DWI validation sample was not significant, r = -.010, p = .677. ROC analyses were conducted for the MR weighted LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the MR weighted LSI-OR/demographic variable on DWI recidivism produced a ROC of AUC = .549 (95% *CI* = .483, .616) and a ROC of AUC = .579 (95% *CI* = .510, .647) for the initial risk levels on DWI recidivism for the DWI validation sample. The initial risk levels generated from the LSI-OR were slightly better in predicting DWI

recidivism in the validation sample compared to the MR weighted LSI-OR/demographic variable. As well, the MR weighted LSI-OR/demographic variable was worse at predicting DWI recidivism in the DWI validation sample compared to the DWI construction sample (AUC = .648) and was equivalent to the MR binary LSI-OR/demographic variable in the DWI validation sample (AUC = .549). Figure 36 presents the ROC curve for the MR weighted LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

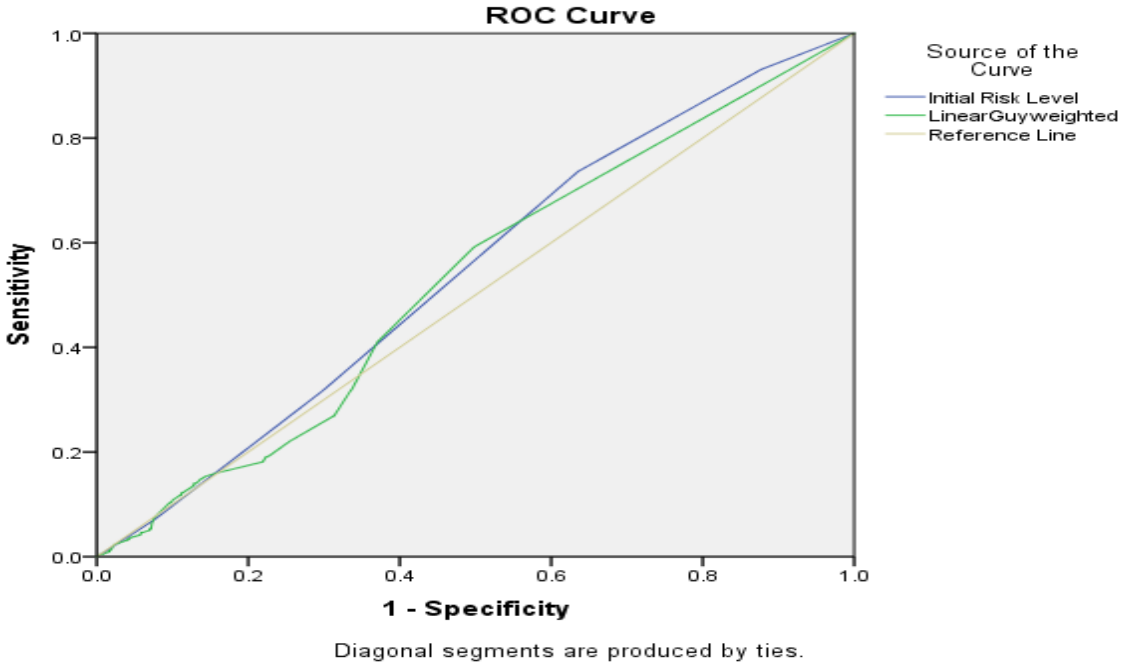
Figure 36.
ROC Curve on DWI Recidivism for the MR Weighted LSI-OR/Demographic Variable and Initial Risk Levels – DWI Validation Sample.



Finally, a correlation was generated between the MR weighted LSI-OR/demographic variable and DWI recidivism among the non-DWI sample and it was not significant, r = -.004, p = .337. As well, ROC analyses were conducted for the MR weighted LSI-OR/demographic variable, initial risk levels, and DWI recidivism. The analysis of the MR weighted LSI-

OR/demographic variable on DWI recidivism produced a ROC of AUC = .527 (95% *CI* = .501, .552) and a ROC of AUC = .543 (95% *CI* = .518, .568) for the initial risk levels on DWI recidivism for the non-DWI sample. The initial risk levels generated from the LSI-OR were slightly better able to predict DWI recidivism in the non-DWI sample than the MR weighted LSI-OR/demographic variable. In addition, the MR binary LSI-OR/demographic variable was slightly better able to predict DWI recidivism than the MR weighted LSI-OR/demographic variable. Figure 37 portrays the ROC curve for the MR weighted LSI-OR/demographic variable and the initial risk levels on DWI recidivism.

Figure 37.
ROC Curve on DWI Recidivism for the MR Weighted LSI-OR/Demographic Variable and Initial Risk Levels – Non-DWI Sample.



Summary of the Correlations and ROC Analyses Among the Samples and LSI-OR and LSI-OR/Demographic Predictor Variables.

A summary table of the correlations and ROC analyses that were previously discussed above are presented in Table 48. Both the MR binary and weighted and logistic binary and weighted LSI-OR variables were better able to predict DWI recidivism with the DWI construction sample compared to the DWI validation sample, with the exception of the MR weighted LSI-OR variable. A similar pattern of results emerged for the LSI-OR/demographic predictor variables. As well, the eight variables that were created also predicted DWI recidivism better than the LSI-OR total score and initial risk levels for the DWI construction sample. However, this held true for only some of the variables in the DWI validation sample (e.g., MR binary LSI-OR, logistic weighted LSI-OR/demographic).

Table 48.
Summary Tables of the Correlations and ROC Analyses Among the DWI Construction and Validation Samples for LSI-OR and LSI-OR/Demographic Predictor Variables

Predictor Variable	DWI Construction Sample (*r*, AUC)	DWI Validation Sample (*r*, AUC)
LSI-OR:		
MR Binary	.143***, .667	.094***, .605
MR Weighted	.109***, .609	.159***, .676
Logistic Binary	.109***, .660	.074***, .598
Logistic Weighted	.088***, .636	.055*, .584
LSI-OR/Demographic:		
MR Binary	.109***, .654	.009, .549
MR Weighted	.086***, .648	-.010, .549
Logistic Binary	.105***, .642	.007, .545
Logistic Weighted	.137***, .685	.074**, .603
LSI-OR Total Score	.054*, .580	.058*, .584
LSI-OR Initial Risk Levels	.056*, .581	.057*, .582

*** Correlation is significant at or below the .001 level (2-tailed)
**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

A summary table of the correlations and ROC analyses for both the LSI-OR variables and LSI-OR/demographic variables for the non-DWI samples are illustrated in Table 49. Both MR and logistic versions of our LSI-OR variable were better able to predict DWI recidivism among all non-DWI samples compared to the LSI-OR/demographic variables. As well, both MR and logistic versions of our LSI-OR variable were able to better predict DWI recidivism compared to the LSI-OR total score and initial risk levels. Even though both the MR and logistic versions of our LSI-OR variable outperformed the previously mentioned variables, the logistic binary and weighted versions were better able to predict DWI recidivism compared to both versions of the MR LSI-OR variables. It is important to note, however, that most predictors were found to be weak (AUC = .5 - .6 range) with the exception of the logistic weighted LSI-OR variable which had AUC values that were approaching the .7 range.

Table 49.
Summary Tables of the Correlations and ROC Analyses Among the Non-DWI Samples for LSI-OR and LSI-OR/Demographic Predictor Variables

Predictor Variable	**Non-DWI Total Sample (*r*, AUC)**	**Non-DWI Construction Sample (*r*, AUC)**	**Non-DWI Validation Sample (*r*, AUC)**
LSI-OR:			
MR Binary	.026***, .580	.024***, .569	.029***, .587
MR Weighted	.032***, .591	.028***, .577	.036***, .600
Logistic Binary	.042***, .643	.040***, .620	.044***, .641
Logistic Weighted	.056***, .687	.055***, .669	.058***, .680
LSI-OR/Demographic:			
MR Binary	.003, .533	.007, .536	-.001, .530
MR Weighted	-.004, .527	.001, .531	-.009, .523
Logistic Binary	.006, .548	.010, .557	.002, .539
Logistic Weighted	.034***, .598	.033***, .600	.034***, .596
LSI-OR Total Score	.015***, .561	.013*, .557	.016**, .564
LSI-OR Initial Risk Levels	.015***, .554	.014**, .552	.016**, .556

*** Correlation is significant at or below the .001 level (2-tailed)
**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

A summary table of the correlations and ROC analyses for both the LSI-OR variables and LSI-OR demographic variables for all the validation samples is presented in Table 50. The MR binary and weighted variables predicted best in the DWI validation sample while the logistic binary and weighted variables predicted DWI recidivism best with the total validation samples. As well, both of the MR LSI-OR variables and both of the logistic LSI-OR variables predicted DWI recidivism better than the LSI-OR total score and initial risk levels. The LSI-OR/demographic variable did not predict DWI recidivism well with either the construction and validation samples, with the exception of the DWI construction sample (see Tables 48 - 49).

Table 50.
Summary Tables of the Correlations and ROC Analyses Among the Validation Samples for LSI-OR and LSI-OR/Demographic Predictor Variables

Predictor Variable	**Total Validation Sample (*r*, AUC)**	**DWI Validation Sample (*r*, AUC)**	**Non-DWI Validation Sample (*r*, AUC)**
LSI-OR:			
MR Binary	.031***, .584	.094***, .605	.029***, .587
MR Weighted	.038***, .595	.159***, .676	.036***, .600
Logistic Binary	.050***, .645	.074***, .598	.044***, .641
Logistic Weighted	.064***, .684	.055*, .584	.058***, .680
LSI-OR/Demographic:			
MR Binary	.000, .526	.009, .549	-.001, .530
MR Weighted	-.009, .520	-.010, .549	-.009, .523
Logistic Binary	.002, .536	.007, .545	.002, .539
Logistic Weighted	.037***, .593	.074**, .603	.034***, .596
LSI-OR Total Score	.008, .552	.058*, .584	.016**, .564
LSI-OR Initial Risk Levels	.015**, .546	.057*, .582	.016**, .556

*** Correlation is significant at or below the .001 level (2-tailed)
**Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

LSI-OR Total Score and Initial Index DWI Charges

A logistic stepwise regression was conducted using the LSI-OR total score and the total number of DWI convictions among the index (current) offences as predictor variables and DWI recidivism as the outcome variable. The analysis was conducted on the DWI offenders in the construction sample. However, only the LSI-OR total score was significant. Therefore, the ROC analysis was conducted with only the LSI-OR total score for both the DWI construction and validation samples and the corresponding AUCs and confidence intervals are provided in Table 51. A logistic regression using the enter method was also conducted on the DWI offenders in the construction sample to ensure that both variables were included in the model and, again, the only significant predictor that emerged was the LSI-OR total score. However, a composite measure using these two variables was created. Further, the ROC analysis was conducted with this composite measure (i.e., LSI-OR total score/number of current DWI offences) for both the DWI construction and validation samples (see Table 51).

Table 51.
Summary Tables of the ROC Analyses Among the DWI Construction and Validation Samples for LSI-OR Predictor Variable on DWI Recidivism

Predictor Variable	DWI Construction Sample (AUC, 95% CI)	DWI Validation Sample (AUC, 95% CI)
LSI-OR Total Score:		
Logistic Stepwise Binary	.580 (.512, .647)	.584 (.519, .649)
LSI-OR Total Score Plus Number of Current DWI Offences		
Logistic Enter Binary	.580 (.513, .648)	.585 (.520, .650)

The preceding logistic stepwise regression was repeated on the full construction sample (DWI and non-DWI offenders). Both predictor variables were significant predictors, with the number of DWI current offences entering on step 1 and the LSI-OR total score entering on step 2. A composite (weighted) predictor variable was computed using the unstandardized beta coefficients as follows: LSI-OR total score/initial DWI charges = 1.229 initial DWI charges + .018 LSI-OR total score. The standardized beta coefficients for current DWI charges and LSI-OR total score were 3.419 ($p < .001$) and 1.018 ($p = .005$), respectively. The ROC analysis was conducted with the composite variable for both the total construction and validation samples. The corresponding AUCs and confidence intervals are provided in Table 52.

Table 52.
Summary Tables of the ROC Analyses Among the Total Construction and Validation Samples for LSI-OR and Initial DWI Charges Predictor Variable on DWI Recidivism

Predictor Variable	**Total Construction Sample (AUC, 95% CI)**	**Total Validation Sample (AUC, 95% CI)**
LSI-OR Total Score Plus Number of Current DWI Offenses:		
Logistic Weighted	.628 (.595, .660)	.647 (.615, .680)

Discussion

The current study examined the predictive accuracy of the LSI-OR with DWI provincial offenders in Ontario. DWI and non-DWI custody and community offenders were compared to assess the unique differences that exist within these offender populations, as well as to compare the performance of the LSI-OR. DWI offenders were most likely to be older, male, and Caucasian. This held true for both DWI custody and community offenders. Similarly, past research (Oklahoma Department of Corrections, 2011; Perreault, 2013) has also found that DWI offenders tend to be male. With respect to age, the average age at release for our DWI offenders was 41 years, which is consistent with another study (Oklahoma Department of Corrections, 2011) which reported the average age of DWI offenders to be approximately 41.8 years. However, other research (Chang et al., 2001a; Hanson, 2009; Perreault, 2013) has found that DWI offenders tend to be young (i.e., 20-35 years of age) with the rate slowly declining with age. A possible explanation is that this may not have been these offenders' first index offence of DWI charges, as they may have encountered DWI charges earlier in their lives.

There was also a large representation of Aboriginal offenders in all of our groups of offenders. This was not surprising, as Aboriginal peoples continue to be overrepresented in Ontario's correctional system, as is the case nationally (MCSCS, 2011). This finding is also consistent with the Oklahoma Department of Corrections' (2011) finding that a large portion of DWI offenders were highly represented among Caucasians and Native Americans. Another interesting finding in our study regarding ethnicity was the large representation of South Asian offenders in the DWI group of offenders compared to the non-DWI offender sample, 5.5% versus 2.7%. DWI offenders in our study also had significantly lower offence severity levels and, thus, served significantly less time in custody compared to non-DWI offenders. Similar

findings have been reported elsewhere (e.g., Oklahoma Department of Corrections, 2011). DWI offenders scored significantly lower on all LSI-OR summary measures, with the exception of strength scores and substance abuse. This finding replicates Wormith et al.'s (2012) results. In addition, the override feature was used least frequently with DWI offenders, which was also the case in Wormith et al.'s (2012) examination of the LSI-OR with impaired driving offenders. Furthermore, both our study and Wormith et al. found that non-DWI offenders had significantly higher rates of general recidivism and recidivated significantly quicker compared to DWI offenders. Specifically, the recidivism rate was 30.5% for the total sample, 43% for the custody sample and 28.8% for the community sample.

Overall, the DWI recidivism rate was low for the total sample (0.8%) but was slightly higher for the custody sample compared to the community sample, 1% and 0.8%, respectively. Importantly, our results revealed that the DWI offenders had significantly higher rates of DWI recidivism compared to the non-DWI sample. Specifically, the DWI recidivism rate for the DWI offenders was five times more than the recidivism rate for the non-DWI offenders (i.e., 3.6% versus 0.7%). This is in line with the widely reported (e.g., Ahlin et al., 2011; Cavaiola, Strohmetz, & Abreo, 2007; Cavaiola et al., 2003; Chang et al., 2001a; Jewell et al., 2008; Taxman & Piquero, 1998) finding that the majority of impaired driving offences are committed by a small group of chronic repeat offenders and that prior impaired driving behaviour is a useful predictor of future impaired driving behaviour. However, some studies have reported contrary results. Wormith et al. (2012) found that non-DWI offenders had a significantly higher rate of impaired driving reoffending and reoffended more quickly than DWI offenders.

When examining the custody and community samples of DWI and non-DWI offenders, a few differences are worth noting. Among the custody offenders, non-DWI offenders served

significantly more days incarcerated. In addition, DWI custody offenders had lower scores on criminal history compared to the non-DWI custody offenders, but this difference did not approach significance. Similar to results for the combined custody and community samples, non-DWI custody offenders had significantly higher rates of general recidivism compared to the DWI custody offenders (44.1% compared to 30.4%) and non-DWI community offenders had significantly higher rates of general recidivism compared to the DWI community offenders (29.5% compared to 17.4%). Wormith et al. (2012) also found that the non-DWI offenders had a significantly higher rate of general reoffending. Alternatively, the DWI custody offenders had significantly higher rates of DWI recidivism compared to the non-DWI custody sample (4.3% versus .7%) and the DWI community offenders had significantly higher rates of DWI recidivism compared to the non-DWI community sample (3.5% versus .7%). As to be expected, the DWI custody sample had a higher rate of DWI recidivism compared to the DWI community offenders (4.3% versus 3.5%). Higher DWI recidivism rates among the DWI offender population is in line with previous research (e.g., Nochajski & Stasiewicz, 2006) that also found that individuals who have prior DWI arrest and criminal histories are more likely to recidivate with an impaired driving offence. A majority of offenders in both custody groups (74.2% DWI and 79.5% non-DWI custody) received subsequent custodial sentences for their recontact offence. A higher proportion of both DWI and non-DWI community offenders also received more custodial sentences for their recontact offence; however, this finding was not significant for either of the community offender groups.

Interestingly, the non-DWI offenders incurred significantly more DWI recontact charges compared to the DWI offenders. This held true for both the custody and community non-DWI offenders. A possible explanation for this finding is that offenders in the non-DWI sample may

have previously incurred DWI charges prior to the index offence for which that they were most recently captured. Our data did not allow for an accumulation of a life history of DWI index offences. Thus, non-DWI offenders could have prior impaired driving index offences that were not captured by our dataset.

Overall, our results indicated that the LSI-OR was applicable to the DWI offenders as nearly all of the correlations between the LSI-OR and general recidivism were significant, with the exception of the strength score for the DWI custody offenders. Interestingly, it would be expected that the total strength score would be negatively correlated with recidivism. However, our findings did not indicate that strength was negatively correlated with general recidivism for the DWI custody offenders nor was it significant. All of the correlations between general recidivism and the LSI-OR were significant for the non-DWI offenders. Further, many correlations were significant for both the DWI and non-DWI offenders between DWI recidivism and the LSI-OR (i.e., general risk/needs score, initial risk level, final risk level, criminal history, and substance abuse). In addition, the companions and anti-social patterns sections were also significant for the DWI offenders, while the education/employment subscale was significant for the non-DWI offenders. There were no significant correlations among the LSI-OR variables and DWI recidivism for the DWI custody offenders. However, due to the low base rate of DWI recidivism, the correlations that were obtained need to be cautiously interpreted; the AUCs, which are discussed below, are more appropriate in this case.

The results from the ROC analyses that examined the LSI-OR total and section scores with general recidivism for the various groups of offenders suggested that the LSI-OR and its subscales were better able to predict general recidivism in the non-DWI sample compared to the DWI sample. This held true for both custody and community non-DWI offender samples. In

contrast, the LSI-OR and its subscales were better able to predict DWI recidivism in the DWI sample compared to the non-DWI sample, except in the case of custody offenders. Correlations and ROC analyses were also employed to examine if the total number of impaired driving offences was associated and predictive of general and DWI recidivism. This correlation was not significant for DWI recidivism (r = .022, p = .158) among the DWI offenders and we found that impaired driving charges were relatively equivalent in being able to predict general and DWI recidivism among all offender groups (all AUC values were within the .500 range); however, the predictive accuracy was slightly better for DWI offenders than non-DWI offenders. Overall, the ability of impaired driving charges to predict general and DWI recidivism was weak with no AUC values approaching the .7 range.

The ROC analyses on our logistic LSI-OR variable and DWI recidivism indicated that our logistic LSI-OR variables, binary and weighted, outperformed the initial risk levels generated by the LSI-OR among the DWI construction, DWI validation, and non-DWI construction and validation samples. In fact, the logistic LSI-OR binary variable was found to predict DWI recidivism for the construction (AUC = .660) and validation samples (AUC = .598) better than the general risk/need total score (AUC = .582) of the LSI-OR for DWI offenders. This also held true for the logistic weighted LSI-OR variable for both the DWI construction (AUC = .636) and validation samples (AUC = .584; just slightly better). As well, the logistic LSI-OR binary variable (AUC = .643) and logistic LSI-OR weighted variable (AUC = .687) was found to predict DWI recidivism for the non-DWI sample better than the general risk/need total score (AUC = .561) of the LSI-OR for non-DWI offenders. Otherwise, our logistic binary LSI-OR variable was best for predicting DWI recidivism among the DWI construction and validation

samples, while the logistic weighted LSI-OR variables was best for predicting DWI recidivism for the non-DWI sample.

Further, our logistic LSI-OR/demographic variable (binary and weighted) which included LSI-OR items and demographic variables also outperformed the initial risk levels generated by the LSI-OR among the construction, validation and non-DWI samples, with the exception of the binary in the DWI validation sample. It was found that our logistic LSI-OR/demographic variable predicted DWI recidivism better when the variable was weighted compared to when the variable was binary.

The ROC analyses on our MR LSI-OR variable and DWI recidivism indicated that our MR LSI-OR variables, binary and weighted, outperformed the initial risk levels generated by the LSI-OR among the DWI construction, DWI validation, and non-DWI construction and validation samples. In fact, the MR LSI-OR binary variable was found to predict DWI recidivism for the construction (AUC = .667) and validation samples (AUC = .605) better than the general risk/need total score (AUC = .582) of the LSI-OR for DWI offenders. This also held true for the MR weighted LSI-OR variable for both the DWI construction (AUC = .609) and validation samples (AUC = .676). As well, the MR LSI-OR binary variable (AUC = .580) and MR LSI-OR weighted variable (AUC = .591) was found to predict DWI recidivism for the non-DWI sample better than the general risk/need total score (AUC = .561) of the LSI-OR for non-DWI offenders. Otherwise, our MR binary LSI-OR variable was best for predicting DWI recidivism among the DWI construction samples and the MR weighted LSI-OR variables were best for predicting DWI recidivism for the DWI validation and non-DWI sample.

As well, our MR LSI-OR/demographic variable (binary and weighted) which included LSI-OR items and demographic variables also outperformed the initial risk levels generated by

the LSI-OR among the DWI construction sample. However, this did not hold true for the DWI validation and non-DWI samples. The initial risk levels of the LSI-OR predicted DWI recidivism better than the MR LSI-OR/demographic variable (binary and weighted) for the DWI validation and non-DWI samples. It was found that our MR LSI-OR/demographic variable predicted DWI recidivism better when the variable was binary compared to when the variable was weighted.

In summary, the eight variables that were created (i.e., MR binary and weighted and logistic binary and weighted LSI-OR and LSI-OR/demographic) were better able to predict DWI recidivism with the DWI construction sample compared to the DWI validation sample, with the exception of the MR weighted LSI-OR variable. As well, the eight variables also predicted DWI recidivism better than the LSI-OR total score and initial risk levels for the DWI construction sample. However, the LSI-OR total score and initial risk levels predicted DWI recidivism better than the logistic weighted LSI-OR variable in the DWI validation sample, and the MR binary LSI-OR/demographic variable, the MR weighted LSI-OR/demographic variable, and the logistic binary LSI-OR/demographic in the total, DWI and non-DWI validation samples. The MR binary and weighted variables predicted best in the DWI validation sample while the logistic binary and weighted variables predicted DWI recidivism best with the total validation samples.

Overall, the logistic weighted LSI-OR/demographic variable predicted DWI recidivism best (AUC = .685) with the construction sample, the MR weighted LSI-OR predicted DWI recidivism best (AUC = .676) with the validation sample, and the logistic weighted LSI-OR variable predicted DWI recidivism best with the non-DWI sample (AUC = .687) and the total validation sample (AUC = .684). It is not surprising that the computed logistic variables tended to be better predictors of DWI recidivism than the computed MR variables given that reicidivism

was measured in a binary fashion, making logistic regression the more appropriate statistical procedure to apply. Both MR and logistic versions of our LSI-OR variable were better able to predict DWI recidivism among all non-DWI samples compared to the LSI-OR/demographic variables. The LSI-OR/demographic variable did not predict DWI recidivism well with many of the samples, with the exception of being a great predictor in the DWI construction sample. Importantly, most predictors were found to be weak (AUC = .5 to .6 range) with the exception of the logistic weighted LSI-OR variable which had AUC values that were approaching the .7 range.

Limitations

An identified limitation in our study included the use of only general and DWI recidivism rather than examining other types of recidivism such as violent recidivism. Furthermore, our dataset captured only index offences and not offenders' past index offences. Thus, some of the non-DWI offenders could have possibly had DWI index offences in their past criminal history. Such information would be helpful in interpreting the results that were obtained in the study (such as non-DWI offenders having a higher number of DWI recontact offences). Another identified limitation pertained to the recidivism outcome. That is, only an offender's first recidivistic event was captured in the dataset. It would have been informative to examine all DWI recidivistic events for all of the offenders which may have led to a higher base rate of DWI recidivism, but was beyond the scope of this project. Finally, the use of correlations in the analysis of DWI recidivism and LSI-OR scores should be interpreted with caution as correlations are not reliable below 20%.

Future Directions

A possible direction for future research may include the development of a risk assessment tool designed and validated on DWI offenders. As well, a replication of this study factoring in an examination of all offenders' past DWI offences and DWI recidivistic events which could significantly increase the DWI offender sample size and possibly result in a higher base rate of DWI recidivism may clarify some of the results in the present study.

Conclusion

The findings of our study added to the literature on DWI offenders (e.g., lower recidivism rates compared to the general offender population) and confirmed specific risk factors (e.g., male, ethnicity). As DWI risk assessment is greatly needed for this offender population, our findings demonstrated that the LSI-OR has moderate predictive accuracy for both DWI and non-DWI custody and community offenders. However, our results proved that the LSI-OR was more effective in predicting general recidivism with non-DWI offenders (which is to be expected as it was originally designed for use with the general offender population) and more effective in predicting DWI recidivism with DWI community offenders. Further, our computed versions of the LSI-OR variable outperformed the original LSI-OR total scores and initial risk levels in predicting DWI recidivism. However, all of the AUCs were still weak and did not achieve the desired .7 range. Therefore, more research is needed in order to find a risk assessment tool that strongly predicts DWI recidivism.

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Appendix A: University of Saskatchewan Research Ethics Board Approval

UNIVERSITY OF SASKATCHEWAN

Behavioural Research Ethics Board

Certificate of Approval

PRINCIPAL INVESTIGATOR	DEPARTMENT	BEH#
Steve Wormith	Psychology	15-15

INSTITUTION(S) WHERE RESEARCH WILL BE CONDUCTED
University of Saskatchewan

SUB-INVESTIGATOR(S)
Lisa Jewell

STUDENT RESEARCHER(S)
Amy Pilon

FUNDER(S)
PUBLIC SAFETY CANADA

TITLE
Impaired Drivers: The Present Status of Assessing Their Risk and Predictors of Reoffending

ORIGINAL REVIEW DATE	APPROVAL ON	APPROVAL OF:	EXPIRY DATE
03-Feb-2015	06-Feb-2015	Application for Behavioural Research Ethics Approval List of variables for data be provided by MCSCS Acknowledgement - Research Agreement with Ministry of Community Safety and Correctional Services (MCSCS)	07-Feb-2016

Full Board Meeting ☐ Delegated Review ☒

CERTIFICATION
The University of Saskatchewan Behavioural Research Ethics Board has reviewed the above-named research project. The proposal was found to be acceptable on ethical grounds. The principal investigator has the responsibility for any other administrative or regulatory approvals that may pertain to this research project, and for ensuring that the authorized research is carried out according to the conditions outlined in the original protocol submitted for ethics review. This Certificate of Approval is valid for the above time period provided there is no change in experimental protocol or consent process or documents.

Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Research Ethics Board consideration in advance of its implementation.

ONGOING REVIEW REQUIREMENTS
In order to receive annual renewal, a status report must be submitted to the REB Chair for Board consideration within one month of the current expiry date each year the study remains open, and upon study completion. Please refer to the following website for further instructions: *http://www.usask.ca/research/ethics_review/*

Vivian Ramsden, Chair
University of Saskatchewan
Behavioural Research Ethics Board

Please send all correspondence to:

Research Ethics Office
University of Saskatchewan
Box 5000 RPO University, 1602-110 Gymnasium Place
Saskatoon SK S7N 4J8
Telephone: (306) 966-2975 Fax: (306) 966-2069