

An Investigation of the Dynamic Risk Assessment for Offender Re-Entry (DRAOR) with
New Zealand Sexual Offenders

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Science in Psychology

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Abstract

Probation supervision has been found to be an effective external agent of change during re-integration for offenders, but requires accurate risk assessments to guide sentence management and interventions appropriately. Early evidence supports the use of the Dynamic Risk Assessment for Offender Re-Entry (DRAOR), a risk assessment tool used by probation officers in New Zealand with offenders on community based sentences. This study investigated the validity of the DRAOR to predict sexual, violent and general recidivism for 851 sexual offenders released from prison. Patterns of scores post release were also investigated to determine whether changes in scores over time may assist in the prediction of who may go on to reoffend. Overall, the DRAOR showed incremental validity beyond the static RoC*RoI tool for violent and general recidivism; however, further investigation is required for its ability to predict those who go on to reoffend sexually. Downwards trends in DRAOR scores following release are observed, however, risk appears to gradually increase and protective factors decrease in the weeks preceding violent, general and administrative recidivism. Implications of the findings in terms of use for the DRAOR in practice are discussed.

Table of Contents

Acknowledgements.....	ii
Abstract.....	iii
List of Tables.....	vi
List of Figures.....	vii
An Investigation of the Dynamic Risk Assessment for Offender Re-Entry (DRAOR) with New Zealand Sexual Offenders.....	1
Overview.....	1
Understanding Criminal Behaviour.....	2
Advancement of Risk Assessment.....	4
Determining Assessment Efficacy.....	7
The Re-Entry and Desistance Process.....	8
The Dynamic Risk Assessment for Offender Re-Entry.....	10
Assessing Risk of Sexual Recidivism.....	14
Current Study.....	18
Method.....	20
Sample.....	20
Sample Clean.....	20
Instruments.....	21
DRAOR.....	21
RoC*RoI.....	26
Automated Sexual Recidivism Scale (ASRS).....	26
Procedure.....	27
Data Analyses.....	28
Results.....	31
Sample Demographics.....	31
Recidivism Rates.....	32
Descriptive Statistics.....	33
Comparisons Between Recidivists and Non-Recidivists.....	35

Convergent Validity	35
Cox Regression Survival Analysis: Univariate	36
Cox Regression Survival Analysis: Multivariate	39
Recidivism Base Rates	44
Patterns of Change Over Time in DRAOR Scores	45
Testing for Trends Prior to Recidivism.....	51
Natural Groups on Release.....	54
Discussion	56
Predictive Validity.....	56
Base Rates.....	57
Patterns of Change Over Time	57
Implications	59
Limitations and Future Research.....	62
Data Consistency.	62
Low Recidivism Rates.....	63
Score comparisons	64
Conclusion.....	65

List of Tables

Table 1 <i>Sample Demographics</i>	31
Table 2 <i>Distribution of Static Recidivism Risk Level</i>	32
Table 3 <i>Recidivism Rates</i>	33
Table 4 <i>Descriptive Statistics for Contact Sexual Offenders</i>	34
Table 5 <i>Bivariate Correlational Analyses of Assessment Tools and Recidivism</i>	35
Table 6 <i>Correlational Analyses of Risk Assessment Measures</i>	36
Table 7 <i>Cox Regression Survival Analysis Predicting Sexual Recidivism: Univariate Analysis</i>	37
Table 8 <i>Cox Regression Survival Analysis Predicting Violent Recidivism: Univariate Analysis</i>	38
Table 9 <i>Cox Regression Survival Analysis Predicting General Recidivism: Univariate Analysis</i>	39
Table 10 <i>Cox Regression Survival Analysis Predicting Sexual Recidivism: Multivariate Analysis</i>	41
Table 11 <i>Cox Regression Survival Analysis Predicting Violent Recidivism: Multivariate Analysis</i>	42
Table 12 <i>Cox Regression Survival Analysis Predicting General Recidivism: Multivariate Analysis</i>	43
Table 13 <i>One-Way Repeated Measures ANOVA – 5 Fortnights Prior to Recidivism</i>	52

List of Figures

Figure 1. Distribution of Total DRAOR score across the contact offender sample.34

Figure 2. Predictive probability of recidivism based on Total DRAOR score.44

Figure 3. Fortnightly Average Total DRAOR Score over two years post release.....46

Figure 4. Fortnightly Average Total DRAOR Score over one year post release47

Figure 5. Group differences in total DRAOR score across 12 months, averaged across six
time points.....50

Figure 6. Fortnightly Average DRAOR Domain Score Backwards From Date of Recidivism
.....53

Figure 7. Two-step cluster analyses for DRAOR domains.....55

An Investigation of the Dynamic Risk Assessment for Offender Re-Entry (DRAOR) with
New Zealand Sexual Offenders

Overview

Accurate assessment about the level of risk an offender poses to the community is critical for staff working in criminal justice systems. This information is fundamental to sound decision making regarding level of supervision, interventions, early release (e.g. Parole), and the classification level of prisoners (Andrews, Bonta, & Wormith, 2006; Bonta, 2002; Hildebrand, Hol, & Bosker, 2013). Reoffending rates are typically at their peak during the initial weeks and months following release from prison (Nadesu, 2007), and probation supervision has been found to be an effective external agent of change supporting this re-integrative period (Serin, Lloyd, & Hanby, 2010). Recidivism risk assessment has become standard practice within probation services in many countries (Bosker, Witteman, & Hermanns, 2013); thus, to ensure accuracy in determining an offender's risk, criminogenic needs and responsivity issues, empirical evidence has informed the development of assessment instruments to assist with sentence management. This study sets out to further examine the practical utility of the Dynamic Risk Assessment for Offender Re-Entry, (DRAOR; Serin, Mailloux, & Wilson, 2012) as applied in a probation setting for sexual offenders in New Zealand.

Firstly, this study will review the risk assessment literature and related research of known risk factors for recidivism, as well as providing a brief overview of what makes an effective risk assessment tool and the difficulties of offender re-entry. The current research on the DRAOR will also be reviewed, including how it may, or may not, relate to the literature into the assessment of sexual recidivism. Ultimately, generalised assessment tools can be used more appropriately when there is an increased understanding of how they work for specific offender groups.

Understanding Criminal Behaviour

A sound understanding of criminal behaviour is important to assist in the assessment of what influences people to commit crime and to guide interventions with offenders (Bonta, 2002). The General Personality and Social Psychological Perspective (GPSPP) is a comprehensive and holistic model which is based on personality and social learning perspectives, and was developed to assist our understanding of crime and causal factors of criminal activity (Andrews & Bonta, 2010). While no causal mechanisms are described by this perspective, it does highlight a set of causal cognitive, behavioural, biological and situational factors that have been associated with criminal behaviour (Ward, Melser, & Yates, 2007). Some of these factors are considered more important than others (Bonta, 2002). For example, Andrews and Bonta (2010) discussed what is known as “the Central Eight” which includes factors related to criminal conduct, history of antisocial behaviour, antisocial personality pattern, antisocial cognition, antisocial attitudes, family, school and/or work, leisure and/or recreation, and substance abuse. The first four (also known as the “Big Four”) are theorised to have the most immediate influence on criminal behaviour, with the latter four considered to have a more moderate effect, exerting their effect indirectly through the Big Four (Andrews & Bonta, 2010).

The Personal, Interpersonal, Community – Reinforcement (PIC-R) perspective was proposed to explain the mechanisms by which factors described by the GPSPP are causal in criminal conduct (Andrews & Bonta, 2010). This explanatory model is strongly influenced by learning principles and cognitive social learning theory; and describes how risk factors encourage and protective factors discourage criminal behaviour (Andrews & Bonta, 2010). Ultimately, the model proposed that when costs (negative outcomes) for anti-social conduct and rewards (positive outcomes) for pro-social conduct are raised, the probability of someone desisting from criminal activity will increase. The interaction of the individual with their

environment is considered to determine the strength of the antecedents and consequences, with many physical and cognitive characteristics influencing an offender's ability to react and learn. The PIC-R highlights the significance of assessing an individual offender across a number of domains to assist in understanding what may be maintaining their behaviour.

Andrews, Bonta, and Hoge (1990) developed the Risk, Needs, Responsivity (RNR) model to further guide effective intervention with offender treatment and/or supervision. The first principle of this model, Risk, offers guidance as to who should receive intensive treatment or intervention (Andrews & Bonta, 2010). More specifically, it states that criminal behaviour is able to be predicted, and that the level of treatment services or interventions received should be tailored to an offender's level of risk. In order to facilitate a reduction in recidivism of high risk offenders, more intensive services are required in comparison to the level of service required for low risk offenders. There is evidence to suggest that if intensive services are wrongly applied to lower risk cases, the probability of reoffending can increase (Andrews, 1989). For example, Lovins, Lowenkamp, and Latessa (2009) investigated this principle with a sample of 238 sexual offenders on parole, and concluded that the low risk offenders who were released without intensive interventions had better outcomes than those low risk offenders who received more intervention at a halfway house of a sex offender treatment programme. The needs principle refers to an individual's identified problematic risk factors (Andrews & Bonta, 2010). This principle guides decision making about intervention strategies and intends to reduce recidivism by addressing those factors that are related to risk, rather than non-criminogenic factors that have a weak association with recidivism (e.g. depression; Hanson & Bussière, 1998). Lastly, the responsivity principle refers to how interventions are delivered to offenders. According to this principle, treatment should be provided in a manner that is appropriate for the cognitive capacity, capability and learning style of an individual to optimise the effectiveness of the intervention (Andrews & Bonta, 2010). Conducting accurate risk

assessment procedures are therefore vital to appropriately consider these principals in case management (Chadwick, 2014).

Advancement of Risk Assessment

Research on risk assessment has progressed rapidly over the past few decades, continuing to develop and further assist professionals to carry out effective practice with their clients. Little was known about the principles and theory described by Andrews and Bonta (2010) for criminal conduct in earlier years, with the first generation of offender risk assessment solely reliant on unstructured clinical judgement. This approach had many faults, with professionals assessing risk based on their unique past experience, wisdom and instinct; this resulted in a lack of consistency between clinicians and across jurisdictions or institutions. Empirical evidence indicates that professionals are poorly equipped to make decisions, such as determining an individual's risk of re-offending, when empirically validated risk factors are not used in a structured manner (Andrews & Bonta, 2010). To overcome this, a variation of clinical judgement was developed, termed "Structured Clinical Judgement". This method of assessment arose from the use of a structured set of empirically based risk factors to anchor professional decision making, however, this continued to vary amongst professionals (Borum, 1996). This ensures that professionals are considering relevant information for an individual when making their judgements.

Given the identified limitations with unstructured clinical assessment, from the 1970s there was an increased emphasis on objective actuarial assessments (Bonta & Andrews, 2007), with evidence highlighting the superiority of their use over subjective clinical assessments (Bonta, 2002). These second generation risk assessments were founded on evidence-based science, which identified predictive relationships between an individual's offence history and their risk of future offending. The assessments were almost entirely comprised of static, historical items, and are structured and quantitative (Bonta, 2002). While the static risk of an

offender remains important in the establishment of an individual's risk level and required intensity of monitoring (Tamatea & Wilson, 2009), a reliance on static risk factors limits the ability to identify relevant criminogenic factors that should be the focus of intervention to manage recidivism risk. By their very nature, static factors are unchangeable. This also restricts monitoring of intervention efforts (Chadwick, 2014).

The inability for results of actuarial measures to be applied at an individual level is a fundamental criticism of this approach (Andrews et al., 2006; Craig & Beech, 2009). This contributed to the focus turning to third generation assessments, which comprise dynamic factors (also referred to as criminogenic needs) related to recidivism (Andrews et al., 2006). Dynamic factors are those factors which are able to be measured across time and which, at least in principle, can be changed or altered by external factors and/or treatment. Research with non-sexual criminals concluded that dynamic factors were at least similar, if not superior, in their prediction of recidivism over static factors (Gendreau, Little & Goggin, 1996; as cited in Hanson & Harris, 2000, p. 7). These factors are often divided into two groups; stable and acute dynamic factors (Hanson & Harris, 2000). Stable dynamic factors are enduring characteristics which have the potential to change over several months or years (e.g. anti-social associates and sense of entitlement; Hanson & Harris, 2000, 2001). On the other hand, acute dynamic factors can change quickly, over a few days or hours (e.g. living situation and victim access). While their link with long term potential recidivism risk may be minimal, acute dynamic factors are more indicative of imminent risk of offending or the timing of a recidivistic event (Hanson, Harris, Scott, & Helmus, 2007). Overall, it is recommended that assessing dynamic factors, in addition to static, allows for more accurate implementation of interventions to mitigate risk due to the increased individualised assessment (Bonta & Andrews, 2007).

The fourth generation of risk assessment highlights the link between assessment and case management (Andrews et al., 2006). While similar to third generation risk-needs

instruments, a fourth generation assessment focuses on a broader range of factors, including responsivity factors (Hanby, 2013). This assists with linking treatment services and approaches to the identified problematic risk areas of individual offenders, as well as measuring change in dynamic risk factors to assess treatment progress. The Level of Service/Case Management Inventory (LS/CMI; Andrews, Bonta & Wormith, 2004; as cited in Andrews & Bonta, 2010, pp. 318 - 321) is an example of a fourth generation risk assessment. This tool incorporates assessment of specific risk/needs factors and aspects of the offender and their situation that may have criminogenic potential, in addition to giving consideration to major responsivity factors such as motivation and intelligence (Andrews & Bonta, 2010). Arguably the most important feature of this instrument is the integration of assessment to explicitly inform case management, where criminogenic needs are prioritised, goals/targets are set, and a means to achieve these are chosen.

Factors related to desistence are also becoming increasingly appreciated for their contribution to risk prediction (Rogers, 2000; Serin et al., 2010). Protective factors refer to the characteristics and circumstances of people that are associated with a reduced chance of engagement in criminal activity. Including protective factors in assessment broadens the assessment and understanding of contextual factors related to when someone is likely to reoffend by identifying buffers that may ameliorate the impact of risk factors on an individual's behaviour (Andrews & Bonta, 2010; Tamatea & Wilson, 2009). There is argument in the literature that protective factors are simply the opposite of risk factors and are measuring the same construct (Nicholls, Petersen, Brink, & Webster, 2011; Webster, Martin, Brink, Nicholls, & Middleton, 2004; as cited in Miller, 2015, p. 35). However, research by Hoge, Andrews and Leschied (1996) investigated risk and protective factors in 338 serious juvenile offenders and concluded that protective factors did not overlap with risk factors (as cited in Rogers, 2000, p. 597). They ultimately suggested that the two are distinct in their predictive abilities. Similar

results were found by de Vries Robbé, de Vogel, and Douglas (2013), who indicated that protective factors provided incremental predictive validity over and above the use of risk factors independently for assessing violent recidivism. Empirical evidence for the use of protective factors is in the early stages, although research predominantly supports the consideration of protective factors in risk assessment (de Vries Robbé et al., 2013; Yesberg, Scanlan, Hanby, Serin, & Polaschek, 2015), including with sex offender populations (Miller, 2015).

Unlike the risk assessments mentioned earlier, the Structured Professional Judgement (SPJ) approach is not included in the generation classifications. SPJ approaches use empirically based risk factors and provide more structure than first generation assessments, however, do not fit the actuarial approach of second and third generations (Borum, 1996; Hanby, 2013). Clinicians use their assessment of empirically based risk factors to develop potential offending scenarios and use these to intervene or recommend ways to prevent recidivism (Chadwick, 2014).

Determining Assessment Efficacy

Accurate risk assessment is critical to determine best practice intervention and/or treatment for offenders within the RNR model (Smid, Kamphuis, Wever, & Van Beek, 2014). Fundamentally efficacious risk assessment instruments require face validity, good internal and inter-rater reliability, and a stable factor structure (Bonta, 2002). Best practice risk assessment procedures will provide information helpful for management of a case/sentence in addition to accurate risk prediction, such as that described by fourth generation risk assessments (Hanson & Morton-Bourgon, 2009). In order to validate these requirements for offender risk assessment and check their adherence to the RNR principals many factors require consideration. Some examples to determine predictive validity include differentiation between recidivists and non-recidivists, the causal relationship between assessed factors and the outcome of interest, and

expected recidivism rates based on a specific set of risk factors an individual has (Hanson & Howard, 2010).

Borum (1999; cited in Rogers, 2000, p. 595) described risk assessment as a probabilistic estimate of a continuous variable. It should therefore be anticipated that accuracy will be greatest for the outcome measure for which a tool was designed (e.g. to predict recidivism; Hanson & Morton-Bourgon, 2009). Further, predictive validity of quantitative risk measures is largely dependent on the sample used in validation sample. Cording, Beggs-Christofferson, and Grace (2015) highlight the necessity of validating a measure not only for a population as a whole, but across different countries/jurisdictions and with different offender types.

It is important that recidivism risk is accurately monitored so changes can be identified and, in turn, potential supervision violations or criminal behaviour can be pre-empted and prevented and/or effectively managed in response to changes in risk over time (Brown, Amand, & Zamble, 2009). Therefore, as well as dynamic risk factors being linked with recidivism, more broadly, changes on these dynamic variables should also be correspondingly linked with changes in the risk of reoffending (Cording et al., 2015).

The Re-Entry and Desistance Process

When re-entering the community following a period of imprisonment an individual is often confronted with a number of challenges, and consistently the initial months of release are typically when recidivism rates are at their peak (Nadesu, 2007). When released, individuals are leaving the structured environment a prison provides and entering back into a potentially unstructured world where they are required to make their own decisions (Bahr, Armstrong, Gibbs, Harris, & Fisher, 2005). For example, securing finances, securing stable accommodation, feelings of loneliness, and encounters with criminal peers are all potential stressors for someone to manage from day one back in the community (Smit, O'Regan, & Bevan, 2014; Tamatea & Wilson, 2009). This re-entry to the community is a critical time, and

can be understood as a dynamic process whereby the individual can reinvest in their community, be hindered by the above mentioned challenges, or re-engage in criminal behaviour (Serin, Gobeil, Hanby, & Lloyd, 2012). These difficult challenges may lead an individual towards re-offending by elevating acute dynamic factors, such as location of accommodation increasing their access to potential victims, or increasing their substance use due to being in a neighbourhood of anti-social peers or where drugs are readily accessible. Willis and Grace (2008) suggest that effective re-integrative planning is essential in order to ameliorate these environmentally initiated risk factors. Four domains of potential release barriers are identified in the literature; individual needs (e.g. mental health and offense-specific treatment); social needs (e.g. support); accommodation needs (e.g. securing stable living arrangements); and employment needs. To investigate the benefits of re-integrative planning across these areas, Willis and Grace (2008) developed coding protocol to measure the comprehensiveness of re-integrative plans for a sample of child sex offenders. Their sample of 98 sexual offenders who had completed a rehabilitative programme while in custody was matched on static risk level and follow-up time. Those who re-offended had significantly lower scores relating to the robustness of their release plan. Additionally, when controlling for IQ and sexual deviance, the accommodation component of a release plan was found to be significantly related to sexual recidivism.

A goal of a successful re-entry process is the ultimate desistance from crime, where previous offending lifestyles are permanently left behind. For many offenders, successful desistance includes battling substance abuse, removing association from criminal peers and developing long-term prosocial habits (Serin & Lloyd, 2009). Lloyd and Serin (2012) discuss that while the 'turning point' (point of change) is important; this is more likely an external representation of an internal change processes for an individual. In other words, it is not the observable changes per se that are important, but the psychological meaning of someone

embracing the opportunity for change as accessible, desirable, and meaningful (Lloyd & Serin, 2012). This is one of the initial concepts described by the Integrated Theory of Desistance from Sex Offending (ITDSO), which identifies that an individuals must critically evaluate a life event with a degree of dissonance and the probability to which their self-concept will result in a satisfying and purposeful life (Göbbels, Willis, & Ward, 2014). Additionally, the ITDSO explains that the promotion of desistance through rehabilitation/intervention, re-entry (maintenance of desistance), and normalcy (successfully maintain desistance over time) are phases of successful desistance processes (Göbbels et al., 2014).

The Dynamic Risk Assessment for Offender Re-Entry

An instrument currently used within probation services in several countries/jurisdictions (e.g. New Zealand, IOWA and Canada) for offenders on a form of community supervision is the DRAOR (Serin, Mailloux, et al., 2012). DRAOR was developed to provide a more practical assessment tool for Community Probation services (Tamatea & Wilson, 2009), and has been adopted and developed for use with offenders in New Zealand's Community Probation service (Serin, Mailloux, et al., 2012). Following a SPJ approach, this tool also allows for management planning based upon identified problematic factors across three domains, namely Stable, Acute and Protective. Stable dynamic risk and Protective factors are used to assist with identifying intervention needs, whilst Acute risk factors are incorporated as indicative of imminent risk of re-offending. It is intended for use with adult offender populations in general, and is designed to predict general and violent recidivism, including technical violations (Hanby, 2013). The DRAOR also allows for the planning of potential risk scenarios for reoffending in order to further inform decision making and management strategies.

A pilot study with the DRAOR in New Zealand was conducted by Tamatea and Wilson (2009). Seven senior Probation Officers were trained to use the DRAOR and supervised in its

application with 59 offenders. The DRAOR was used by the Probation Officers in their typical contact with offenders, and they submitted score data via a completed DRAOR form. Their findings supported the reliability and validity of the DRAOR tool, with corresponding changes in scores across assessments and moderate correlations between the three domains. Correlations between the RoC*RoI (static risk measurement tool used by the New Zealand Department of Corrections; Bakker, O'Malley, & Riley, 1998) and DRAOR supported the relationship between higher Stable and Acute domain scores and the static risk of reoffending. Additionally, feedback from the probation officers was positive, indicating that the DRAOR was viewed as assisting with everyday practice and the management of New Zealand offenders. This pilot ultimately resulted in the rollout of DRAOR as part of a best practice approach to offender management throughout the New Zealand Department of Corrections Community Probation service.

A more comprehensive validation study of the use of DRAOR within New Zealand was completed by Hanby (2013) who examined parolees over a two year period. Her sample consisted of all people released on parole in New Zealand between 01 April 2010 and 31 of March 2012 (N = 3498). She examined the underlying factor structure of the DRAOR and compared the existing (Stable, Acute and Protective domains) with two alternatives. Specifically, the Protective domain was present in both solutions, however, the Stable and Acute factors were split into “mostly stable” and “mostly acute” domains in option one, or “stable” and “mixed stable/acute” domains in option two. Despite these alternative structure options, the original had a similar fit and superior predictive accuracy, thus she did not recommend a change. Further investigation of the original domain model found that the three domains predicted recidivism over the two-year follow up period, and that for the first year of an offenders parole their DRAOR could add incremental predictive accuracy beyond that of the RoC*RoI score (described in the Method section of this thesis) alone (Hanby, 2013).

Additionally she investigated the psychometric properties of the tool at various periods of time (e.g. initial and last assessments, and in the months leading to recidivism) and determined that the last acute domain assessment prior to recidivism had the best predictive validity. Her results also showed that across periods of time the DRAOR demonstrated acceptable psychometric properties, although, the predictive accuracy of scores declined over time, consistent with previously discussed theories of timing of re-offence. Specifically, multi-level growth modelling in her study established that over time the risk domain scores decreased, and protective scores increased. Overall, this study provided further support about the predictive ability and construct/face validity of the DRAOR, and supported the response by Probation Officers in the pilot study (Tamatea & Wilson, 2009) that the dynamic nature of the DRAOR scale supported and enhanced case planning and decision making. For example, it was noted from Hanby's (2013) results that a sudden elevation (over one to a few assessments) was indicative of increased imminent risk for recidivism.

Similar results were found by Chadwick (2014), who sought to validate the use of DRAOR with a sample of offenders in Iowa. Both the original DRAOR structure and his empirically-formed two-factor structure significantly predicted technical violations and any recidivism (when all considered together); however the DRAOR failed to predict recidivism alone. That is, the DRAOR was able to distinguish all non-compliant offenders and had difficulty with determining those at risk of higher level recidivism. Of the examined factor structures, the original was the strongest predictor of further offending, and he concluded that all factors included in the DRAOR domains should remain. Chadwick's findings also indicated that increased risk domain scores differentiated recidivists from non-recidivists, however, that independently the Protective domain could not. This indicates that the Protective domain may not add enhanced information regarding the more imminent timing of a potential re-offence.

Another recent study investigating the psychometric properties of the DRAOR was completed using a sample of high risk New Zealand parolees (Yesberg & Polaschek, 2015). Congruent with the previously discussed DRAOR research, this study explored the original three domain structure of the DRAOR in addition to a new four-subscale structure, where the Acute factors were split into internal factors (Substance Abuse, Anger/Hostility and Negative Mood) and external factors (Interpersonal Relationships, Living Situation and Attachment with Others). In this new structure, Opportunity/Access to Victims and Employment were moved to the Stable subscale, with Attachment to Others moved from the Stable subscale to the External Acute subscale. Immediately following release, Stable, Protective and total DRAOR scores were significantly predictive of recidivism outcomes, however the internal and external acute domain scores were better predictors of recidivism when measured closer to re-offence date. This is consistent with Hanby's (2013) conclusion, that spikes in scores may indicate anti-social behaviours, and suggests that acute risk factors are the most useful prediction of imminence and timing of recidivism. Both the new and original structures demonstrated good convergent validity with other dynamic and static risk instruments, and ultimately provided further validation of the DRAORs ability to predict recidivism (Yesberg & Polaschek, 2015).

Yesberg and colleagues (2015) identified that many risk assessment tools have been predominantly developed and validated using male offender populations. Given debate over whether risk assessment factors are equally predictive across populations, they sought to investigate whether the DRAOR tool, which is routinely used across genders in New Zealand, is predictive of recidivism for both genders over and above static risk. Their investigation supported the gender-neutral approach of the risk assessment, with evidence that DRAOR predicted recidivism over and above static risk for both male and female parolees in New Zealand.

The predictive validity of the DRAOR has also been assessed with a sex offender population in Iowa. Smeth (2013) compared DRAOR scores with the Static-99R, a static actuarial tool used to assess risk of sexual recidivism in adult sexual offenders. Her results showed that the DRAOR risk domains and total score were positively correlated with the Static-99R and that the protective domain was negatively correlated. Further investigation revealed that although areas under the curve (AUC) were significant when determining time to parole violation more broadly for each DRAOR domain and total score, this was not the case when examining sexual recidivism. Only the Static-99R yielded results which predicted sexual recidivism. Ultimately, Smeth's study indicated that DRAOR was useful in the prediction of violations and general non-compliance which resulted in breach action of sex offenders on a community based sentence, however, that the DRAOR may not provide valuable information regarding the timing or imminence of a future sexual offence.

Assessing Risk of Sexual Recidivism

In order to reduce rates of recidivism and enhance successful and effective risk management it is vital to ensure that the risk assessment tools being used (such as DRAOR) are reliable and valid. Smeth's (2013) study highlighted that the DRAOR, a regularly used tool in New Zealand developed for prediction of general type of recidivism, did not aid in the prediction of sexual recidivism. Further research with a New Zealand population is necessary to understand the validity and reliability of DRAOR more specifically across offence types and offenders. Despite having a low sexual recidivism base rate, sexual offenders are a subgroup of offenders who are of significant public concern due to the high level of harm this type of offending has (Andrews & Bonta, 2010; Hanson et al., 2007; Harris & Hanson, 2010; Mann, Hanson, & Thornton, 2010). Moreover, the challenge with sexual offenders low base rates is determining what distinguishes recidivists and non-recidivists (Hanson & Bussière, 1998).

Similarly to risk assessments produced for general offending, when assessing risk of sexual recidivism it is agreed that multiple factors must be considered (Mann et al., 2010). Research highlights significant differences between sex and non-sex offenders in their dynamic characteristics. For example, Craig, Browne, Beech, and Stringer (2006) examined sexual, violent, and general offender populations and found significantly different characteristics. Their research indicated that violent offenders were more likely to have substance abuse histories, greater psychopathology and more chaotic lifestyles. They also displayed higher hostility, impulsivity, aggressiveness, and psychopathic characteristics compared with sexual offenders, who appeared to exhibit high lie scale scores and introversion. Other empirically supported dynamic sexual risk factors included cognitions supportive of sexual offending; intimacy deficits; poor cooperation with supervision; sexual self-regulation; sexual preoccupation; and social collapse (Hanson & Harris, 2000; Kewley, Beech, Harkins, & Bonsall, 2015).

The low rate of reoffending for sex offender populations (research reports rates as approximately 9-25% over a five to 15 year period; Hanson & Bussière, 1998; Olver, Wong, Nicholaichuk, & Gordon, 2007; Skelton, Riley, Wales, & Vess, 2006) has caused difficulty in determining dynamic risk factors that specifically relate to recidivism for this group (Hanson & Bussière, 1998). Hanson and Harris (2000) artificially set their recidivism rate at 50% in their retrospective research of dynamic risk factors linked to sexual recidivism to overcome the challenge of the low base rate for sexual recidivism. Significant differences were noted between the recidivist and non-recidivist offenders' sentences, with those who re-offended generally having poorer social supports, attitudes tolerant of sexual assault, antisocial lifestyles, poor self-management, and poorer cooperation with their supervision requirements (e.g. manipulative, disengaged, or absent). The risk factors identified were generally relevant for both child molesters and rapists, and provide guidance for treatment targets and intervention

for this population (Hanson & Harris, 2000). In the lead up to re-offending, it was reported that recidivists displayed increased anger and subjective distress. While it is generally agreed upon in the literature that general psychological problems (e.g. anxiety and depression) are not predictive of long term sexual or nonsexual recidivism (Hanson & Bussière, 1998; Hanson et al., 2007; Hanson & Morton-Bourgon, 2009), subjective distress has been argued to instead be a transient state (Hanson & Bussière, 1998). This may in turn trigger maladaptive coping strategies to alleviate this (e.g. alcohol use and sexual fantasies/masturbation), placing the individual at an increased risk of sexual recidivism (Hanson & Bussière, 1998). Further research has highlighted three major risk categories which a number of dynamic factors believed to be a precursor to sexual recidivism fall into; antisociality, sexual deviance, and poor interpersonal competence (Seto, 2013). For example, factors such as sexual preoccupation, victim access, anger, acute changes in mood, and rejection of supervision have been linked to recidivism of sexual offender populations. These factors are utilised in tools specifically developed to measure sexual recidivism (Hanson & Harris, 2001).

To aid the use of the above risk variables in assessing sexual recidivism risk a variety of actuarial risk assessment instruments have been developed. An example of a static assessment used within New Zealand is the Automated Sexual Recidivism Scale (ASRS; Skelton et al., 2006), which calculates a risk score based on an offenders criminal history. Like other static measures, this tool, such as some other static tools used for general recidivism, acquires its risk rating based on information within an individual's criminal offence history (Skelton et al., 2006). The factors included within the scale have empirical evidence linking them with increased risk of sexual recidivism. For example, variables such as offender age and having had a male victim of a sexual offence have support in the literature for their link with increased risk of sexual recidivism (Hanson & Bussière, 1998; Hanson & Morton-Bourgon, 2005).

Dynamic actuarial scales are also used for sexual offenders to assist with intervention/treatment planning and monitoring of changes in recidivism risk. The Stable-2007/Acute-2007 are adaptations of their predecessors, the Stable-2000/Acute-2000, based on empirical factors linked with sexual recidivism (Harris & Hanson, 2010). The decision was made to keep the stable assessment separate from the acute assessment as the two are used for different purposes. The stable assessment is used for monitoring medium-long term recidivism risk and identifying targets for treatment, whereas the acute scale is used for monitoring high risk periods on supervision (e.g. sudden change in living situation; Harris & Hanson, 2010) and inform the assessment of the potential timing for re-offence. The Stable-2007 is an interview and file based assessment tool which comprises variables across five subsections; significant social influences, intimacy deficits, sexual self-regulation, general self-regulation, and cooperation with supervision. Research with a German-speaking sample supported the abilities of the Stable-2007 to predict risk of sexual recidivism (Eher, Matthes, Schilling, Haubner-MacLean, & Rettenberger, 2012). Over a mean 6.4 year follow-up, the Stable-2007 incrementally contributed to the predictive power of static assessment instruments. The investigation also supported the adaptation from the Stable-2000, with the Stable-2007 outperforming its predecessor with moderate to good predictive ability and significant areas under the curve (AUC) for all measured outcome variables.

The Violence Risk Scale – Sexual Offender Version (VRS-SO) developed in 2003 by Wong, Olver, Nicholaichuk & Gordon (cited in Olver et al., 2007) is another example of an instrument specifically designed for assessing sex offenders recidivism risk. The 24-item assessment tool is designed to measure both static and dynamic risk variables to assess sexual offender risk, identify treatment variables and evaluate changes in dynamic risk variables following treatment or other intervention events (Olver, Nicholaichuk, Kingston, & Wong, 2014). It comprises seven static items (involving factors related to criminal history, victim and

offender demographics) and 17 dynamic items which have empirical, theoretical or conceptual links to risk of sexual recidivism. A prospective study using a sample of treated sex offenders in Canada found that the VRS-SO demonstrated significant predictive accuracy for violent, general, and sexual recidivism (Olver et al., 2014), supporting previous research with the VRS-SO (Beggs & Grace, 2010; Olver et al., 2007).

Support is growing for independent factors to predict sexual recidivism, however, there is also evidence of a strong overlap among characteristics predictive of sexual and non-sexual recidivism in sexual offenders (Hanson & Bussière, 1998). For example, substance abuse, impulsivity and antisocial attitudes have regular empirical support for being a strong predictor of general, violent and sexual recidivism (Hanson & Bussière, 1998; Hanson & Morton-Bourgon, 2005; Gendreau, Little & Goggin, 1996, as cited in Smeth, 2013). Additionally, it is recommended that assessment of non-sexual criminogenic factors also require consideration for sex offender populations, as they are also at risk to commit non-sexual crimes (Andrews & Bonta, 2010).

Current Study

Although there are dynamic risk assessment tools used specifically for assessing risk of sexual recidivism (e.g. Acute-2007 and Stable-2007; Harris & Hanson, 2010), the DRAOR is also completed at probation contacts with sex offenders who are subject to Community Probation sentences in New Zealand. Support for the use of DRAOR is positive when considering offenders as a homogenous group and based on gender (Hanby, 2013; Tamatea & Wilson, 2009; Yesberg et al., 2015), however, investigation into a specific subgroups of offenders indicated that further exploration is required (Smeth, 2013). More specifically, there is evidence to suggest that the DRAOR, while was able to predict sentence violations or breaches, did not significantly predict sexual recidivism in a group of sex offenders in IOWA (Smeth, 2013). Notably, some variables that have been identified as contributing to the

prediction of sexual recidivism are included within the DRAOR stable and acute domains (e.g. anger/hostility, impulsivity, anti-social attitudes and social support). It is possible that the inclusion of these factors may contribute to the overall DRAOR scores, and ultimately aid the prediction of sexual recidivism in addition to that of general and administrative (i.e. breach of sentence) recidivism, as the tool was intended.

This study sets out to determine the predictive validity of the DRAOR for a sex offender population in New Zealand for different types of recidivism (sexual, violent and general). Being able to predict those individuals most at risk is an important role for probation staff, meaning knowledge of early warning signs for those requiring some form of intervention is of great importance. It is hypothesised that the DRAOR will add incremental predictive ability over static risk for general and violent recidivism, but not for sexual recidivism. Additionally, it is recognised that release from prison can reflect a crucial time in the desistance process, with re-entry processes implemented by correctional agencies potentially being a promising way to reduce risk of recidivism (Tamatea & Wilson, 2009). Because DRAOR is a frequently administered tool, monitoring of scores may help to reflect patterns in the re-entry process. A further aim of this study is to identify patterns of adjustment during the first eight weeks (approximately two months) post-release to determine if DRAOR can identify patterns of scores for this sample of sexual offenders. It is hypothesised that there will be distinct groups on release which are differentiated by their initial adjustment and those who go onto reoffend. We also predict that those who go on to reoffend will show a spike in their DRAOR score, and more specifically in their acute domain score in the assessment prior to the re-offence date.

Method

Sample

In New Zealand, if an individual receives a prison sentence of less than two years, they are typically released once they serve half of the imposed sentence. Conditions can be imposed on release, with standard conditions automatically enforced if the sentence of imprisonment is over 12 months. However, a Court Judge can impose conditions on anyone who is imprisoned, and extend these conditions to continue six months beyond the sentence end date. Parole is imposed if someone is sentenced to two or more years' imprisonment. After serving one third of their prison sentence (or a specific time frame set by the sentencing Judge) they are eligible to be considered for release on Parole. Release is determined by the New Zealand Parole Board (NZPB), who can impose conditions that remain until six months beyond the sentence end date.

The sample for the current study included offenders convicted of a sexual offence who were released on Conditions or Parole in New Zealand between 06 April 2010 and 30 January 2013. The offenders also had at least one DRAOR assessment completed.

Sample Clean. Data was obtained for 1126 offenders released on Parole, Conditions, Compassionate Release, or who were subject to an Extended Supervision Order within the previously outlined time period. For each offender, data was included between their release date and their sentence end date or date of data extraction (February 2015). Data beyond sentence end date occurred for those subject to multiple sentences, or who were reconvicted of a new offence after their sentence termination date and prior to the date of data extraction.

For offenders on Compassionate Release, DRAOR scores were not available and they did not have corresponding Parole or Release Condition sentences. Additionally, the start date of Extended Supervision Orders did not necessarily correspond to the release date, nor did every individual subject to this order also have a concurrent Parole or Release Conditions sentence. Therefore those offenders subject to Compassionate Release (n=2) were removed

from the sample in addition to information directly related to Extended Supervision Orders (n=42). For offenders who had concurrent sentences of Parole and/or Release Conditions, only the sentence with the earliest release date was maintained. After these cases were omitted, the sample included 1099 offenders who had been released on either conditions or parole.

Using Microsoft Access, all DRAOR assessments that occurred outside of the sentence start and termination dates were removed, and only offenders who had a minimum of one DRAOR assessment remaining were retained. This reduced the final sample to 869 all male offenders. The number of DRAOR assessments per offender ranged from 1 to 220 ($M = 37.43$). Of the final sample, all offenders had an ASRS score and 864 had a RoC*RoI score.

Instruments

DRAOR. The DRAOR is a tool designed for use by Probation Officers to assess an offender's dynamic risk of reoffending and to identify targets for treatment and/or intervention. The tool allows for the repeated assessment of risk over time; updating scores across a variety of factors at each significant contact when new information is discovered. The DRAOR tool assesses factors across three scales; Stable risk, Acute risk, and Protective factors.

Stable risk factors, includes items which tend to persist across various settings and be durable, with change expected to be gradual over months or years. The Acute factor domain of the DRAOR measures the risk factors that change more rapidly. Deterioration within the seven acute items indicates the offender may be at a higher risk for imminent reoffending. Lastly, the Protective factors scale measures an individual's internal assets and external strengths which may reduce their risk of reoffending.

Factors within each scale (i.e. risk domain) are scored on a scale of 0 to 2, with 0 being "not a problem", 1 being a "possible problem", and 2 being a "definite problem" for the individual. The protective factors are similarly measured; with a score of 0 indicating the factor is not an asset and 2 being a definite asset.

A most likely and most serious risk (offence) scenario is then developed by the Probation Officer by bringing together information from the DRAOR scales and other available information (e.g. criminal history). This further identifies different risk factors which may precipitate the potential offence and protective factors that may mitigate the offence. Developing these scenarios assists with determining the level of intervention and management strategies that match a particular offender by identifying what and how risk factors could lead to future offending.

The Probation Officer scores on a scale of 1 to 6 how concerned they are about the offender reoffending prior to their next contact, both in relation to either the most likely or most serious scenario). A score of 1 would be given if the Probation Officer was not concerned about reoffending and 6 if they were extremely concerned. This scoring system is also completed for the risk of harm that this offence would have.

Stable Risk Domain in the DRAOR

Peer Associations. This domain assesses the nature of an offender's peer associations, including the balance between anti-social and pro-social peers. For example, being an active gang member would be scored as a definite problem (score of 2) while only having prosocial peers would be scored 0 (i.e., not considered an issue).

Attitudes towards authority. This item is scored based on how the offender views others. Offenders who are primarily antagonistic towards others, particularly those in a role of authority, are considered a concern (score of 2). This behaviour could be displayed in a variety of ways, including overt anger and frequently seeking arguments about their sentence and its requirements. A score of 1 would be given if this attitude varies, such as accepting the authority of some people, but not others.

Impulse Control. Those with poor self-regulation are at an increased risk of reoffending (and scored a 2). This item identifies those who make decisions in the moment rather

than considering consequences of their actions. These offenders will often engage in substance abuse and binge drinking and frequently engage in risk taking. Alternatively, a score of 0 could be given if an offender is able to make decisions independently, is reflective, and self-monitors.

Problem-Solving. This item measures an offender's ability to make decisions and consider the consequences of their actions across different settings. An offender who demonstrates logic and structure in their approach to arrive at a decision and consider opinions of others and consequences would be scored a 0. No consideration of consequences would be scored a 2.

Sense of Entitlement. This item identifies those offenders who have an exaggerated sense of self-worth. For example, a score of 2 would be given for those who view themselves as different from other offenders (e.g. superior, or a victim of the system), and may frequently ignore personal and professional boundaries. Entitlement evident in their offending behaviour may not reflect an ongoing pattern of entitlement more generally; therefore entitlement needs to be identified across time and settings.

Attachment with Others. The purpose of this item is to identify how connected and concerned the offender is about others. A score of 2 would be given for those who are callous and indifferent towards those around them. For example, relationships with others may only be brief and self-centred; the offender may seek isolation, and/or cannot understand the emotional consequences of their actions or the impact.

Acute Risk Domain in the DRAOR

Substance Abuse. This item focuses on the substance use of an offender. Those who are abstinent from alcohol and drug use would be scored a 0. Conversely, individuals who continue to engage in problematic use (e.g. gaining money to continue abuse, which provides a barrier to the offender committing to prosocial activities or support to desist from crime) would be scored a 2.

Recent behaviour and the individual's patterns of substance use are considered for this item. For example those who are on a methadone programme would typically be scored a 1 as methadone withdrawal could result in a relapse to illegal drug use.

Anger/Hostility. A score of 2 is given for offenders who have a noticeable presence of hostility or anger. For example, an offender who presents as callous and rude, and/or becomes easily irritated and frustrated would be scored a 2. Statements related to revenge and rumination which maintains emotional volatility to a high level are indicators of anger/hostility.

Opportunity/Access to Victims. Offenders who are putting themselves in situations where they are likely to have access to victims (particularly if they have a preferred victim or a pattern of selecting victims) would be scored a 2. For example, a child sex offender spending time near a school would be of significant concern.

Negative Mood. Low mood or heightened anxiety has been identified as a risk factor for offending. A score of 2 would be given for an offender with acute or continued presence of negative mood. Expressions of hopelessness or sadness, presenting as tearful, and possibly expression of hyperarousal (e.g., tense, fidgety, restless and unable to concentrate) are indicators of negative mood.

Employment. Those who are unemployed would score a 2 on this scale. Offenders who are working in a preferred job would receive a score of 0. Assessment of a preferred job includes factors such as the level of income, skills of the individual to maintain the employment, and also whether the employment is suitable (i.e. does not increase risk via access to victims). Cases in which the offenders are training or studying to gain employment, or are between jobs and taking appropriate steps to secure work, would typically be scored a 1.

Interpersonal Relationships. This item assesses whether someone is in a stable, healthy, emotionally close, intimate relationship. This may be a relationship with a relative or a close friend; however the important consideration is the quality of closeness or intimacy of the

relationship. Intimacy for this item is defined by their closeness and familiarity through frequent socialising (interactions) and honesty in their disclosure of personal emotions and thoughts. A score of 0 is given if the relationship is currently close or intimate. Conversely, a score of 2 is given if the relationship is currently conflicted. If the offender does not have any current stable relationships a score of 1 is to be given.

Living Situation. Those with stable accommodation that does not pose a risk to other occupants or increase likelihood of contact with potential victims or high risk situations would be scored a 0. Those who lack accommodation, or are in an unstable living situation, would receive a score of a 2.

Protective Factors Domain in the DRAOR

Responsive to Advice. This item scores offenders on their responsiveness to advice from positive influences. A score of 2 is given to offenders who will follow direction from prosocial others, whereas a 0 is given to those who are usually resistant to advice or direction. Following direction needs to be demonstrated in behaviour outside the interviews with the probation officer.

Prosocial Identity. On this item, a score of 2 would be given for offenders who have shown a prosocial identity. This requires behavioural evidence examples, such as distancing themselves from antisocial peers, leaving a gang and prosocially supporting their family or community (e.g. volunteer activities).

High Expectations. This item is scored as 2 for the offenders (and their support network) that have high expectations in regards to their success in rehabilitation and reintegration. The expectations should be realistic, with credence given to plans the offender has in place to achieve positive results.

Cost/Benefits. This item assesses the extent to which an offender's behaviour considers the costs and benefits of a situation. For example, an individual who demonstrates that they

find prosocial behaviour to be more important/rewarding than criminal behaviour would receive a score of 2.

Social Support. This item measures the accessibility of a prosocial support system for an offender, considering both the quality and amount of support. For example, a score of 2 would be given for someone who has prosocial supports which are both meaningful and accessible.

Social Control. This item considers whether an offender responds appropriately to prosocial models or whether they ignore advice, or attempt to control others around them in an effort to minimise opposition to antisocial behaviour. Offenders who show compliance and cooperation with prosocial models (for example, seeking out or accepting guidance from someone even if the advice differs from what they want to do) would receive a score of 2.

RoC*RoI. The RoC*RoI is an actuarial risk assessment model for New Zealand offenders developed by Bakker et al. (1998). Based on static risk predictors derived from offence history, the RoC*RoI is produced by a computer algorithm and expresses the probability of an individual being both reconvicted and sentenced to a term of imprisonment within the next five years. Scores on the RoC*ROI range from 0, indicative of a low risk of serious reoffending, to 1.0, indicative of a very high risk of serious reoffending. All individuals who are managed on a sentence with the Department of Corrections will have a RoC*RoI score generated, with the measure demonstrating acceptable predictive validity (Bakker, Riley, & O'Malley, 1999).

Automated Sexual Recidivism Scale (ASRS). An ASRS score is calculated for all offenders who have received a conviction for a sexual offence in the District or High Court in New Zealand (Skelton et al., 2006). This score is based on static information acquired from their official criminal offence history and is used as an assessment of risk of sexual recidivism. The ASRS is based on items from the Static-99 (Hanson & Thornton, 2000), and is scored

based on information available in the Department of Corrections' Integrated Offender Management System (IOMS) database. Some offences where there is no specific victim (e.g. living on the earnings of a prostitute) are excluded, as are any convictions from the Youth Court (with the exception of sexual offences against male victims). The index offence is the most recent sentencing date for a sexual offence, with all previous sexual offences being calculated as the number of previous sentencing dates for sexual offences. On the date of the assessment, the ASRS calculates the age of an offender based on the date of birth information included in their official criminal history.

During the development of the ASRS a significant level of predictive validity for sexual recidivism was evidenced (Skelton et al., 2006). As a result the ASRS is used as an initial screening tool for sexual offenders by the New Zealand Psychological Service of the Department of Corrections for those who are being considered for early release from prison and those who may be eligible for extended periods of parole supervision.

Procedure

The DRAOR is administered for every significant contact a Probation Officer in New Zealand has with someone subject to a sentence managed by the Department of Corrections Community Probation service (Supervision, Intensive Supervision, Home Detention, Post-Detention Conditions, Released on Conditions, Parole or Extended Supervision). The number of administrations for any offender can vary depending on their risk, compliance and other external factors. DRAOR scores are entered into the IOMS database by the probation officers.

For the present study, scores for the risk assessment scales (RoC*RoI, DRAOR and ASRS) were provided by the Department of Corrections, in addition to conviction histories, treatment history and demographic information.

Data Analyses

Microsoft Excel and Access 2010 were used for preliminary data screening and to construct variables from raw data records for subsequent analyses using IBM SPSS (version 22). Domain scores for the DRAOR were calculated by summing the scores of their factors. These domain scores were then used to calculate the total DRAOR score by summing the Stable and Acute domains and subtracting the Protective domain.

Descriptive statistics were used to characterise the sample in terms of sample demographics, recidivism rates (sexual, violent, administrative, general), and scores across each risk assessment tool. Chi square tests were used to compare recidivism rates. For the chi-square analysis a phi coefficient is also reported and can be interpreted as 0.1 = small effect, 0.3 a medium effect and 0.5 = a large effect (Cohen, 1992). A visual representation was also used to check normality and outliers. Pearson correlations were completed to investigate the convergent validity of the DRAOR with the RoC*RoI and ASRS. Correlational analyses were also used to determine how scores on each of the static tools and across DRAOR domains were related to recidivism (sexual, violent, general and administrative).

Survival analysis (Cox regression) was used to investigate the predictive ability of the DRAOR. Analyses were based on the time between release and recidivism or until the end of the follow up period. Coefficients obtained from Cox regression are interpreted as hazard ratios, that is, the change in relative rate of recidivism with each unit increase of the predictor variable. Values greater than 1.0 reflect an increase in recidivism risk when scores are higher on the predictor variable, and values below 1.0 indicate a decreased risk of recidivism. Cox regression analyses were also used to test the incremental validity of the DRAOR domains over and above static risk measures.

Logistic regression was used to estimate recidivism base-rates for the sample. Logistic regression is used when the outcome variable is categorical and the predictor variable(s) are

continuous or categorical (Field, 2009). Predicted probabilities for each type of recidivism (sexual, violent, general and administrative) were calculated based on the overall DRAOR score. The purpose of these analyses was to provide information about sexual offender recidivism for different DRAOR scores.

To investigate changes in scores following release, a visual representation of scores with line graphs was followed with mixed model analyses (hierarchical linear modelling). This analysis was chosen over repeated measures ANOVA due to the increased flexibility to model effects of time and correlation patterns between repeated measurements, in addition to its ability to handle missing data. The SPSS hierarchical linear modelling procedure requires the repeated covariance type to be specified. Plausible covariance-pattern models (unstructured, diagonal, compound symmetry, autoregressive and scaled identity) were fitted, without inclusion of random intercept effects. Likelihood ratio comparison tests were used to select the best-fitting model. Fixed effects of group (recidivism), time (six points across 12 months), and group \times time were performed in the analyses.

Scores for recidivists were analysed separately to identify any significant trend. Specifically, the DRAOR domain and total scores in the five fortnights leading up to recidivism were analysed. This was completed by using a line graph to plot fortnightly averages backwards from recidivism. To confirm significance of change between scores one-way repeated measures ANOVA were completed and the linear and quadratic contrasts considered. The Greenhouse-Geisser correction was used when the univariate repeated measures assumption was violated.

Finally, model-based cluster analyses were used to test for heterogeneity in longitudinal patterns of DRAOR scores post-release. These analyses used the 'two step' cluster analysis option in SPSS, which uses a model comparison criterion to identify the optimal number of

clusters. Two-way repeated measure ANOVA was used to determine whether there was an interaction effect of time and the identified clusters.

Results

Sample Demographics

Descriptive statistics for the sample is included in Table 1. The mean age for the full sample on their release date was 41.97 years ($SD = 14.42$). The ethnic composition of the sample was predominantly Maori (44.1%) and New Zealand European (43.7%). Risk level information for the sample is summarised in Table 2. All offenders included in the sample were male.

Table 1

Sample Demographics

Variable	n	%
Age at Release $M (SD)$	41.97 (14.42)	
Index Sexual Offence		
Child victim	530	61.0
Adult victim	321	39.9
Non-contact victim	18	2.1
Ethnicity		
Maori	383	44.1
European	380	43.7
Pacific Island	90	10.4
Asian	7	0.8
Other	7	0.8
Unknown	2	0.2

Table 2

Distribution of Static Recidivism Risk Level

Variable	n	%
RoC*RoI		
Low (.00 – .29)	410	47.2
Medium (.30 – .69)	361	41.5
High (.70 – 1.0)	93	10.7
ASRS		
Low (0)	175	20.1
Moderate-Low (1-2)	313	36.0
Moderate-High (3-4)	306	35.2
High (>5)	75	8.6

Recidivism Rates

Rates of recidivism for the sample are displayed in Table 3. Recidivism was classified as any offence that occurred between the release date and the day of data extraction which resulted in a further conviction. The average follow up time for the sample was 415.2 days (Range = 1 to 1712 days). Of the 869 cases in this study, 315 (36.2%) were identified as having reoffended (and being re-convicted) for an offence during their follow up period. For those who reoffended, the average time to recidivism was 189 days (Range = 1 to 983 days; Median = 150 days). The recidivism rate for the non-contact group of offenders was higher than the two contact groups (Index Child/Index Adult). A chi square test for independence (with a Yates Continuity Correction) confirmed that the difference in recidivism for the contact groups compared with the non-contact group was statistically significant $X^2(1, 869) = 8.77, p = .003$,

$\phi = .109$. To maintain consistency within the data, the non-contact offender group was removed from the remainder of analyses.

Table 3

Recidivism Rates

Recidivism Type	Total sample N (%)	Index Child N (%)	Index Adult N (%)	Index Non-contact N (%)
Any recidivism	315 (36.2)	152 (28.7)	150 (46.7)	13 (72.2)
Any sexual	29 (3.3)	10 (1.9)	14 (4.4)	5 (27.8)
Any Violence	57 (6.6)	19 (3.6)	35 (10.9)	3 (16.7)
Any General	155 (17.8)	63 (11.9)	82 (25.6)	10 (55.6)
Any Admin	237 (27.3)	118 (22.26)	112 (34.9)	7 (38.9)

Descriptive Statistics

Initial overviews of the data involved checking for normality by using the total DRAOR score. Figure 1 shows the distribution of the average total DRAOR score for the sample of contact offenders. Results indicate the distribution was normal. Table 4 summarises the descriptive statistics of the static measures and the overall average DRAOR score for each domain. Four cases in the sample were missing RoC*RoI scores, and thus those cases were excluded from any analysis which involved the RoC*RoI.

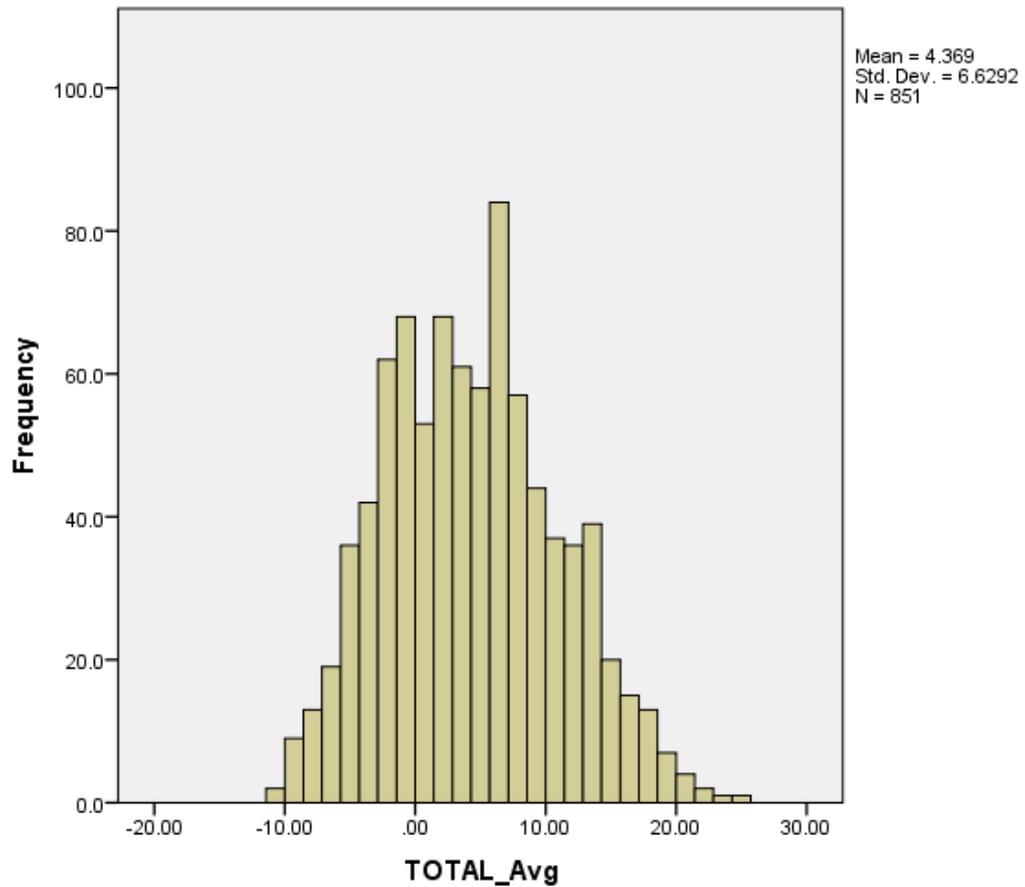


Figure 1. Distribution of Total DRAOR score across the contact offender sample.

Table 4

Descriptive Statistics for Contact Sexual Offenders

	n	Min	Max	Mean	SD
RoC*RoI	847	.00587	.92928	.3413847	.25112665
ASRS	851	0	7	2.128	1.6136
DRAOR					
Stable subscale	851	0	12	5.8175	2.68957
Acute subscale	851	.08	13.67	5.1554	2.20759
Protective subscale	851	0	12	6.6039	2.56441
Total score	851	-10.93	25.33	4.3690	6.62920

Comparisons Between Recidivists and Non-Recidivists

To investigate whether there were differences between recidivists and non-recidivists, correlational analyses were used. Results of the bivariate correlational analyses between recidivism and assessment tools and domains are displayed in Table 5. Examination of these correlations show that the DRAOR domains were significantly correlated with all recidivism types except for sexual recidivism, where only the Acute domain was significantly correlated at the .05 level (2-tailed).

Table 5

Bivariate Correlational Analyses of Assessment Tools and Recidivism

Variable	Type of Recidivism				
	All	Sexual	Violent	General	Admin
RoC*RoI	.478**	.080*	.230**	.430**	.383**
ASRS	.471**	.193**	.293**	.357**	.390**
DRAOR Stable	.333**	.019	.184**	.201**	.314**
DRAOR Acute	.386**	.073*	.260**	.235**	.368**
DRAOR Protective	-.329**	-.060	-.167**	-.206**	-.308**
DRAOR Total	.391**	.055	.226**	.239**	.369**

Note: * Correlation is significant at the .05 level (2-tailed) and ** Correlation is significant at the 0.01 level (2-tailed).

Convergent Validity

Further correlational analyses were completed to determine whether the DRAOR total and subscale scores are assessing similar constructs to the static tools, and are displayed in Table 6. The correlations among all measures were significant at the $p < .01$ level, with the largest correlation between the ASRS and DRAOR total domain. As expected, the two DRAOR

risk factor domains were positively correlated with one another, and the DRAOR protective domain was negatively correlated with the DRAOR risk domains and the other static tools.

Table 6

Correlational Analyses of Risk Assessment Measures

	RoC*RoI	ASRS	DRAOR Stable	DRAOR Acute	DRAOR Protective	DRAOR Total
RoC*RoI	1					
ASRS	.602**	1				
DRAOR						
Stable	.374**	.449**	1			
Acute	.396**	.452**	.681**	1		
Protective	-.251**	-.365**	-.731**	-.627**	1	
Total	.380**	.474**	.915**	.852**	-.892**	1

Note: **. Correlation is significant at the 0.01 level

Cox Regression Survival Analysis: Univariate

To examine how effectively the average scores of the DRAOR domains are able to predict time to recidivism (sexual, violent and general) five univariate cox regression survival analyses were completed. Table 7 shows the results from the univariate cox regression analyses for the sexual recidivists. The only DRAOR domain which did not significantly predict time to sexual recidivism was the Stable domain, with two other domains and the total score all demonstrating a significant independent association.

Table 7

Cox Regression Survival Analysis Predicting Sexual Recidivism: Univariate Analysis

Variable	X^2	p	B	SE	p	$Exp(B)$	95% CI for $Exp(B)$
ASRS	45.103	<.001	.889	.147	<.001	2.432	[1.822, 3.246]
DRAOR							
Stable	1.918	.166	.107	.078	.168	1.113	[.956, 1.297]
Acute	10.067	.002	.267	.085	.002	1.306	[1.105, 1.544]
Protective	6.983	.008	-.204	.078	.009	.816	[.700, .951]
Total	6.936	.008	.081	.031	.009	1.084	[1.020, 1.153]
DRAOR domains concurrently	13.80	.003					
Stable			-.201	.127	.113	.818	[.638, 1.049]
Acute			.288	.123	.019	1.333	[-1.049, 1.695]
Protective			-.192	.116	.098	.825	[.657, 1.036]

Table 8 displays the univariate Cox regression results for the violent recidivists. In contrast to the results for sexual recidivists, when analysing the prediction of time to violent recidivism, all of the DRAOR domains were found to be significant. Table 8 shows that a one point increase across the DRAOR Stable, Acute, Protective and Total domains led to a 45%, 67.2%, 27.5% and 19.8% increase in likelihood of violent recidivism, respectively. Entering the three domains simultaneously in Block one indicated that as a collective model they are also significant, however, only the Acute domain made a significant contribution within this. This indicates that only the Acute domain makes an independent contribution to the prediction of a new violent conviction.

Table 8

Cox Regression Survival Analysis Predicting Violent Recidivism: Univariate Analysis

Variable	X^2	p	B	SE	p	$Exp(B)$	95% CI for $Exp(B)$
RoC*RoI	62.572	<.001	4.402	.626	<.001	81.579	[23.913, 278.308]
DRAOR							
Stable	48.493	<.001	.372	.056	<.001	1.450	[1.299, 1.619]
Acute	95.707	<.001	.514	.056	<.001	1.672	[1.498, 1.865]
Protective	41.802	<.001	-.322	.051	<.001	.725	[.656, .802]
Total	73.763	<.001	.181	.022	<.001	1.198	[1.147, 1.252]
DRAOR domains concurrently							
Stable			.106	.083	.201	1.112	[.945, 1.307]
Acute			.429	.075	<.001	1.535	[1.326, 1.777]
Protective			-.036	.075	.634	.965	[.833, 1.118]

Table 9 summarises the prediction of time to general recidivism. Independently, all DRAOR domains significantly predicted time to general recidivism, with a one point increase of the DRAOR total score indicative of a 13.2% increase in the relative rate. Entering the three DRAOR domains simultaneously was also significantly predicted of time to this type of recidivism, with both the Acute and Protective subscales independently significantly contributing to this model.

Table 9

Cox Regression Survival Analysis Predicting General Recidivism: Univariate Analysis

Variable	X^2	p	B	SE	p	$Exp(B)$	95% CI for $Exp(B)$
RoC*RoI	209.015	<.001	5.076	.407	<.001	160.195	[72.196, 355.452]
DRAOR							
Stable	64.938	<.001	.255	.032	<.001	1.291	[1.211, 1.375]
Acute	94.899	<.001	.338	.035	<.001	1.402	[1.308, 1.503]
Protective	67.234	<.001	-.253	.031	<.001	.776	[.730, .826]
Total	94.326	<.001	.124	.013	<.001	1.132	[1.103, 1.161]
DRAOR domains concurrently							
Stable			.068	.050	.169	1.071	[.971, 1.180]
Acute			.227	.050	<.001	1.255	[1.139, 1.383]
Protective			-.092	.047	.048	.912	[.832, .999]

Cox Regression Survival Analysis: Multivariate

The dynamic variables found to be independently predictive of survival time in the univariate analyses were included in subsequent hierarchical cox regression analyses to explore the incremental predictive validity of the dynamic domains over and above static risk. Hierarchical cox regression takes place in two “blocks”. In the first, as used in the univariate analyses, the measure being controlled for (static risk) is entered. In block two any other domains, or combination of domains, were entered to determine whether they significantly improve the prediction model over and above the block one entry. For the prediction of sexual recidivism, ASRS was entered into block one, with each dynamic domain and DRAOR total score entered into the second block. For violent and general recidivism, the RoC*RoI scores

replaced ASRS scores in the first block. The final model for each analysis had the DRAOR domains entered concurrently in the second block.

Table 10 displays the multivariate results for the sexual recidivist group. None of the DRAOR domains made an independent contribution to the prediction of a new sexual conviction over and above the ASRS score. Entering the domains concurrently in Block two also did not significantly change the overall prediction model from the initial ASRS entered alone in Block one. While it does appear that the Stable domain significantly contributed to the prediction model when entered in Block two with the other DRAOR domains, this is not in the positive direction intended by the DRAOR. This result is surprising given the direction of the domains association with recidivism in the univariate analysis (see Table 7), and indicates that the Stable domain may not be reliable in the prediction of sexual recidivism for this sample. Overall, these results indicate that the DRAOR is not contributing significant information concerning risk of sexual recidivism over and above the ASRS.

DRAOR domains appeared to be better predictors over static risk when measuring violent and general recidivism. Table 11 displays the multivariate results for violent and general recidivists, respectively. Table 11 shows that entering the DRAOR total score in Block two significantly predicted time to violent re-offence over the RoC*RoI, as was the case when the three DRAOR domains were added individually in Block two. Concurrently entering the domains in Block two also significantly improved the prediction of time to violent recidivism. However, only the RoC*RoI and Acute DRAOR domain significantly contributed uniquely to this model. Analyses of prediction to general recidivism yielded similar results, and are summarised in Table 12. The DRAOR total score and individual domains assisted prediction to general recidivism over and above the RoC*RoI, and concurrently the DRAOR domains also improved the predictive model. These results support DRAOR's ability to predict both violent and general recidivism over and above static risk.

Table 10

Cox Regression Survival Analysis Predicting Sexual Recidivism: Multivariate Analysis

Variable	X^2 change	p	B	SE	p	$Exp(B)$	95% CI for $Exp(B)$
Block 1							
ASRS			.889	.147	<.001	2.432	[1.822, 3.246]
Block 2							
	1.695	.193					
ASRS			.952	.153	<.001	2.591	[1.918, 3.500]
DRAOR Stable			-.110	.084	.192	.896	[.759, 1.057]
Block 1							
ASRS			.889	.147	<.001	2.432	[1.822, 3.246]
Block 2							
	.123	.726					
ASRS			.870	.157	<.001	2.386	[1.753, 3.248]
DRAOR Acute			.035	.098	.725	1.035	[.854, 1.255]
Block 1							
ASRS			.889	.147	<.001	2.432	[1.822, 3.246]
Block 2							
	.403	.525					
ASRS			.868	.152	<.001	2.381	[1.768, 3.208]
DRAOR Protective			-.053	.084	.524	.948	[.804, 1.117]
Block 1							
ASRS			.889	.147	<.001	2.432	[1.822, 3.246]
Block 2							
	.022	.882					
ASRS			.897	.156	<.001	2.451	[1.805, 3.328]
DRAOR Total			-.005	.035	.882	.995	[.930, 1.065]
Block 1							
ASRS			.889	.147	<.001	2.432	[1.822, 3.246]
Block 2							
	7.422	.060					
ASRS			.940	.161	<.001	2.561	[1.867, 3.514]
DRAOR Stable			-.359	.140	.011	.699	[.531, .920]
DRAOR Acute			.117	.128	.360	1.125	[.875, 1.446]
DRAOR Protective			-2.45	.125	.050	.783	[.613, 1.000]

Table 11

Cox Regression Survival Analysis Predicting Violent Recidivism: Multivariate Analysis

Variable	X^2 change	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>Exp(B)</i>	95% CI for <i>Exp(B)</i>
Block 1							
RoC*RoI			4.402	.626	<.001	81.579	[23.913, 278.308]
Block 2	20.994	<.001					
RoC*RoI			3.432	.648	<.001	30.943	[8.689, 110.193]
DRAOR Stable			.262	.059	<.001	1.300	[1.157, 1.461]
Block 1							
RoC*RoI			4.402	.626	<.001	81.579	[23.913, 278.308]
Block 2	44.832	<.001					
RoC*RoI			2.986	.665	<.001	19.799	[5.377, 72.897]
DRAOR Acute			.415	.061	<.001	1.515	[1.344, 1.708]
Block 1							
RoC*RoI			4.402	.626	<.001	81.579	[23.913, 278.308]
Block 2	20.899	<.001					
RoC*RoI			3.775	.634	<.001	43.605	[12.585, 151.086]
DRAOR Protective			-.243	.052	<.001	.784	[.708, .869]
Block 1							
RoC*RoI			4.402	.626	<.001	81.579	[23.913, 278.308]
Block 2	37.187	<.001					
RoC*RoI			3.104	.652	<.001	22.298	[6.210, 80.069]
DRAOR Total			.140	.024	<.001	1.150	[1.098, 1.204]
Block 1							
RoC*RoI			4.402	.626	<.001	81.579	[23.913, 278.308]
Block 2	45.780	<.001					
RoC*RoI			2.909	.671	<.001	18.343	[4.924, 68.330]
DRAOR Stable			.038	.084	.649	1.039	[.881, 1.225]
DRAOR Acute			.367	.080	<.001	1.443	[1.234, 1.688]
DRAOR Protective			-.042	.074	.573	.959	[.830, 1.109]

Table 12

Cox Regression Survival Analysis Predicting General Recidivism: Multivariate Analysis

Variable	X^2 change	<i>p</i>	<i>B</i>	<i>SE</i>	<i>p</i>	<i>Exp(B)</i>	95% CI for <i>Exp(B)</i>
Block 1							
RoC*RoI			5.076	.407	<.001	160.195	[72.196, 355.452]
Block 2							
	11.451	.001					
RoC*RoI			4.644	.424	<.001	103.983	[45.330, 238.527]
DRAOR Stable			.112	.034	.001	1.119	[1.048, 1.195]
Block 1							
RoC*RoI			5.076	.407	<.001	160.195	[72.196, 355.452]
Block 2							
	24.170	<.001					
RoC*RoI			4.493	.423	<.001	89.373	[39.023, 204.690]
DRAOR Acute			.193	.039	<.001	1.213	[1.125, 1.308]
Block 1							
RoC*RoI			5.076	.407	<.001	160.195	[72.196, 355.452]
Block 2							
	25.522	<.001					
RoC*RoI			4.653	.412	<.001	104.899	[46.762, 235.315]
DRAOR Protective			-.164	.032	<.001	.849	[.797, .904]
Block 1							
RoC*RoI			5.076	.407	<.001	160.195	[72.196, 355.452]
Block 2							
	26.044	<.001					
RoC*RoI			4.434	.423	<.001	84.251	[36.757, 193.111]
DRAOR Total			.069	.014	<.001	1.071	[1.043, 1.100]
Block 1							
RoC*RoI			5.076	.407	<.001	160.195	[72.196, 355.452]
Block 2							
	31.415	<.001					
RoC*RoI			4.505	.428	<.001	90.469	[39.102, 209.313]
DRAOR Stable			-.042	.050	.408	.959	[.870, 1.058]
DRAOR Acute			.132	.054	.015	1.141	[1.026, 1.270]
DRAOR Protective			-.123	.046	.007	.884	[.808, .967]

Recidivism Base Rates

To provide information about predicted recidivism rates associated with DRAOR scores, a series of logistic regressions were completed. Figure 2 displays the base rates of recidivism occurring within two years post release based on the average total DRAOR score during the first six months of release. Examination of these rates indicates that generally there is an increased probability of violent, general and administrative recidivism as the total DRAOR scores increase. This trend becomes more rapid when the scores are positive (i.e. higher risk and lower protective scores). While the trend appears to be the same for the predictive probabilities of sexual recidivism, the base rate for this type of recidivism does not appear to exceed a 10% chance of occurring, compared with administrative recidivism reaching approximately a 75% change of occurring when the total score is 24 (the maximum total DRAOR score).

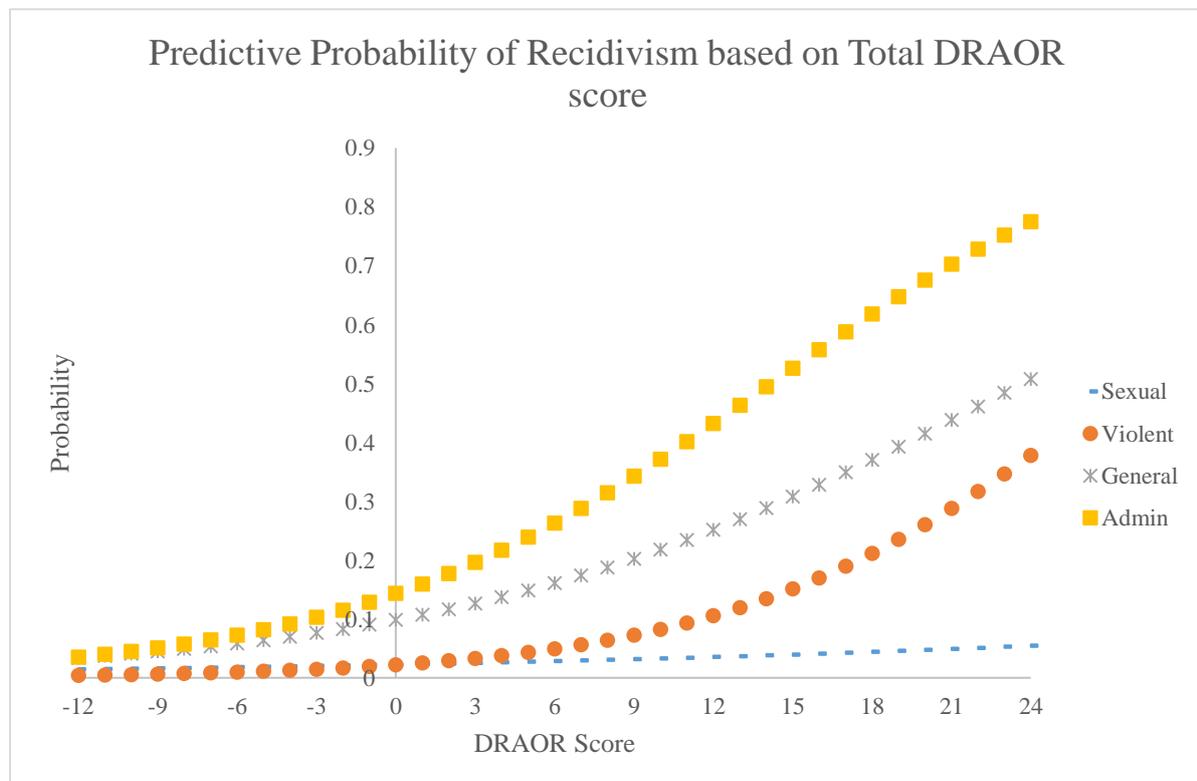


Figure 2. Predictive probability of recidivism based on Total DRAOR score.

Patterns of Change Over Time in DRAOR Scores

An initial examination of the data patterns was completed using a visual examination, comparing scores across recidivists and non-recidivists with a line graph. Those points on the graph not connected by the line fit with their corresponding type of recidivism, however, were disconnected when the number of cases remaining in the group fell below five; ultimately becoming less reliable in determining potential trends in the data.

Figure 3 displays the average fortnightly DRAOR total score for contact offenders over the first two years post release. There appeared to be a downward trend in scores across all offenders, with non-recidivists starting with, and predominantly maintaining, lower overall scores than the recidivists. There was large variability in scores near the end of the two year period. However, this is likely to reflect the drop in cases over this period. As the number of cases used to calculate the average at each fortnight is unable to be confirmed, this visual representation should be interpreted with caution.

The first year post release was chosen for further investigation as the same size was consistently above five offenders for each recidivist group. Figure 4 displays this in the same manner as the data two years post release displayed in Figure 3.

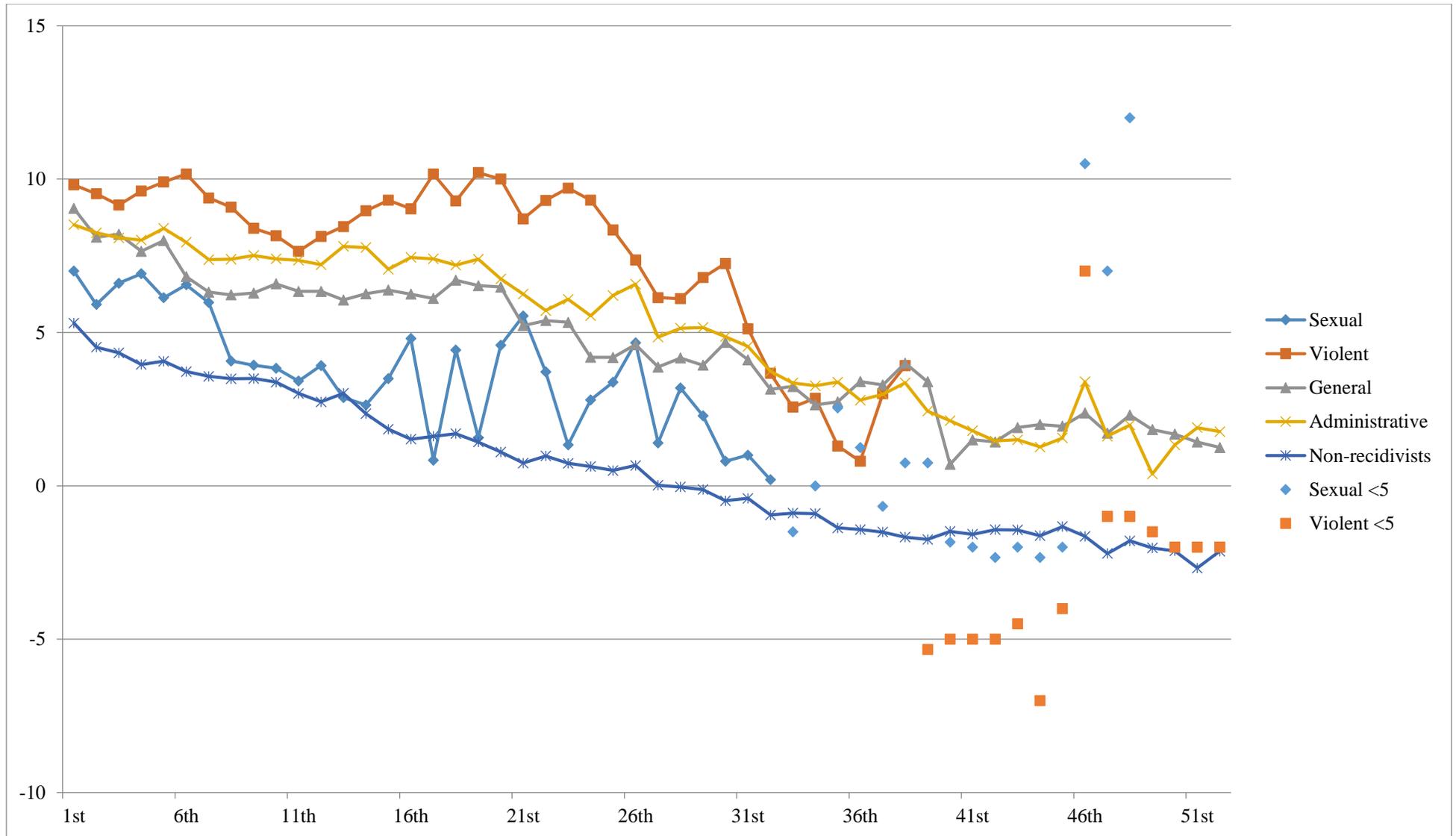


Figure 3. Fortnightly Average Total DRAOR Score over two years post release

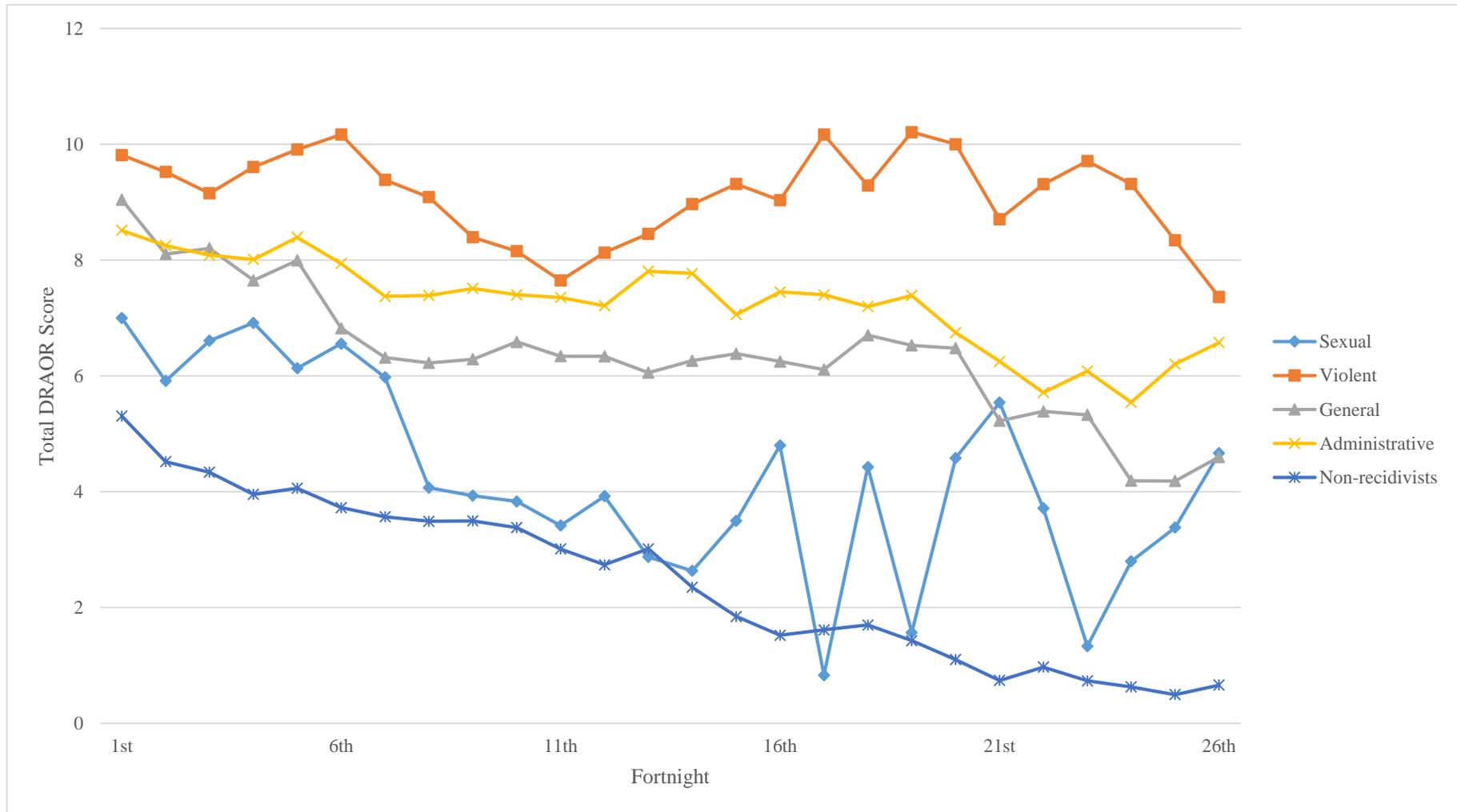


Figure 4. Fortnightly Average Total DRAOR Score over one year post release

To investigate the changes in total DRAOR scores over the first 12 months post release mixed model analyses were conducted. The scores over this period were consolidated into six different time points across the first 12 months post release. The first five time points were the average score across every four fortnights, and the sixth time point was the average of the remaining six fortnights. Scores of non-recidivists were compared to each group of recidivists (violent, sexual, general and administrative) individually. A visual representation of score differences at the six time points is displayed for each type of recidivism versus non-recidivists in Figure 5. Downward trends appear more notable for non-recidivists compared with the violent, general and administrative types of recidivism. These types of recidivists appear to have relatively stable scores across the six time points. Sexual recidivists on the other hand seem to have a slight downwards trend, suggesting a small reduction in risk score over time, similar to that of the non-recidivists.

These observations were confirmed with a series of mixed-model analyses. For each recidivist comparison, variations in scores at the six time points were best modelled using an unstructured covariance structure. A significant effect of Group \times Time for any model (comparing a recidivist group against non-recidivists) indicates that differences across time are different between the groups (e.g. scores over time change significantly differently between groups). For the model comparing violent recidivists vs non-recidivists, there was a significant effect for group [$F(1,593) = 57.027; p < .001$], time [$F(5, 484) = 5.736; p < .001$], and Group \times Time [$F(5, 484) = 6.528; p < .001$]. General recidivists vs non-recidivists was similar, with significant effects of group [$F(1,674) = 68.898; p < .001$], time [$F(5,551) = 25.852; p < .001$], and Group \times Time [$F(5, 551) = 3.656; p = .003$], as was admin recidivists vs non-recidivists who also had significant group [$F(1, 756) = 121.512; p < .001$], time [$F(5, 600) = 22.302; p < .001$], and Group \times Time [$F(5, 600) = 11.649; p < .001$] effects. Sexual recidivists vs non-recidivists displayed significant effects of group [$F(1, 578) = 6.963; p = .009$] and time [$F(5,$

448) = 6.374; $p < .001$] however, not a main effect of Group \times Time [$F(5, 448) = 1.284$; $p = .284$]. Overall, these analyses indicate that sexual recidivists, while have higher scores, have a similar downward trend in scores overtime to non-recidivists, whereas violent, general and administrative recidivists have higher scores which are also more stable over time than the non-recidivists.

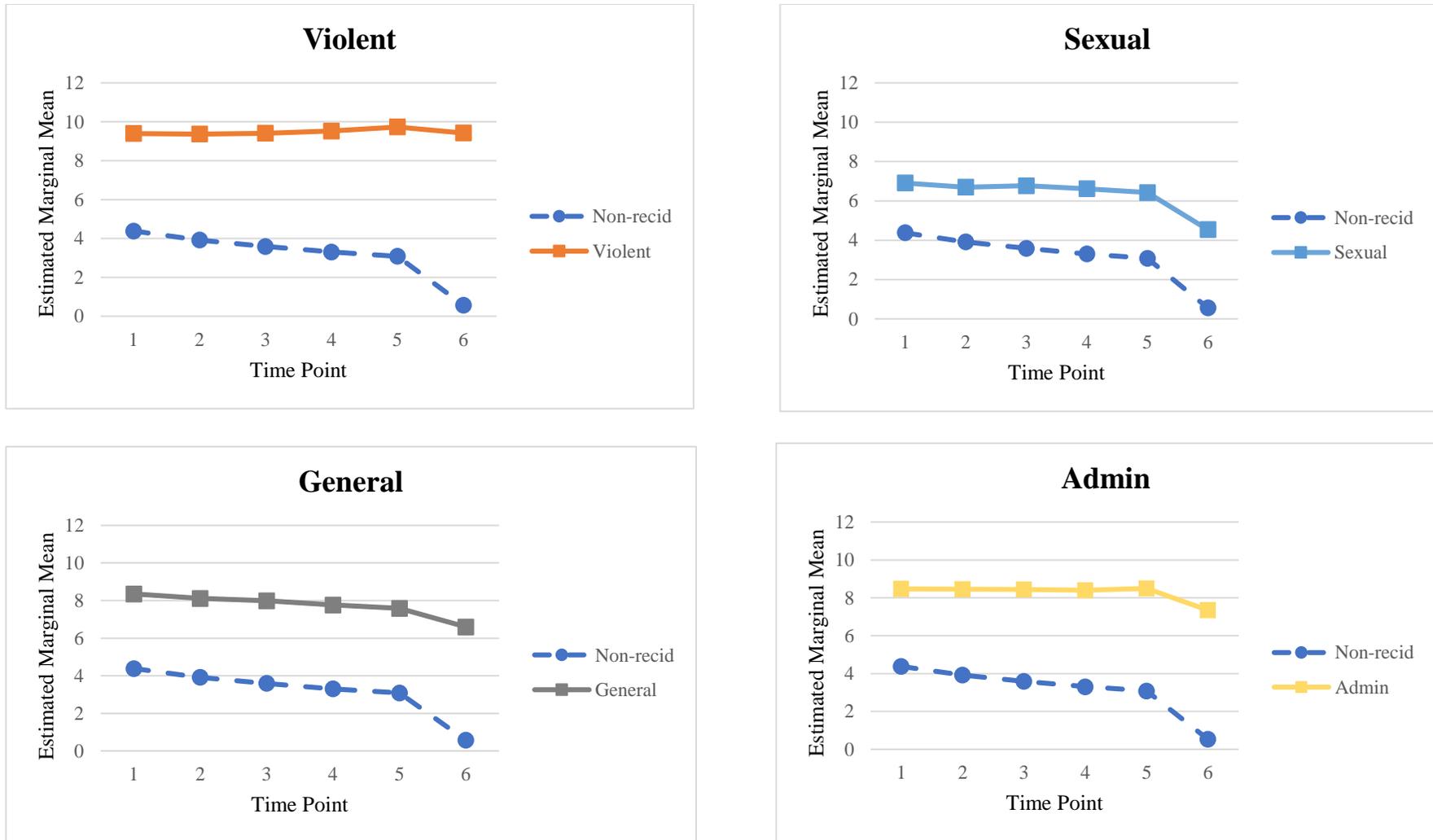


Figure 5. Group differences in total DRAOR score across 12 months, averaged across six time points

Testing for Trends Prior to Recidivism

To determine if there were changes in scores prior to reoffending, data from recidivists were analysed for possible trends. Figure 6 graphs each DRAOR domain scores and the total DRAOR scores backwards five fortnights from the date of recidivism, for different groups of recidivists.

Figure 6 shows that stable scores appeared to increase slightly in the month leading to violent, general and administrative recidivism. There also appears to be a slight upwards trend towards recidivism for the Acute domain, and downwards for the Protective domain. More clearly displayed when observing the total score trend is a spike in scores prior to violent, general and administrative recidivism. This result was not found for the sexual recidivist cases.

These observations were evaluated by testing for linear and/or quadratic trends in DRAOR scores leading up to recidivism using a one-way repeated-measures ANOVA. This type of analysis requires no missing data for each case, meaning a score for each fortnight over the set period of time was required of the chosen sample. These analyses used the five time points (fortnights) leading up to each type of recidivism (as displayed in Figure 6) in order to retain as many recidivists as possible. This resulted in the number of cases for the sexual, violent, general and administrative recidivist groups being 17, 32, 67 and 95, respectively (reduced from 24, 54, 145, and 230 overall recidivists in each respective group due to missing data). For each analysis the Greenhouse-Geisser correction was used as the univariate repeated measures assumptions were violated. A summary of the overall F ratio and the linear and quadratic contrasts are displayed in Table 13.

Results in Table 13 show that DRAOR scores for sexual, violent, and general recidivists did not have significant linear or quadratic trends, although a small increase is apparent for violent recidivists in Figure 6. However, the quadratic trend was significant for administrative

recidivists, confirming that the sudden increase in DRAOR scores for this group prior to recidivism was significant. Possible reasons for this result will be addressed in the Discussion.

These analyses were repeated using three and four time points prior to recidivism in an attempt to increase sample size. Despite the increased sample size (e.g. with three time points the sample sizes were sexual = 19, violent = 43, general = 87 and admin = 127), the results were similar to those obtained with five time points.

Table 13

One-Way Repeated Measures ANOVA – 5 Fortnights Prior to Recidivism

Recidivism	<i>F</i>	<i>df</i>	<i>p</i>
Sexual	2.679	[1.75, 27.93]	.093
Linear	3.385	[1,16]	.084
Quadratic	.002	[1,16]	.966
Violent	1.220	[1.29, 40.07]	.289
Linear	1.689	[1, 31]	.203
Quadratic	1.111	[1, 31]	.300
General	1.732	[2.24, 148.02]	.176
Linear	1.862	[1, 66]	.117
Quadratic	2.017	[1, 66]	.160
Administrative	2.572	[1.88, 177.09]	.083
Linear	.089	[1, 94]	.766
Quadratic	11.673	[1, 94]	.001**

Note: * F ratio significant at the .05 level, and ** F ratio significant at the .01 level

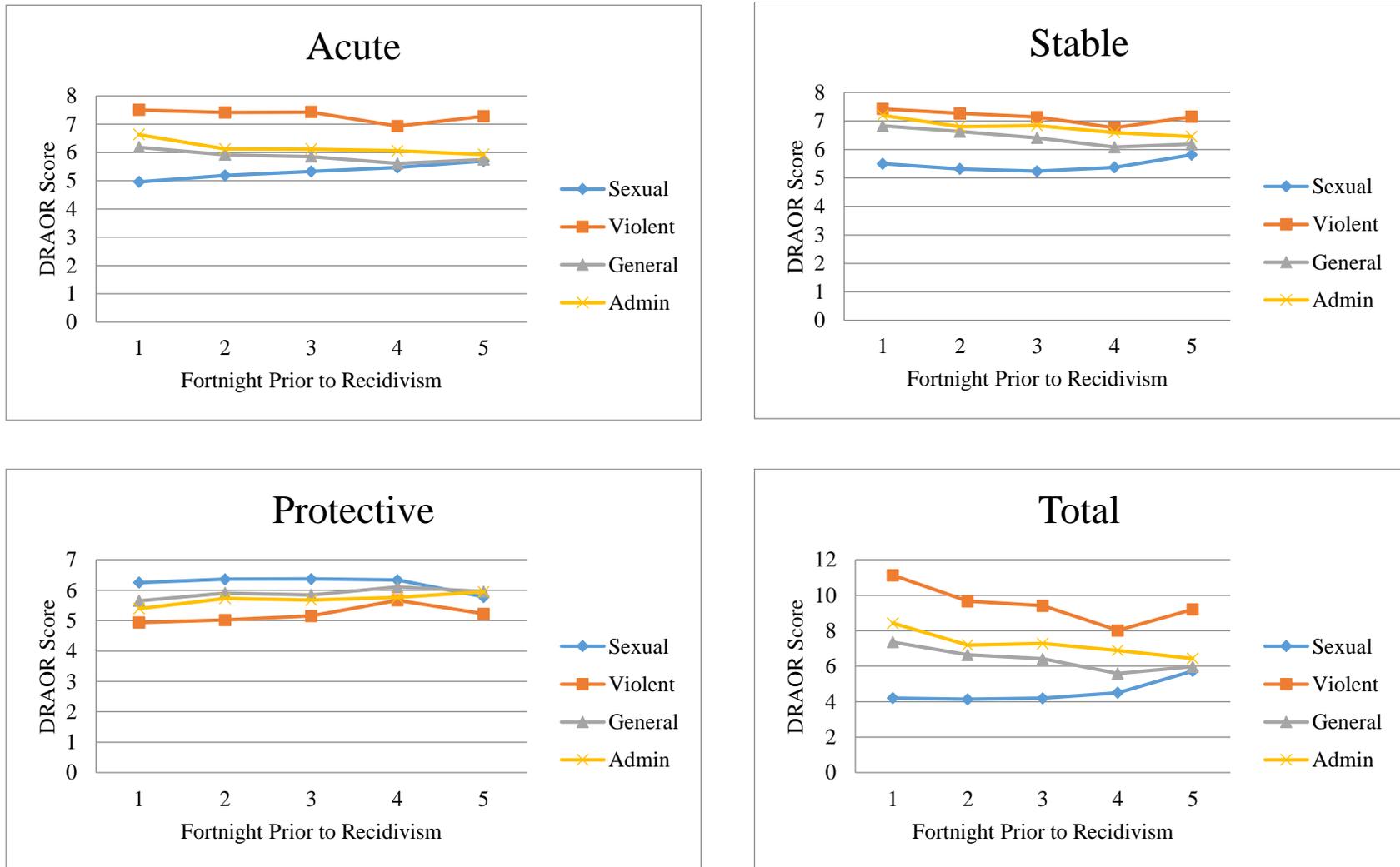


Figure 6. Fortnightly Average DRAOR Domain Score Backwards From Date of Recidivism

Natural Groups on Release

Finally, we conducted a model-based cluster analysis to explore whether there were different patterns of change in DRAOR scores (total and domain) post-release. A series of two-step cluster analyses was used for this purpose, and required full records for each case. To ensure consistency and complete data, only those cases which had at least one assessment completed each fortnight over the first two months post release were retained, leaving 671 cases. Figure 7 displays the clusters identified during the analyses. Three clusters were identified for the total DRAOR score, and four found for the Stable and Protective domains and three for the Acute domain. All clusters were considered to have good quality, with their silhouette coefficients (measure of cohesion and separation) larger than 0.5. Across this first two month period there are distinct clusters for all DRAOR domains. All groups for each DRAOR domain and total score differ in terms of their score level, however, there also appears to be slight differential patterns of change in scores during the two month period post release (for example, cluster 1 in the total score group appears to be decreasing while others remain more stable).

To test whether there was a cluster \times time interaction, two-way repeated measures ANOVA analyses were used. The total DRAOR score [$F(3.87, 1290.96) = 19.92; p < .001$], Stable domain [$F(5.64, 1252.98) = 16.62; p < .001$], and the Protective domain [$F(5.79, 1287.71) = 17.12, p < .001$] all showed significant interactions at the .01 level between cluster and time, indicating that score changes differ between the clusters. The Acute domain [$F(2.174, 1454.29) = 3.401; p = .03$] was also significant, although at the .05 level. This confirms the observation that some changes in scores may be occurring differently between the identified clusters.

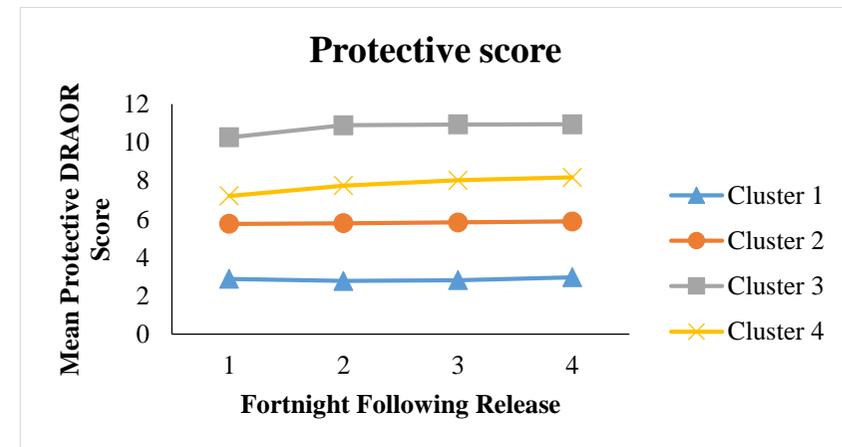
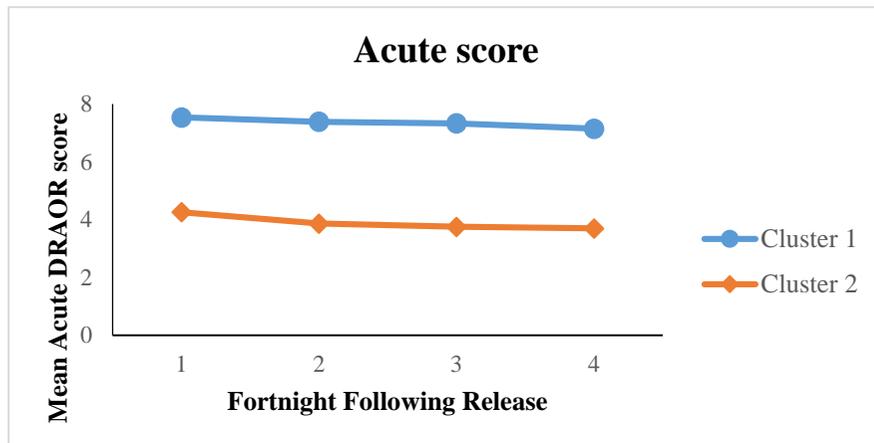
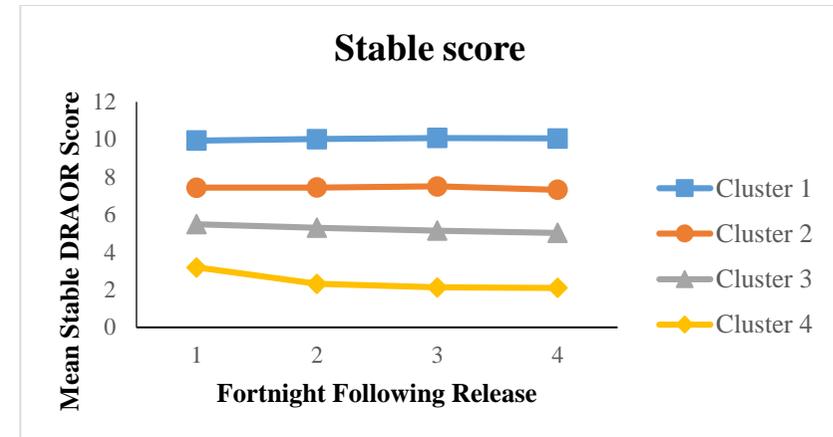
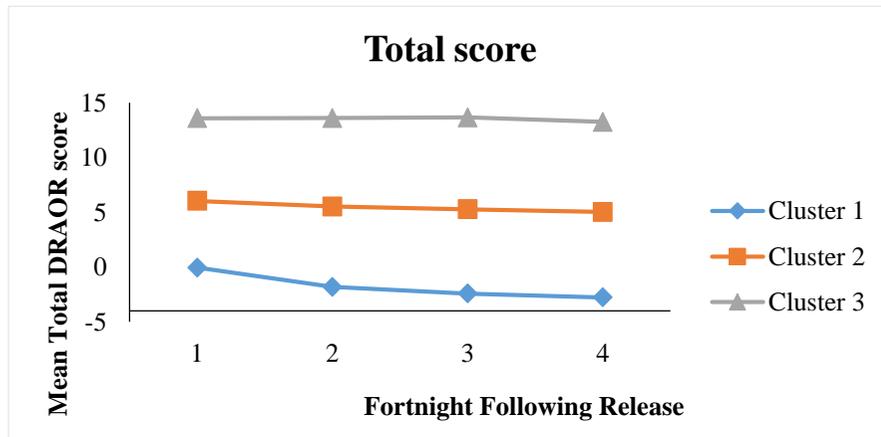


Figure 7. Two-step cluster analyses for DRAOR domains

Discussion

The goal of the present study was to explore the utility of the DRAOR tool in the assessment and management of recidivism risk with a cohort of sexual offenders in New Zealand. More specifically, we investigated the predictive validity of the DRAOR for recidivism, including whether it increased accuracy beyond static tools, and explored patterns of adjustment on release. Consistent with previous research (Hanby, 2013; Yesberg & Polaschek, 2015), there were significant correlations between the DRAOR domains and with the RoC*RoI and ASRS static tools, which is supportive of the convergent validity of the measure. Also encouraging were the significant correlations between recidivism and the individual DRAOR domains. The findings of this study support the continued use of the DRAOR. Scores significantly predicted violent and general recidivism for this sample, and increase in the overall DRAOR score was apparent in the months preceding these types of re-offences.

Predictive Validity

Comparisons of the DRAOR with static tools (the ASRS and RoC*RoI) were promising, supporting the DRAOR as a measure of recidivism risk. DRAOR domain scores were also significantly correlated with all types of recidivism, excluding sexual recidivism, where only the correlation for the Acute domain was significant. Overall, the DRAOR has good predictive validity for violent, general and administrative re-offences.

Further investigation of the DRAOR's predictive validity with the cohort was established using a series of univariate and multivariate Cox regression survival analyses. Previous research with the DRAOR has concluded that it is able to predict recidivism over and above static risk (Hanby, 2013; Yesberg & Polaschek, 2015), however, this was not found for predicting sexual recidivism alone (Smeth, 2013). The findings of this study are supportive of this study's first hypothesis, that the DRAOR has good predictive ability for time to violent,

general, and administrative offences for a sexual offender population in New Zealand. All DRAOR domains and the total DRAOR score provided incremental predictive validity over and above the Roc*RoI score for these types of recidivism. Prediction of time to sexual recidivism was independently predicted by DRAOR total scores and Acute and Protective domains, however, similar to Smeth (2013), this result was not significant when controlling for static risk (in this case, the ASRS score).

Base Rates. Because our findings supported the use of DRAOR for predicting a range of recidivism outcomes, logistic regression analyses were completed to estimate two-year recidivism base rates for violent, general, administrative and sexual reoffending associated with particular DRAOR scores. As the total score increased and entered the positive range, the general trend for recidivism rates similarly increased. The increase in recidivism rate with DRAOR score appeared to be steepest for administrative recidivism, increasing to approximately a 75% rate when the DRAOR total score was at its maximum. At this maximum score, the rates for violent and general recidivism appeared to be within the 30-50% rate range, and the sexual recidivism rate did not exceed 10% at any stage. Although not investigated in this study, the high rate of administrative offences is potentially a reflection of sentence compliance decreasing as recidivism rate increases. It is also possible that when scores are higher on the DRAOR, Probation Officers are more vigilant to potential sentence non-compliance, and therefore more likely to take action in an attempt to mitigate other possible offending. Examination of how probation officers respond to increases in DRAOR scores would help to investigate this possibility.

Patterns of Change Over Time

A further aim of this research was to determine whether there are common patterns of scores which would assist identification of potential outcomes, or early warning signs that indicate that further intervention is required. Hanby (2013) found that while there was a general

downward trend in DRAOR risk scores (and upwards for protective factors) there was a spike in the Stable risk score prior to any new recidivism and criminal recidivism alone, and a drop in the Protective domain score. Thus we expected for the present study that the risk assessment scores closest to recidivism would increase prior to recidivism, and that the protective score would decrease. Contrary to this prediction, we found a stable, and somewhat increasing risk (and decreasing protective) score for the recidivists in the five weeks prior to recidivism. A visual examination of the total DRAOR scores show that a small spike in score may have occurred for the violent, general and administrative recidivists, however, statistically, only the administrative recidivists had a significant quadratic trend, indicative of a potential spike in their score prior to an administrative offence. A plausible explanation for the spike prior to administrative recidivism is the increased vigilance by Probation Officers, as discussed previously for the high base rate of administrative offences as DRAOR score increased. The sudden escalation in score likely prompts the Probation Officer to take administrative action (e.g. breach) more rapidly than when scores are lower in an attempt to deter an individual from engaging in higher level offences (e.g. violent, general or sexual). Hanby's (2013) study investigated this trend prior to recidivism for all recidivists (including administrative recidivism) and criminal reconvictions as a collective group, which may in part explain the difference in our study as we explored recidivists as independent groups (violent, general, sexual and administrative).

The increasing risk and decreasing protective score is an observable trend leading up to recidivism, however, following release, overall risk scores appear to decrease with time. This alternative temporal ordering of scores would not be affected by the individual increases in scores for offenders who are coming close to recidivism. This trend following release was also identified by Hanby (2013), who observed risk scores decreasing and protective scores increasing over time. Hierarchical linear modelling analyses in this study confirmed a

significant effect of time for changes in DRAOR total score for all the recidivist vs non-recidivist models. Group \times Time effects were also apparent for the all models excluding the sexual recidivist vs non-recidivist model. The significant interaction effect showed that change over the first year may also differ between the recidivists and the non-recidivists. This being that the non-recidivists risk scores decreased over time whereas the recidivist groups (excluding sexual recidivists) did not. As this effect was not significant for the sexual recidivists vs non-recidivists model it would appear that these groups have a similar downward trend over time. Visual representations of the six time points indicate that scores decrease more rapidly for the non-recidivists compared with the violent, general and administrative recidivists whose scores are more stable over this period. It is possible that the decreasing scores for the non-recidivists is representative of successful reintegration, whereas the lack of decrease suggests that recidivists are failing to achieve this.

In addition to differences in DRAOR scores based on recidivism, a series of two-step cluster analyses identified two to four distinct groups in the first two months following release. All groups identified differed in terms of their risk level (DRAOR score), with some indication of significant differential changes in DRAOR scores. This ultimately suggests that in the first two months of release there may be distinct patterns of DRAOR score changes that may help to classify different outcome groups of offenders. The ways in which these clusters differ requires further investigation; however, it appears that there are distinct groups of risk level scores, with some remaining stable over this two month period. This possibly may be replicating the above observation that non-recidivists have a decrease in their scores over time whereas recidivists may be more stable.

Implications

Because sexual offenders are a distinct offender subtype, it is important to validate the DRAOR with sexual offenders specifically. Sex offenders are generally an offender group of

significant public concern due to the high level of harm sexual offences cause (Andrews & Bonta, 2010; Hanson et al., 2007; Harris & Hanson, 2010; Mann et al., 2010). Previous research by Smeth (2013) in IOWA concluded that the DRAOR was able to predict sentence violations (administrative recidivism) however, that it was unable to predict risk of an offender going on to commit further sexual offences. As this study is the first on DRAOR specifically for a New Zealand sexual offender population, it was important to find out not only if it was valid for general types of recidivism, but also for sexual offences. The DRAOR is currently being used at every significant contact with offenders in New Zealand who are managed on a sentence by the New Zealand Department of Corrections Probation service, similar to those in our sample, and this present research supports the continued use of the DRAOR in this way. Although the focus with sexual offenders is their risk for sexual recidivism, consideration also needs to be placed on their risk of other types of recidivism. The findings highlight the need to take into consideration what changes of scores on the DRAOR are used to predict what aspects of risk for an offender. Violent and general recidivism, for example, are appropriately measured by the DRAOR, and base levels of scores can assist probation officers to take action aimed at mitigating potential recidivism based on these. For sexual offences, whereas it is still useful to consider them in other aspects of the tool not investigated in this study (i.e. risk scenarios), there was no evidence that DRAOR could significantly predict sexual recidivism. This was likely due to the low base rate of sexual recidivism in this study (2.8% of the contact sexual offender sample). As such, the finding that DRAOR does not provide incremental information over static risk for predicting sexual recidivism is likely due to limited statistical power. Taking into consideration the generally low base rate for sexual recidivism, the follow up time for this study is very short. Therefore, this statistical power may increase if the same cohort has further follow up in 3-5 years. However, based on the indication of results from this study, it is possible that other factors not included within the DRAOR may influence the risk of sexual recidivism,

which is supportive of previous research focused on identifying factors of sexual crime (Craig et al., 2006; Hanson & Harris, 2000; Kewley et al., 2015). The independent predictive ability of the acute domain when not accounting for the static tool could possibly be explained by some factors, such as substance use and hostility, which have empirical links to both general and sexual recidivism (Hanson & Bussière, 1998; Hanson & Morton-Bourgon, 2005). Overall, this study supports the use of the DRAOR for a sexual offender population when assessing risk other than sexual recidivism. As such, best practice would indicate that other validated tools specifically for sexual recidivism (e.g. Stable 2007) would be best suited for assessing this type of risk.

The DRAOR provides useful information for probation officers in aiding decision making and the detections of the general disengagement from monitoring efforts. While the use of scores across DRAOR domains requires further validation regarding its use for sexual recidivism, other aspects of the DRAOR should not neglect the possibility of further sex-offences. When assessing risk scenarios, the allocation of a sexual offence as a ‘most likely’ or ‘most serious’ risk scenario for an offender previously convicted for a sexual offence is an appropriate consideration. When developing risk scenarios for other offences, DRAOR scores can influence the consideration of aggravating, situational and protective factors related to the offences. Given that the validity of these scores for sexual offences are unable to be confirmed by this study, best practice should consider factors from other validated tools be used to inform the specific sex-offence based scenarios. Using the DRAOR alongside tools designed specifically for sexual recidivism, such as the Stable-2007 and Acute-2007 (Harris & Hanson, 2010), will ensure desistance-focused interventions are directed at the most empirically relevant risk factors for the scenario of most concern.

Over time DRAOR scores have a downward trend, with Hanby (2013) indicating that risk domain scores decreased and protective scores increased over time. The findings in this

study were similar, with a downwards trend in scores visible over the follow up period. This downward trend is more clear for the non-recidivists (with a similar trend for sexual recidivists also), with scores for violent, general and administrative recidivist more stable over the first year post release. Another trend observed is a gradual increase in risk (and decrease in protective factors) in the months leading to a new offence. Other research has had similar findings, and commented on a 'spike' in scores occurring closely before recidivism (Hanby, 2013; Yesberg & Polaschek, 2015). This study only found a statistically significant sudden increase in score prior to administrative recidivism and overall higher average scores across time for all recidivists compared with non-recidivists. This finding is valuable for officers using DRAOR scores to predict various types of recidivism. Although a sudden increase in score remains an important indicator of recidivism based on the previous research, Probation Officers would benefit from additionally considering scores over time. Particularly, overall DRAOR scores of a high range which appear stable over time can help to identify early in a sentence which of two offenders with the same (or similar) static risk scores are at the highest risk of recidivism and require intervention. As discussed above, it is possible that the decreasing scores for non-recidivists is indicative of successful re-entry into the community. The lack of this decrease for the violent, general and administrative recidivists on the other hand may indicate a failure to accomplish successful re-entry. Therefore, Probation Officers using the DRAOR should be 'on the lookout' for lack of a decrease in risk over time.

Limitations and Future Research

There are a number of methodological factors that may have influenced the results of this study.

Data Consistency. A possible flaw with the consistency of the data is the time frame of the follow-up. This period includes the initial application of the DRAOR within New

Zealand, which may mean that officer confidence or consistency with scoring of the tool was still developing. Additionally, as the data is information stored within the IOMS system at the Department of Corrections, characteristics of those administering the tool (e.g. knowledge of training and competency) could not be considered. If officers have not been given sufficient training, the validity of the DRAOR will likely be compromised. An aspect of the DRAOR that has not been established is its inter-rater reliability. Further research using a prospective design may be able to address both these administrative limitations with the current DRAOR research. This would also allow for investigation about how probation officers are responding to changes in DRAOR scores amongst different offender populations. For example, testing if the score for the level of concern or harm increases when the DRAOR total score increases, and whether actions being taken may directly mitigate further offending, would be interesting to study. The DRAOR was developed to assist practice, and while its predictive ability appears to be supported in the current literature, its direct use requires further attention.

Low Recidivism Rates. As with much of the research with sexual offenders, one of the most significant limitations of this study was the low rate of recidivism for the sample. Given the limited time that the DRAOR has been used in a New Zealand population, this has considerably limited the available time for follow up data on sexual offenders. Moreover, as an offender population they general have low rates of recidivism (approximately 9-25% over five to 15 years; Hanson & Bussière, 1998; Olver et al., 2007; Skelton et al., 2006). Because cases with Extended Supervision Orders alone were removed during the sample clean, this likely resulted in some data for some of the sexual offenders considered at the highest risk of sexual offending to be removed if they did not additionally have a Parole or Release Conditions sentence that fit within the set criteria. However, while the highest risk, the increased level of monitoring this group receives may have meant that the sexual recidivism rate for this study would not have changed. Future research should consider using longer follow up times to

increase the chance of a larger sexual recidivist population. Additionally, follow up times for our sample varied, with those released earlier potentially having a longer follow up period for recidivism than those released later. This ultimately meant that some of our recidivism data was outside the DRAOR follow up period, occurring instead during the data extraction dates of April 2010 to February 2015.

In addition to the generally low offending rate of sex offenders, previous research has suggested that child sex offenders are less oriented towards all types of criminal offending compared with rape offenders (Nadesu, 2007). A limitation of this study was that subtypes of sexual offenders were not considered. For example it is suggested that a proportion of child sex offenders having no other convictions for other types of offences (Nadesu, 2007). To account for this difference between contact offenders future research would benefit from exploring the predictive accuracy of tools for subgroups within a sexual offender population.

Score comparisons. Ideally, DRAOR scores would have been compared against a well validated dynamic tool developed specifically for sexual offenders, such as the Stable-2007 and/or the Acute-2007. Research highlights the strength of using static and dynamic tools together to inform risk and intervention factors (Bonta & Andrews, 2007). Smeth's (2015) study investigated the DRAOR and the Stable-2007 and Acute-2007 in determining incremental validity and found that the DRAOR did not significantly aid the comparison static tool, but that the Stable-2007 and Acute-2007 did. Because these tools are also used within New Zealand, a comparison between them will assist in determining best practice with their administration.

Future research would benefit by investigating score changes and links to recidivism across individual factors within the DRAOR domains for a similar sample. This may help to understand which factors within the DRAOR's acute domain are linked with sexual recidivism,

as was identified in the Cox regression analyses. Additionally, future research would benefit on considering other subsamples of offenders (e.g. index offence, demographic groups) with the DRAOR which were not able to be addressed within this study.

Conclusion

This study was the first validation of the DRAOR specifically for sexual offenders in New Zealand. Overall, the findings provide support that the DRAOR is a valid risk assessment procedure for assessing risk of general, violent and administrative offences, supporting its continued use with this population. In terms of its ability to predict sexual offences, more detailed investigation into specific factors within the domains is required. Although the short follow-up period meant that the base rate for sexual recidivism was too low to draw firm conclusions, other tools such as the Stable-2007 and Acute-2007 could augment the DRAOR for probation officers working with sexual offenders. It is hoped that this study will provide a base for further research to investigate the DRAOR and its domains and factors in more detail for sexual offenders.

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