DEVELOPING A UNIQUE RISK OF VIOLENCE TOOL FOR AUSTRALIAN INDIGENOUS OFFENDERS

Dr Alfred Allan & Deborah Dawson

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Indigenous Advisory Committee

Deanne Fitzgerald
Deanne Fitzgerald is currently acting as Aboriginal Service Design Officer with the Department for Community Development. Deanne's job involves the development of Aboriginal specific services in Western Australia.

Hector O'loughlin

Hector is a Wongi/Noongar man having links to the South-West Goldfields area of Western Australia. He is presently the Senior Mediation Officer with the Aboriginal Alternative Dispute Resolution Service (AADRS) which mediates disputes throughout the state, to reduce Aboriginal peoples contact with the criminal justice system. He was recruited under recommendation 178 into deaths in custody which was to increase Indigenous Prison Officer numbers. After working at various regional and metropolitan prisons he was awarded a study scholarship to complete a double major in Justice Studies/Aboriginal Intercultural studies at Edith Cowan University. He is presently completing a Masters in Criminal Justice at the Crime Research Centre University of Western Australia.
Hector has a strong interest in criminal justice issues and especially the implementation of programs designed to reduce Aboriginal peoples contact with the criminal justice system.

Neil Fong

Neil Fong was born in Broome Western Australia and is currently the Executive Officer of the Inquiry into Responses by Government Agencies to Complaints of Family Violence and Child Abuse in Aboriginal communities. He recently completed a Bachelor of Law while working part time at the Department of Indigenous Affairs. He has worked extensively in Aboriginal Affairs, in particular the acquisition of land for the outstation movement.

He is extremely interested in the improvement of social justice issues for the Indigenous Australians.

Nic Merson

Nic Merson is currently working in Melbourne with the Department for Justice as a Project Manager within the Indigenous Issues Portfolio Planning Unit. The Unit: -

- Provides and Develops Leadership in the Implementation of the Victorian Aboriginal Justice Agreement;
- Builds capability in Justice and the Koori community to develop and deliver effective and efficient justice services to the Koori community; and
- Monitors, reviews and proposes improvements to the delivery of the Victorian Aboriginal Justice Agreement.

Cheri Yavu-Kama-Harathunian

Cheri Yavu-Kama-Harathunian is a member of the Kubbi Kubbi people of Queenslands Central Western region. She is the Project Manager of the Western Australian Law Reform Commission's Customary Law Project. Projects she has either managed or team membered span Aboriginal/Island such as the Royal Commission into Aboriginal Deaths in Custody, and industries as varied as entertainment, hospitality, welfare, social and criminal justice, religion, community development, economic, education, academic and therapeutic, cross aculturalisation, research and critical analysis and evaluation.

Cheri is widely travelled developing strategic relationships with Indigenous and women's groups, religious and social organisations and industry in Burma, Fiji Islands, Malaysia, Thailand, Kenya, South Africa, Swaziland, and United States of America. She has published papers related to Aboriginal Spirituality, male sexual and violent behaviour, cultural issues, gender, identity and education. She is currently completing her Masters Criminal Justice and holds a B.App.Sci Indigenous and Community Health. She holds the honour of being the first Indigenous person to be appointed as Research Fellow at the University of Western Australia's Crime Research Centre.

Jane Tittums

Jane is a Ingarda – Yamatji woman from (Goyne) which means Carnarvon in the North West of Western Australia. Jane works for Department of Justice as Senior Programs Officer with Programs. Jane has worked in other areas of the Department such as Education, Vocational and Training Unit as a prison based tutor, and Coordinator of Indigenous Education and Training Programs. Jane has also worked with the Prison Operational Review Team. The Review Team was established to review and report on all custody services provided in publicly managed prisons. The review's main focus was on:

- The treatment of and conditions for people in custody.
- The effects of custody on particular groups of people in custody and
- Any other matter of significance

Jane has extensive practical knowledge and experience in youth, education, employment, and imprisonment of Australian Indigenous people and the underlying issues of why Indigenous people are incarcerated. Jane has qualifications in Public Relations, Sociology and Anthropology.

As an Australian Indigenous woman Jane has a clear understanding of many underlying issues that Indigenous people have faced from the past and may still face today. Some of the underlying issues that Indigenous people have faced from the past and may still face today consist of:

- Low vocational and educational knowledge and practical skills (low reading and writing skills)
- Cultural diversity
- Dispossession of land, culture and language
- Stolen generation
- Assimilation
- Racism
- Alcoholism / Addiction
- Low socio-economic status
- High Aboriginal Incarceration rate

The advisory committee worked in partnership with the Research Team to work towards making a difference for the Department of Justice and its Indigenous clientele.

Research Team

Vicky Hovane
Research Assistant

Rupert Felton
Research Assistant

Ranjini Kandoth
Research Assistant

Deanne Fitzgerald
Research Assistant

Deb Ham
System support officer

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We would like to acknowledge the Traditional Land owners in each of the regions we visited in Western Australia.

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Executive Summary

As the prediction of the risk of violent[1] re-offending behaviour has become more important in the corrections setting, so has the development of instruments to assist practitioners in doing risk evaluations. North American research underpins most of the instruments used in Western Australia, and in Australia for that matter, and as we will discuss below we do not believe that these instruments should be used with Indigenous people without further investigation.

As there is no specialist prediction of risk of violence instrument that practitioners can use on Indigenous people in Western Australia it appears to us that there are four possible options they can consider:

(a) Rely on their clinical judgement.

(b) Use an existing instrument.

(c) Select one of the available instruments and examine the degree to which the psychological constructs and models are valid for Indigenous culture, and adjust the instrument if necessary.

(d) Study the dynamics of violent offending in Indigenous communities and identify predictors of risk of violence amongst Indigenous people. Then use this information to develop a unique instrument that will take these predictors into account.

Option (a) is not indicated. There is a large body of research that demonstrates that clinical judgement on its own is not accurate (Grove & Meehl, 1996) and such judgements are likely to be even poorer if the assessor and assessee are from different cultures as will very often be the case with Indigenous people. From a legal, ethical, and practical perspective this is not a method that should be used.

We believe that neither option (b), even though it is often used, nor option (c), which is more acceptable, is an appropriate option to choose. As most of our six reasons for rejecting these two options overlap, we will discuss them together.

[1] Unless it is clear from the context or explicitly stated that we mean to exclude sexual offending, any reference to violent offending must be read to include sexual offending.

Firstly, the literature (for example Cunneen & Libesman, 1995; Howells, Day, Byrne, Byrne, 1999; Mals, Howells, Day, Hall, 2000; McRae, Nettheim & Beacroft, 1997; O'Shane, 1992; Payne, 1992; Wootten, 1992) suggests that the risk factors for Indigenous violence may be different. This was confirmed by a series of focus groups with experts that we undertook prior to this study (Dawson & Allan, 2000; 2001).

Secondly, risk of re-offending instruments that are based on theories, for example the Psychopathy Checklist-Revised (PCL-R; Hare, 1991) and the Dangerous Behaviour Rating Scheme (DBRS; Webster & Menzies, 1993) use constructs that are embedded in Western culture. For instance, the PCL-R (and consequently to some extent the other instruments that incorporate the findings of the PCL-R) is based on the construct psychopathy as defined by Cleckley (1976) and Hare (1980; 1991; 1996). These instruments are therefore loaded with Western values. The construct psychopathy may be valid in Indigenous culture, but we are not aware of any research that has examined the existence, or the usefulness, of psychopathy in Indigenous communities.

Thirdly, because the existing instruments are based on regression models they use predictors obtained from specific populations. The accuracy of such a risk tool is dependent on risk markers that best characterise the population of interest (Brown, 1996; Clear, 1995; Tonry, 1987). Scholars are cautioning against the use of these instruments on people from other cultures (Rogers, 1995; 2000). We would even be reluctant to uncritically adopt an instrument that had been developed using a North American Indigenous group, as different Indigenous groups, even though they may share many commonalties, are still very unique and distinct culture groups. We are therefore not convinced that any of the current instruments could be applied to Australian Indigenous people.

Another concern is that even if these instruments prove to be very accurate in predicting re-offending of Indigenous males, it is always possible that there may be better culture specific predictors that are not included. This may also limit our understanding of the dynamics of violent offending, and restrict the development of possible ways of addressing the situation. The latter aspect, while not the main aim of this study, is for us ultimately the most important reason for collecting information of this nature.

Our next concern is the stage of development of risk prediction instruments. Even though there is some debate about this (see Mossman, 2000; Steadman, 2000) it appears as if much work must still be done before these instruments will be in such a form that they will be practical and satisfy ethical and legal expectations (Gendreau, Goggin & Smith, 2002; Rogers, 2000). It does not seem worthwhile to delay an exploration of the factors that predict re-

offending by Indigenous violent offenders until the North American instruments have been refined.

Finally, we believe that the developers of the existing instruments have generally been too preoccupied with traditional risk (static) factors, and that for an instrument of this nature to be useful locally it should also take into account offender needs (dynamic factors). We further believe the presence of preventative factors should also be taken into account as they may influence the risk of re-offending, but did not examine this aspect in this project.

We consequently prefer option (d). While we have a high regard for the available instruments and the research that underlies them, we believe that it would be inappropriate to use them, even if adapted, with Indigenous people without a more thorough investigation. We concede that it is possible that the available instruments may accurately predict the risk of violence by Indigenous males, but we believe that the appropriate approach is to assume that this is not the case until the contrary is demonstrated. Despite choosing option (d) we believe that it is important for researchers, including us, who want to develop a unique instrument for a specific population, to take into account the methodology the developers of existing instruments used, and the range of variables they examined, when they developed the existing instruments.

Aims of the research project

The primary aim of this study was to empirically identify those risk factors that characterise Indigenous Australians who violently re-offend and on this basis construct a population specific risk assessment tool.

The participants and studies

In order to do this a retrospective study was done using the file data of 1838 adult male Western Australian Indigenous offenders who had been identified as requiring either a violent or sexual offender program, including those who did not engage in or complete a program. The project involved a predictor isolation study, a model building study and a cross-validation study and offenders were randomly assigned to the three studies.

The predictor isolation study

For the predictor isolation study the data of 525 offenders were available and 67 predictors could be coded from the file data. Using three different approaches we tried to collapse the predictors into predictor domains. When an early attempt revealed distinct differences between violent and sexual offenders we differentiated between these two groups.

For sexual offenders concordance was found for 10 predictor items (age at index offence; juvenile violence; male victims; anger management; release plans; exposure to violence; unrealistic goals; denial; non responsive to treatment; and treatment prior to re-offending). These included a relatively large number of dynamic predictor items.

For violent offenders concordance was found for nine predictor items (previous violence; victim died; alcohol use; male victims; anger management; release plans; exposure to violence; relationship instability; and non responsive to treatment). In contrast to the sexual offending sample the relative proportion of dynamic predictor items was not noticeable.

Model building study

The data of 380 offenders who met the inclusion criteria and whose files were available were used for the model building process. The results of the predictor isolation study were the primary source of predictors. In respect of both groups we used the majority of predictors that had been identified during the predictor isolation study, even those in respect of which there was not total concordance.

For both groups the following predictors were used: age of first offence, age of index offence, previous violent offences, juvenile violence, male victims, anger, exposure to violence during childhood, problem behaviour during childhood, unfeasible release plans, non responsive to treatment, lack of realistic long-term goals, impulsivity, denial, and affect.

This meant that there was a strong emphasis on risk predictors. In order to provide a needs companion for the risk models the Community Justice Case Needs (Case Needs) model was coded. The Case Needs is a model that is used by the Community Justice Services of the Western Australian Department of Justice as a needs assessment for offenders undertaking a range of community based sanctions including Parole Board Orders. The model has eight domains that capture; occupation/employment; marital /family; associates/social interaction; alcohol use; substance use; community functioning; personal/emotional orientation and attitude. The domains originated from work undertaken by the Canadian Corrective Service and were

localised through research undertaken by the University of Western Australia Crime Research Centre (Maller & Lane, 2002).

For the violent group the following predictors were coded: previous non violent offences; breach of past orders; previous prison terms; family victims; victim death; victim required medical attention; employment; alcohol misuse; drug misuse; solvent misuse; relationship instability; criminal associates; irresponsibility; active involvement in feuding behaviour; and grandiose sense of self worth. For the sexual group the following predictors were coded: previous sexual offences; marital relationships; had treatment prior to re-offending; sexual abuse in childhood and poor coping skills.

Discriminant Function Analysis (DFA) was used for all analyses. The recidivism predictive accuracy (95.4%) of the model for the violent offenders was good but the desisting predictive accuracy (55%) was poor. It had only one static predictor (age at first offence) and three dynamic predictors, viz. impulsivity, unfeasible release plans and personal/emotional orientation.

In the case of the sexual offenders the sexually violent group had a bearing on predictor utility and classification accuracy. As found with the predictor isolation study, predictive utility was mediated by offence type (sexually violent and not sexually violent). As a consequence it was decided to test a model during the cross validation process that took into account the range of predictors identified by both offence types and based on the findings either abandon the classification of sexually violent offenders or cross validate a model that takes into account both offence types. In the case of the non violent sexual offenders the best predictors were unrealistic long-term goals and unfeasible release plans. Both the recidivism predictive accuracy (75%) and desisting predictive accuracy (81.8%) of the model for non violent sexual offenders was good.

Cross Validation study

The cross validation sample consisted of 354 offenders, that included 96 non Indigenous sexual offenders. These offenders were included for the purpose of establishing the accuracy of the sexual offender model for non Indigenous offenders. This was a convenience sample. DFA and Receiver Operating Characteristic Curves (ROC) were used for all analyses.

The predictors for the sexual offender model were: age of index offence; age of first offence; unfeasible release plans; childhood behaviour; unrealistic long-term goals; number of previous interventions, sexual abuse as a child; sexually abused by a relative; poor coping skills; Case Needs marital/family item; Case Needs substance misuse item; and Case Needs total score.

For violent offenders the predictors were: age of index offence; age of first offence; unfeasible release plans, impulsivity; and the Case Needs personal/emotional orientation item. Where the definitions of the predictors for Indigenous offenders had been modified to ensure cultural relevance, commonly accepted definitions were used for non Indigenous offenders.

For the purpose of establishing concurrent validity various instruments used in Western Australia were applied to the sample. They were the Case Needs model, the Level of Service Need Inventory (LOSNI; Ward & Dockerill, 1999), the Rapid Risk Assessment for Sexual Offence Recidivism (RRASOR; Hanson, 1997) and the Adult Actuarial Risk Instrument (AARI; Lane & Maller, 2002). Care should be taken when the results of the cross-validation study are interpreted. The reason for doing this study is the absence of appropriate locally developed instruments in Western Australia, it follows that these instruments were used in circumstances they were not designed to be used in. The AARI, for example, used parameter values that may not be accurate for offenders in the present study.

The results of the final models for sexual offending are reported here. As experienced in the earlier studies we were not successful in developing a violence model that provided adequate separation between re-offenders and non re-offenders. While high levels of accuracy were achieved for re-offenders the accuracy for non re-offenders was untenable.

The DFA results (Wilks lambda, .382, chi square 101.491, df = 3, $p < .000$) for Indigenous sex offenders ($N = 109$) suggested the best predictors for distinguishing between non re-offenders and re-offenders were unrealistic long-term goals, unfeasible release plans and poor coping skills (the "3-Predictor model"). The centroids for the two groups (non re-offenders = .940; re-offenders = 1.688) suggested re-offenders had higher discriminant scores than non re-offenders. Table 1 indicates the contribution of each predictor.

The percentage of grouped cases correctly classified was 93.6%. For re-offenders the classification accuracy was 92.3% and for non re-offenders 94.3%. Probabilities of group membership were used to generate ROC results for the 3-Predictor model. The outcome suggested that at least one tie between the positive actual state group and the negative actual state group existed and thus the outcome may have been biased. The Area Under the Curve (AUC) was .97 (95% confidence interval was .94 to 1.00). The ROC curves should be interpreted with caution, as the sample size for re-offenders was only 39.

Table 1: Discriminant Function Indicators of Relative Importance of Predictor Variables for Indigenous Sexual Offenders

Variable	Structure Coefficient	Univariate F (1,109) p < .000	Re-offender M	Re-offender SD	Non Re-offender M	Non Re-offender SD
Goals	.701	95.597	2.538	.478	1.336	.680
Release Plans	.747	84.975	2.769	.627	1.457	.755
Poor Coping	.695	60.797	2.462	.790	1.357	.660
Canonical R	.786					
Eigenvalue	1.617					

Tables 2 and 3 and Graph 1 indicate the results of DFA and ROC curves for the competing models. As the results indicate the three predictors outperformed all of the models in terms of predictive accuracy for both re-offenders and non re-offenders. While the Case Needs model provided good accuracy for re-offenders it did not provide comparable accuracy for non re-offenders. It is worthy to note that in contrast to the majority of existing risk models, both the 3-Predictor model and the Case Needs model consist of dynamic predictors.

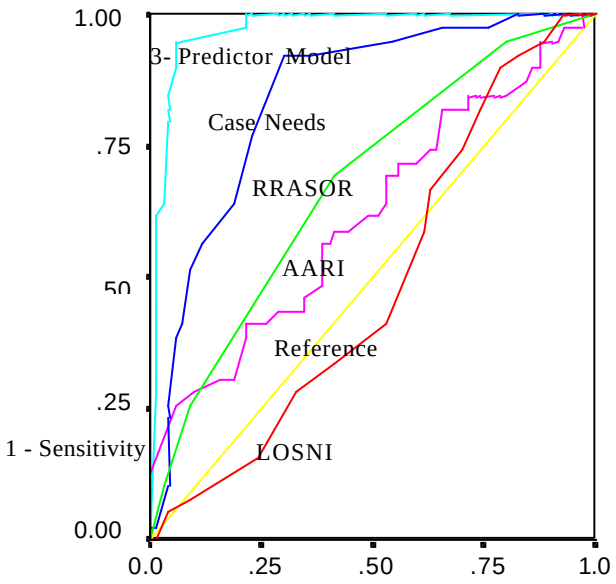
Table 2: Discriminant Function Results for Competing Models for Indigenous Sexual Offenders

Risk Method	Wilks Lambda	Chi-square	Df	Sig	Centroids re-offend	Centroids non re-offend	Eigenvalue	Canonical R
Case Needs	.685	40.279	1	.000	.900	-.501	.460	.561
LOSNI	.999	.093	1	.760	3.922E-02	-2.18E-02	.001	.030
AARI	.973	2.943	1	.086	.222	-.124	.028	.165
RRASOR	.902	11.033	1	.001	.439	-.244	.109	.314

Table 3: Discriminant Function Classification Accuracy and ROC Curve Results for Competing Models for Indigenous Sexual Offenders

Risk Method	ROC	95% Confidence Interval	DFA Classification Accuracy Re-offender	Non re-offender	Overall
Case Needs	.844	Lower Bound .769 Upper Bound .919	56.4%	88.6%	77.1%
LOSNI	.487	Lower Bound .377 Upper Bound .597	0%	100%	64.2%
AARI	.618	Lower Bound .505 Upper Bound .731	0%	100%	64.2%
RRASOR	.679	Lower Bound .575 Upper Bound .783	25.6%	91.4%	67.9%

Graph 1: ROC Curves for all Risk Models – Indigenous Sexual Offenders



Diagonal segments are produced by ties.

The three predictors (unrealistic long-term goals, unfeasible release plans and poor coping skills) identified for Indigenous offenders were used with the non Indigenous sample (N = 92). The DFA results suggested the 3-Predictor model effectively separated re-offenders from non re-offenders (Wilks lambda, .176, chi square 153.865, df = 3, p <.000). The centroids for the two groups (non re-offenders = -1.797; re-offenders = 2.553) suggested re-offenders had higher discriminant scores than non re-offenders. Table 4 indicates the contribution of each predictor.

Table 4: Discriminant Function Indicators of Relative Importance of Predictor Variables for Non Indigenous Sexual Offenders

			Re-offender		Non Re-offender	
Variable	Structure Coefficient	Univariate F (1, 92) p < .000	M	SD	M	SD
Goals	.725	221.548	2.05	.57	.35	.52
Release Plans	.607	155.285	2.68	.62	1.09	.59
Poor Coping	.445	83.583	2.58	.55	1.33	.70
Canonical R	.908					
Eigenvalue	4.689					

The percentage of grouped cases correctly classified was 98.9%. For re-offenders the classification accuracy was 100% and for non re-offenders 98.1%. Probabilities of group membership were used to generate ROC results for the model comprising the three predictors. The AUC was 1.0 (95% confidence interval was 1.00 to 1.00). The ROC curves should be interpreted with caution, as sample size for re-offenders was only 38.

Tables 5 and 6 and Graph 2 indicate the results of the DFA and ROC curves for the competing models. Similar results were found for the non Indigenous group in that the three predictors outperformed all of the models in terms of predictive accuracy for both re-offenders and non re-offenders. The Case Needs model and RRASOR, however, also provided reasonable accuracy for both groups.

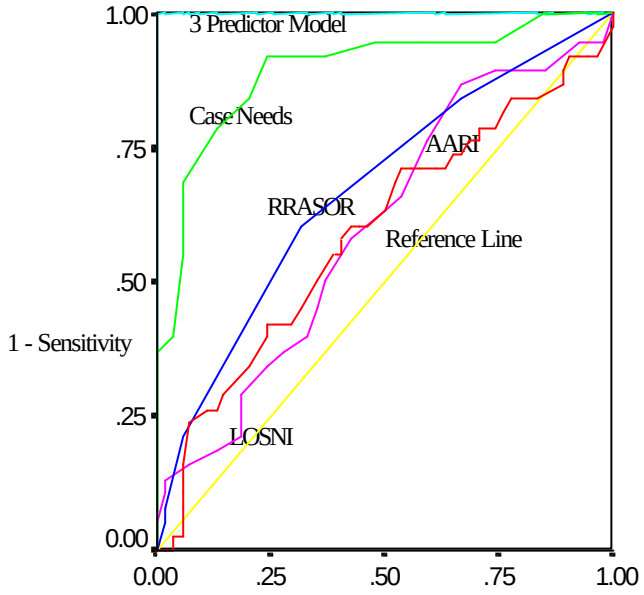
Table 5: Discriminant Function Results for Competing Models for Non Indigenous Sexual Offenders

Risk Method	Wilks Lambda	Chi-square	Df	Sig	Centroids re-offend	Centroids non re-offend	Eigenvalue	Canonical R
Case Needs	.551	50.917	1	.000	1.098	-.725	.814	.670
LOSNI	.984	1.389	1	.239	.156	-.103	.016	.127
AARI	.990	.895	1	.344	.125	-8.24E-02	.011	.102
RRASOR	.901	8.872	1	.003	.402	-.266	.109	.314

Table 6: Discriminant Function Classification Accuracy and ROC Curve Results for Competing Models for Non Indigenous Sexual Offenders

Risk Method	ROC	95% Confidence Interval	DFA Classification Accuracy Re-offender	DFA Classification Accuracy Non re-offender	DFA Classification Accuracy Overall
Case Needs	.896	Lower Bound .826 Upper Bound .966	77.1%	86.8%	83%
LOSNI	.601	Lower Bound .483 Upper Bound .718	11.4%	98.1%	63.6%
AARI	.592	Lower Bound .471 Upper Bound .713	2.9%	96.2%	59.1%
RRASOR	.673	Lower Bound .560 Upper Bound .786	60%	69.8%	65.9%

Graph 2: ROC Curves for all Risk Models – Non Indigenous Sexual Offenders



Diagonal segments are produced by ties.

The 3- predictor model was then applied to Indigenous offenders and non Indigenous offenders combined as one group (N = 178). The DFA results suggested the 3- predictor model separated re-offenders from non re-offenders (Wilks lambda, .361, chi square 177.683, df = 3, p <.000). The centroids for the two groups (non re-offenders = -1.027. re-offenders = 1.702) suggested re-offenders had higher discriminant scores than non re-offenders. Table 7 indicates the contribution of each predictor.

Table 7: Discriminant Function Indicators of Relative Importance of Predictor Variables for Indigenous and Non Indigenous Sexual Offenders Combined

Variable	Structure Coefficient	Univariate F (1,178) p < .000	Re-offender M	Re-offender SD	Non Re-offender M	Non Re-offender SD
Goals	.679	143.501	2.358	.556	1.041	.790
Release Plans	.730	165.825	2.716	.714	1.324	.690
Poor Coping	.584	106.060	2.493	.683	1.396	.691
Canonical R	.799					
Eigenvalue	1.768					

The percentage of grouped cases correctly classified was 89.3%. For re-offenders the classification accuracy was 95.5% and for non re-offenders 85.6%. Probabilities of group membership were used to generate ROC results for the model comprising the three predictors. The AUC was .967 (95% confidence interval was .941 to .993). Tables 8 and 9 and Graph 3 indicate the results of the DFA and ROC curves. These result are similar to those found for the non Indigenous group in that the three predictors outperformed all of the models in terms of predictive accuracy for both re-offenders and non re-offenders. The Case Needs model again provided reasonable accuracy for both groups.

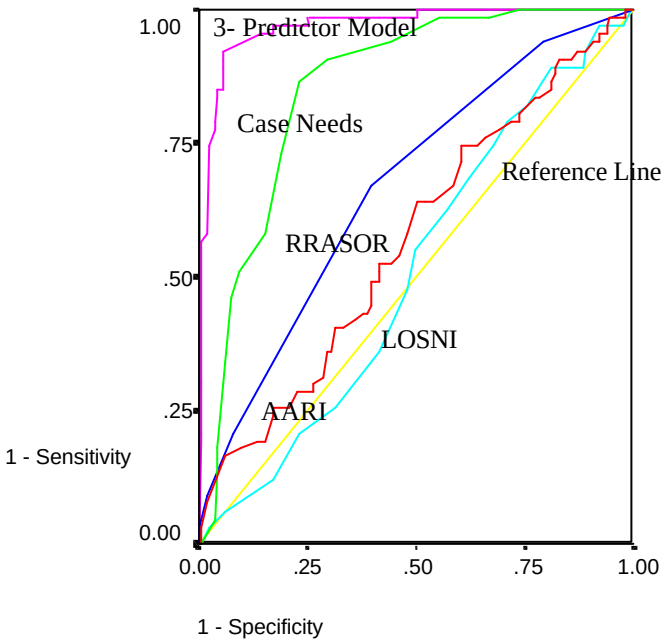
Table 8: Discriminant Function Results for Competing Models for Indigenous and Non Indigenous Sexual Offenders Combined

Risk Method	Wilks Lambda	Chi-square	Df	Sig	Centroids re-offend	Centroids non re-offend	Eigenvalue	Canonical R
Case Needs	.673	69.419	1	.000	.892	-.538	.485	.572
LOSNI	.998	.285	1	.594	5.157E -02	-3.11E-02	.002	.040
AARI	.988	2.123	1	.145	.141	-8.52E-02	.012	.110
RRASOR	.922	14.051	1	.000	.377	-.221	.084	.279

Table 9: Discriminant Function Classification Accuracy and ROC Curve Results for Competing Models for Indigenous and Non Indigenous Sexual Offenders Combined

Risk Method	ROC	95% Confidence Interval	DFA Classification Accuracy Re-offender	Non re-offender	Overall
Case Needs	.854	Lower Bound .799 Upper Bound .910	58.2%	84.7%	74.7%
LOSNI	.511	Lower Bound .426 Upper Bound .597	0%	100%	62.4%
AARI	.569	Lower Bound .482 Upper Bound .655	0%	100%	62.4%
RRASOR	.670	Lower Bound .578 Upper Bound .742	18.5%	91.9%	64.8%

Graph 3: ROC Curves for all Risk Models – Indigenous and Non Indigenous Sexual Offenders Combined



Diagonal segments are produced by ties.

Final comments

As we were not able to construct a single instrument for violent and sexual Indigenous male offenders in Western Australia we separated the non sexual violent offenders (general and family violence) and the sexual offenders (violent and non violent). Unfortunately we eventually also had to abandon our aim of constructing an instrument for non sexual violent offenders. Nevertheless, this study established that the factors that best distinguish between non re-offenders and re-offenders in a population of Indigenous male sexual offenders in Western Australia are unrealistic long-term goals, unfeasible release plans, and poor coping skills (the 3-Predictor model). The predictive accuracy of recidivism (sensitivity) of the 3-Predictor model is 92.3%, while the predictive accuracy of desisting (specificity) is 94.3%.

These findings must be interpreted with caution as the sample size in all of the studies were relatively small and, in case of the model building and cross validation studies, they were not random. Though we are comforted to some extent by the comparable results across the three studies and outcome of the analyses when the Indigenous and non Indigenous offenders were combined. An added problem inherent in a retrospective study of this nature is that the information available for coding in the files limits the predictor isolation process. It is possible that we failed to uncover important factors relevant to Indigenous offenders during the predictor isolation process because the relevant data were not documented in the files. In fact, we, suspect that this may have contributed to our failure to develop an adequate model for violent offenders. However, the results from the cross validation study of sex offenders would suggest very little variance remained unaccounted for in this group.

There are other important findings. First, the relative accuracy of the 3-Predictor model viz a viz the range of other instruments we compared it with indicates that there is a need to further develop and refine a risk of sexual offending tool for male Indigenous offenders. Second, it appears to us that the violent sexual offenders (that is those who, in addition to a sexual offences commit violent offences) in Western Australia are a distinct group. However, due to the relatively small number of them we could not analyse them separately. Our findings during the predictor isolation stage, thirdly, suggest that the profile of offenders who commit family violence differs from the profile of those who commit general violence. During the model building stage the family violence offenders did not exert the same influence, but this may be due to the reduced sample size and this aspect should be explored further. Fourth, our results confirmed that more research should be undertaken in respect of desisters, however, such a study will probably require qualitative research (see for example Maruna, 2001). Fifth, the finding that the 3-Precitor model was accurate in predicting sexual re-offending for non Indigenous offenders was unexpected, but because of the relatively small convenient sample

these finding must be interpreted cautiously. Sixth, we expected that there would be dynamic predictors in our models for Indigenous offenders (Dawson & Allan, 2000; 2001), but the fact that all three predictors in the 3-Predictor model were dynamic was unexpected. This finding confirms the view of several contemporary research groups (Borum, 1996) regarding the importance of dynamic predictors of risk. Finally, a positive aspect of the prominence of dynamic predictors is that it demonstrates that intervention is likely to make a difference. However, it is possible that such interventions will have to reach further than individual offenders and reach into the community.

To conclude, this study was the first attempt in Western Australia, to identify the factors that predict the risk of violent and sexual offending by Indigenous male offenders. In the process of doing this we tried to address some of the concerns about research concerning Indigenous people (see for example Smith, 1999; Worby & Rigney, 2002) by involving an Indigenous Advisory Committee in all aspects of the project and employing Indigenous research assistants. We also tried to move the focus away from static factors to include dynamic factors and the needs of offenders. That we were only able to develop a model for sexual offenders is a disappointment, but this study confirmed that it is possible to develop highly accurate risk prediction models comprising of dynamic factors.

Introduction

In Australia concern about the high level of contact of Indigenous people with the justice system gained momentum in the late 1980's when the Royal Commission of Aboriginal Deaths in Custody (1991) investigated the over-representation of Indigenous persons in custody (Braithwaite, 1989; Fergusson, Horwood & Lynskey, 1993; Harding, Broadhurst, Ferrante & Loh, 1995; Homel, 1996). It was found that Indigenous people were 14 times more likely to be in prison than non Indigenous people and that the higher incarceration rate somewhat accounted for the inflated number of Indigenous deaths in custody (Harding et al., 1995; Sarre, 1997). While there are many factors that could explain the high level of contact between Indigenous people and the justice system (see for example Baker, 1998; 2001) the National Committee on Violence found that there was in fact a high level of criminal behaviour, including violence[1], within the community. This Committee, that was established to delineate violent crime in Australia, concluded that the level of violence perpetrated by, and committed against Indigenous people was "of a scale that dwarfs that in any sector of white Australia" (cited in Sarre, 1997, p. 93). Research further reveals that there is a high level of intra-racial violence amongst Indigenous people and that Indigenous victims are most likely to be victimised by an Indigenous person known to them, or in domestic or family oriented disputes (see Broadhurst, 1997; Harding et al., 1995; Memmott, Stacy, Chambers & Keys, 2001; Sarre, 1997; Strang, 1993).

These general statements are also true in Western Australia. During 1990 to 1991, 35% of all victims and 32% of all perpetrators of homicide were Indigenous while they only represent 2.7% of the population (Strang, 1993). In 1993 Indigenous males in Western Australia were 3.6 times more likely to be the victim of a violent crime than non Indigenous males and Indigenous females 10.7 times more likely to be a victim than non Indigenous females (Harding et al., 1995). In 1993 female Indigenous women were 36 times more likely to be the victims of domestic violence than non Indigenous women and Indigenous children were, depending on their age, two to four times more likely to be victims of violence than non Indigenous children (Harding et al., 1995, also see Broadhurst, 1997). Disturbing trends also emerge in respect to the sexual assault of both Indigenous women and children (Gordon, Hallahan & Henry, 2002).

The reasons for this high rate of violence is currently not clear because there has until recently been limited investigation of the predictors of crime in general, and violence in

[1] Unless it is clear from the context or explicitly stated that we mean to exclude sexual violence any reference to violence must be read to include sexual violence.

particular, in the Indigenous community (Broadhurst, 1997; Sarre, 1997). There could be a number of explanations for the absence of research that investigate the dynamics and predictors of risk of violence of Indigenous men despite the alarming statistics quoted above.

Firstly, Indigenous people may have discouraged such research. At one level because it was understandably difficult to acknowledge the rates of violence, but at another level they had a right to be cynical about the motives of researchers (Smith, 1999). The Indigenous people of Australia must arguably be one of the most researched groups of people, but unfortunately the motive of much past research was scientific curiosity. There was often little, if any, attempt to consider the needs of Indigenous people, consult them or involve them in the research as co-researchers (Worby & Rigney, 2002).

Secondly, it could reflect the ethnocentricity of researchers in the risk area who, as the review of research in this report will demonstrate, seem to have assumed that there is a universal set of risk predictors for all people irrespective of their culture, ethnicity, gender or age.

Thirdly, the ambit and cost of studies required to identify the risk factors predictive of violent offending behaviour in a population suggest that more pragmatic considerations may also have played a role. Research of the nature under discussion is best done if the behaviour studied (in this case violence and sexual behaviour) has a high base rate (i.e. happens frequently) and the relevant population is fairly large and homogenous. One of the general problems of identifying predictors of violent behaviour is that the base rate of violence is relatively speaking low. This is especially true in the case of females, with the exception of women with mental disorders (see Lidz, Mulvely & Gardner, 1993; Swanson, 1994). In the case of Australian Indigenous people this problem is compounded by the heterogeneous nature of this relatively small population. There are subtle, but fundamental, differences between the different Indigenous groups that is related to, for instance, the geographical area they hail from, the language they speak, and their levels of deculturation and acculturation. This means that in a State like Western Australia there are a number of distinct, but relatively small, Indigenous groups. Ideally risk predictors should be identified for each of these groups, something that will be expensive and may be impractical.

The cost benefit ratio may, consequently, have been the fourth factor that played a role to limit research in the area. In countries where research of this nature is undertaken the driving forces are the needs of the corrections and mental health systems. Australian Indigenous people, despite being over-represented in both these systems, are still a minority group compared to the non Indigenous group. As there are well-researched overseas risk of violence instruments available that can be used to assess level of risk of males there has not been much incentive to develop such instruments in Australia, neither for Indigenous nor non Indigenous populations.

Nevertheless, since about 1990 there have been a number of qualitative studies that examined the dynamics of violent behaviour by Indigenous people (see Memmott et al., 2001 for a review of the relevant research). Memmott and his colleagues state that Indigenous violence has multiple originating causes. In this regard they differentiate between three categories of causes, viz. precipitating (specific triggers of violent episodes), situational (e.g. substance use and psychological factors) and underlying (e.g. historical circumstances that make Indigenous people vulnerable to act in a violent manner or of becoming a victim). The quantitative studies (see Memmott et al., 2001 for a review of some of them) tend to be descriptive and do not shed much light on the possible predictors of violence. We believe that a quantitative study to identify predictors of violence in particular is indicated for two reasons.

Firstly, at a global level the identification of predictors is important to contribute to the current attempt to gain a better understanding of the dynamics of violence in the Indigenous community. This is the positive, and ultimately the most important, reason for doing research of this nature as it will make it possible to address the factors that contribute to the problematic situation.

Secondly, and the specific reason for this study, is that we live in what some call the risk society (Beck, 1992; Rose, 1998). In this climate the prediction of risk of violence is becoming increasingly important in mental health (Borum, 1996; Borum, Schwartz & Swanson, 1996) and correctional settings (Douglas & Webster, 1999; Howells, Watt, Hall & Baldwin, 1997; Ward & Dockerill, 1999). Clinicians therefore need instruments that they can use to assess the risk of violence of a specific person, and to develop such instruments it is necessary to identify factors that predict violent behaviour by people. For legal, ethical and practical reasons it is important that these instruments should be accurate. For example, if recidivists are not identified it leads to preventable victimization of members of the community. Instruments should therefore be sensitive, ie accurately identify recidivists. However, using instruments that are not specific, ie they fail to accurately identify desisters, also has negative consequences. At a financial level it is costly because, for example, offenders are unnecessarily diverted to expensive treatment programs and detained for pointlessly long periods of time. Unnecessary detention also infringes offenders' human rights and this may have social implications for them and their families. In Australia the unnecessary detention of offenders could also aggravate the already alarming overrepresentation of Indigenous people in prisons.

Assessment of risk of violence

As implied above the identification of predictors of risk, the development of instruments, and the actual prediction of risk of violence are beset with practical, legal and ethical concerns

(Grisso & Appelbaum, 1992, 1993; Litwack, 1993; Rogers, 2000; Steadman, 1980). As suggested one of the problems is the accuracy of risk of violence predictions. Traditionally the prediction of risk of violence was based on clinical judgement. However, since the late 1960's researchers demonstrated that the clinical judgement of the risk of violence (see for example Monahan, 1981) and sexual violence (see for example Hanson & Bussière, 1998) are inadequate from a practical, legal and ethical perspective. Even though clinicians, in mental health settings at least, can make predictions that are better than chance (Gardner, Lidz, Mulvey & Shaw, 1996a; Monahan, 1996) actuarial assessments consistently match or surpass the accuracy of clinical assessments (Grove & Meehl, 1996; Rice & Harris, 1995). Consequently there was a call for the development of actuarial tools based on statistics and fixed and explicit algorithms that could be used to augment the clinical assessment of risk of violence since the 1970's.

This prompted a number of researchers and research teams to try to develop such tools using primarily multivariable statistical methods such as main effects linear regression and discriminant function analysis. To develop these instruments researchers first identify a large set of factors that are associated with a specific outcome, in this case violence. Researchers select the items for their instruments from these factors by weighting them according to the strength of their association with violence. The final instrument consists of a number of questions and people are assessed by asking them a common set of questions or obtaining the information from other reliable sources. Every answer is weighted to produce a score that can be used for purposes of predicting the person's probability of violence.

In developing these instruments researchers had to overcome a number of complex methodological problems and they have also gained new insights. Five examples will be discussed here because they are of importance in this study.

Firstly, there was initially concerns that the development of such instruments would be impossible because of the low base rate of violent re-offending (Steadman, Cocozza & Melick, 1978) and even lower rate of sexual re-offending (Friendship & Thornton, 2001; Furby, Weinrott & Blackshaw, 1989; Prentky, Harris, Frizzell, & Righthand, 2000). In both cases it was thought to be much lower than the 50% that Blackburn (1993) suggests is necessary. However, thanks to more advanced methodology and accurate definitions of re-offending researchers found that although the base rate is low, it is much higher than initially thought (Borum, 1996; Rice & Harris, 1995 and also see Doren, 1998) and that it is possible to develop risk prediction instruments.

Secondly the common wisdom in the beginning was that static variables were the most robust predictors of recidivism (Andrews & Bonta, 1994; Rice & Harris, 1995). Static predictors are statistical historical factors that cannot be changed through intervention, for example age, past criminal history and early family factors (Hare, 1998; Quinsey, Harris, Rice, & Cormier,

1998). While they are useful for evaluating long-term risk potential, they are poor measures of change in risk (Hanson & Harris, 1998; Rice & Harris, 1995). Consequently researchers have recently also started focussing on dynamic risk factors that may be susceptible to change (Andrews, Bonta & Hoge, 1990; Gendreau, Little et al., 1996). Hanson (1998) subdivides dynamic factors in stable and acute factors. Stable factors are those that have the potential of changing, but normally last for a long time, such as deviant sexual preferences or alcoholism. Acute factors are those rapidly changing states, for example sexual arousal or alcoholism that directly precede crimes. Day and Howells (2002; also see Howells, et al., 1999) suggest another subdivision of dynamic factors by distinguishing between criminogenic needs and non-criminogenic needs. Criminogenic needs are those factors that are directly related to the offending (such as substance abuse and pro-offending attitudes and beliefs). Non-criminogenic needs (such as self-esteem, anxiety, unemployment) in themselves may not be the cause of offending, but may explain offending. This, is a refreshing change of emphasis as it moves away from the total focus on risk. Instruments that combine risk factors and needs of offenders can provide useful information that can be used to predict the risk of violence, develop an individualised intervention plans, and measure whether the intervention or other factors have changed the risk of re-offending. Despite these advantages and suggestions that dynamic factors may predict recidivism as well as static factors, few instruments incorporated them by the middle 1990's (Bonta, 1993; Gendreau, Little et al., 1996; Gendreau, Goggin, et. al, 1996), but recently developers have been incorporating them in their instruments.

Thirdly, Sheldrick (1999) recently pointed out that researchers in the field are ignoring, or virtually ignoring, protective factors that may reduce the likelihood of a maladaptive outcome. Rogers (2000), with reference to research from other fields, convincingly argues that a "risk-only" assessment is inherently inaccurate because it is one sided. This makes intuitive sense, especially considering the research of Maruna (2001) regarding factors that help desisters from re-offending.

The fourth development addressed the manner in which the developers of risk prediction instruments optimise the predictive validity of their instruments. In practical terms the problem is that the more accurate the prediction of risk is, the higher the possibility that more people will erroneously be identified as at risk. In other words, the higher the proportion of recidivists correctly identified as at risk (the true positive rate or sensitivity), the higher the proportion of desisters erroneously identified as at risk (the false positive rate). While it is in society's interest to maximise the true positive rate, it is also important to minimise the false positive rate to protect the rights of offenders. A high false positive rate means the proportion of desisters correctly identified as not at risk of re-offending (true negative rate or specificity) is low. When researchers realised that most prediction instruments have adjustable thresholds they had to find

a way maximizing both sensitivity and specificity (Mossman, 2000). The exact cutoff is a social value judgement that must be made by legislators and bureaucrats as it requires a trade-off between society and individual interests (Blackburn, 1993; Mossman, 2000). However, to inform decision makers, the developers of instruments must be able to characterise trade-offs between the sensitivity and specificity of their instruments (Mossman, 1994; 2000). To do this researchers are increasingly using Receiver Operating Characteristics (ROC) analyses that use a ROC graph (with sensitivity on the vertical axis and "1- specificity" on the horizontal axis) to summarise the results of the instrument as the threshold is moved throughout its range of possible values (Mossman, 1994). The area under the curve (AUC) of this graph also illustrates the predictive accuracy of an instrument, with an AUC of 0.5 indicating that the instrument performs at no better than chance, and 1.0 implying perfect performance (Mossman & Somoza, 1991).

Finally, while the pendulum initially swung completely away from clinical methods to actuarial methods of risk prediction, it seems as if the swing has been reversed to some extent. Hanson (1998) has distinguished between three possible modern approaches to risk assessment. It can take the form of a guided clinical judgement where an expert makes a judgement based on validated risk factors; or a pure actuarial approach; or an adjusted actuarial approach where the actuarial prediction can be modified by the clinician to take into account potentially influential dynamic factors. Despite contrary opinions (see for example Quinsy et al., 1998) the general opinion currently appears to be that the best results predictions of the risk of violent re-offending can be achieved by the last option (Borum, 1996).

In conclusion, researchers have dealt with a number of methodological issues that hampered the development of risk prediction instruments. They also have moved to a situation where most seem to agree that the choice is not between actuarial or clinical methods, but rather how to combine the two methods optimally. There is also a move away from developing instruments that only use static variables to instruments that combine static and dynamic variables and also look at both risk and needs, and in future protective factors may also be taken into account. This suggests that the instruments of the future will, hopefully, be more comprehensive than merely assessing risk.

Instruments for the assessment of risk of violence or sexual offending

A large number of instruments have been developed during the last two decades and a logical way of reviewing them is to examine the work of each of the major teams working in the field. The purpose of this review is to provide a context for this report by demonstrating what is

available and to give some sense of the developments in the field, but it is neither exhaustive nor is it a critique of the respective instruments.

The Hare group

Arguably the best known instruments in the area of the prediction of risk of violence, the Hare Psychopathy Checklist (PCL; Hare, 1980) and its successor the Psychopathy Checklist-Revised (PCL-R; Hare, 1991), were not initially developed as risk prediction instruments. Hare (1996; 1998), the developer of these instruments, believes that psychopathy is the single most important clinical construct in the assessment of risk for recidivism and violence (Hare, 1996; 1998). He operationally defines psychopathy with reference to Cleckley's (1976) description of the constellation of deviant traits and behaviour that constitute this construct. Hare (1991) developed the PCL to operationalise the assessment procedures used by him and his colleagues so that it could be understood by other researchers. The instrument served as a clinical rating scale to obtain reliable and valid measurements of the traits of psychopathic disorder for research in forensic populations (Hare, 1991; Hart, Hare & Harpur, 1992). The PCL and PCL-R started their careers as risk prediction instruments when mental health practitioners working in correctional and forensic settings found them to be the best predictors of subsequent violent recidivism available (Harris, Rice & Quinsey, 1993, for a contra opinion see Gendreau, Goggin & Smith, 2001).

The development samples of the PCL and PCL-R consisted of male prisoners and male forensic psychiatric patients. They included White, Black and North American Indians and one sample of 136 British prisoners (Hare, 1991). Hare (1991) reports that several studies compared the scores of minority groups in Canada and the United States (US) with Whites and that there was "little difference between the two groups in the distribution, reliability, external correlates, or factor structure of the PCL" (p. 31). While this is true as a general statement it should be taken into account that Kosson, Smith and Newman (1990) did find significant differences in both the level and pattern of PCL scores in their sample of Black and White inmates. There is also some doubt about Hare's (1991) cautious optimism about the use of the PCL-R with females. A study conducted by Salekin, Rogers, Ustad and Sewell (1998) raises questions in this regard. Using ROC-analyses these researchers found that for a female group of offenders, the PCL-R was at best a modest predictor of recidivism (area under the curve .64) and based on the odds ratio, the measure "did not provide much information beyond chance regarding the prediction of recidivism" (p. 124).

David Cooke has probably done most to examine the cross-cultural application of the PCL-R. In 1995, after a review of some of the research that had been done up to that stage, he concluded that there were clues that there may be cross-cultural differences in the prevalence,

but not the pattern, of psychopathy in North America, the United Kingdom (UK) and Europe (Cooke, 1995). He also reports the findings of a study in Scotland that demonstrate that while the underlying constructs that were being measured in North America and Scotland were essentially the same, the prevalence of psychopathy differed. Cooke and Michie (1997) also found that their Item Response Analysis "of four North American subsamples reveals remarkable consistency in the performance of this test in different settings and with different cultural groups" (p. 10). However, they found that the most appropriate cut-off scores for a diagnosis of psychopathology may differ among cultures or subgroups.

In a development that by implication appears to contradict the Hare group's initial view that the PCL-R can be used in all populations, the group has developed a separate instrument for juveniles (PCL-YV) and is busy finalising separate norms for females (S Hart, personal communication, 7 July 1999).

The Penetanguishene group

An instrument that was specifically developed to predict the risk of violence is the Violence Risk Appraisal Guide (VRAG) (Harris et al., 1993; Quinsey et al., 1998). The developers used a series of studies to examine a large number of variables suggested in the literature as possible predictors of violent behaviour, to identify which of them, taken separately and in combination with other variables, would best predict violent recidivism. By combining some of the samples and using their common variables the researchers had a large data set they could use to construct a statistical instrument. The construction sample consisted of male mentally disordered offenders who were detained in a psychiatric facility in Ontario and who had committed a serious offence. The researchers followed them up for an average of about seven, later ten, years after their release from secure confinement. The discriminant analysis identified 12 variables for inclusion in the final statistical prediction instrument, with the PCL-R as the best predictor (Harris et al., 1993; Rice & Harris, 1995). In what would become best practice in the field the developers of the VRAG used ROC analyses to determine the predictive accuracy of the VRAG (Rice & Harris, 1995).

The VRAG is based on the premise that risk markers related to violent re-offending "do not vary as a function of the type of population studied" (Quinsey et al., 1998, p.29). However, in what appears to contradict the assumption they make, the team designed the Sexual Offender Risk Assessment Guide (SORAG) to predict violent and sexual recidivism among sexual offenders. It uses the VRAG as a model, and utlises factors identified in several Canadian sexual offender samples (Quinsey, Lalumiere, Rice & Harris, 1995). A subsequent study that examined the utility of the VRAG with sexual offenders found that it was a robust predictor of violent re-offending by them, but that it was less predictive of sexually violent re-offending (Rice

& Harris, 1997). On the basis of this study Quinsey et al (1998) believe that the SORAG marginally exceeds the VRAG in terms of predictive validity and they recommend the use of the former for sexual offenders.

Webster and colleagues

A feature of both the PCL-R and the VRAG is that they use static predictors. Webster has been trying since the mid-nineties to combine clinical considerations (including dynamic factors) and actuarial information in instruments that he develops to guide decision makers regarding the risk of violence of a person (Borum 1996).

The Dangerous Behaviour Rating Scheme (DBRS) based on Megargee's (1976) theoretical framework (Webster & Menzies, 1993) was an early attempt to develop a semi-structured instrument with no psychometric properties that could be used in the assessment of the risk of violence (Borum, 1996). Webster and his colleagues next developed the Violence Prediction Scheme that combined the actuarial features of the VRAG (and consequently the PCL-R) with 10 clinically determined variables. The 10 clinical factors were those that experienced forensic clinicians considered important in assessing dangerousness and included dynamic factors. This instrument served as the model for the development of the three specialised risk of violence prediction guides.

The first is the Historical, Clinical and Risk Management (HCR-20) instrument, a violence risk assessment scheme (Webster, Douglas, Eaves & Hart, 1997). This instrument has a much shorter history than the PCL-R and the VRAG but has a sound conceptual model (Borum, 1996) and the team used ROC analyses in a number of the studies used to develop it. Initial research shows good concurrent validity with the PCL-R and the VRAG (Douglas & Webster, 1999) and acceptable inter-rater and structural reliability across diverse settings and samples and moderate to large effect sizes in terms of its relationship to violence (Douglas, 1999).

The Spousal Assault Risk Assessment (SARA) is a specialist instrument that was developed to identify offenders at risk of committing further acts of spousal assault (Kropp, Hart, Webster & Eaves, 1995). Initial research demonstrated that the ratings of the instrument significantly discriminated between offenders with and without a history of having committed spousal abuse in one sample, and between recidivistic and non-recidivistic spousal assaulters in another (Kropp & Hart, 2000).

The final instrument developed by the Webster team that is based on the Violence Prediction Scheme is the Sexual Violence Risk-20 (SVR-20) (Boer, Hart, Kropp & Webster, 1997). Like the HCR-20, but unlike the SARA, this scheme requires a PCL-R score. Dempster (1998) examined the predictive validity of the SVR-20 and four other risk assessment

instruments for the prediction of violent and sexually violent recidivism in sexual offenders. She found that only the SVR-20 and the Rapid Risk Assessment for Sexual Offence Recidivism (RRASOR) "clinical ratings were significant in distinguishing sexually violent from generally violent recidivists" (p. 3). Her research also demonstrated that the SVR-20 had incremental predictive validity relative to actuarial measures of risk.

MacArthur group

As was said previously most of the actuarial instruments that have been developed until recently used a main effects linear regression model or similar methods. The MacArthur-group (the group) set out to develop an alternative form of actuarial instrument (Steadman et al., 2000; Monahan et al, 2000). One of the reasons for this was to deal with the concern that clinicians do not use the actuarial violence risk assessment instruments available in clinical settings because they are cumbersome, time-consuming and fail to make intuitive sense to them (Gardner, Lidz, Mulvey & Shaw, 1996b). The group believes that the current actuarial instruments do not make sense to clinicians because of two interrelated problems. First, because the existing actuarial instrument were "derived from main effects linear regression models that imply a single solution fits all persons whose risk is being evaluated" (Steadman et al., 2000, p. 84). Secondly, because the magnitude of the improvement in overall accuracy rates made by these actuarial instruments is not seen as clinically significant by clinicians (see Menzies, Webster, McMain, Staley & Scaglione, 1994).

In an attempt to make data collection more manageable the group avoided using the PCL-R as a source of information. To make the approach more acceptable to clinicians they used an iterative classification tree (ICT) method utilising the work of Gardner et al. (1996a). This approach reflects an interactive and contingent model of violence that allows the use of many different combinations of risk factors to classify a person as high or low risk (Steadman et al., 2000). The group believes that this method reflects real-life clinical thinking about the complexity of the nature of violence better than other actuarial methods. The data used in this process are MacArthur group data, which was collected in three mental health settings in America.

The research team's initial estimate of the accuracy of their method is that it is good (Steadman, et al., 2000). However, it is probably an overestimate of its true accuracy as the relevant iterative classification tree was designed for the participants on which it was tested and no cross-validation was done (Mossman, 2000). Nevertheless, when the team applied the ICT method to another sample using a set of violence risk factors commonly available in clinical records they demonstrated that it partitioned 72.6% of the sample as either low risk or high risk (Monahan, et al., 2000).

According to Grisso (personal communication, 16 June 2002) the team has turned the ICT strategy into a computer algorithm packaged as a user-friendly tool that clinicians could use while interviewing a person. The program prompts them what questions to ask next until the program tells them that the person has, according to the ITC rules, been classified as at low, moderate or high risk of violent behaviour. The program is currently being tested at two mental hospitals in the US and if successful will be ready for marketing by late 2003.

Hanson group

Hanson and his colleagues have primarily been working in the area of sexual offending in Canada. After an extensive meta-analysis of recidivism risk factors for sexual offenders (Hanson & Bussiere, 1996), Hanson designed the RRASOR for use with sexual offenders (Hanson, 1997). The RRASOR is an actuarial measure consisting of four static items (prior sexual offences, age at release, victim gender and relationship to victim) where the higher the score the greater the likelihood of re-offending. It was developed on a sample of 2,289 offenders in Canada and North America and was validated on a UK sample of 303 offenders (ROC area average = .71 between development and validation samples).

Dempster (1998) found that the clinical ratings of the instrument were significant in distinguishing sexually violent from generally violent recidivists. Barbaree, Seto, Langton and Peacock (2001) have assessed the accuracy of the RRASOR and five other risk measures as predictors of re-offence for 215 sexual offenders (released for periods of up to 4.5 years) and found that it had the highest predictive accuracy of the six measures (ROC =.77 - .73 dependent on inclusion or exclusion of missing data).

In a later study Hanson and Thornton (1999; 2000), compared the predictive accuracy of the RRASOR with an English instrument, the Structured Anchored Clinical Judgement (SACJ; Grubin, 1998) and the Static-99 (a scale that which was a combination of these instruments). Four diverse data sets drawn from Canada and the UK were used. The researchers report that that the RRASOR and SACJ showed approximately equivalent predictive accuracy, and that the Static-99, which was more accurate than either original scale, showed moderate predictive accuracy. Subsequently Sjöstedt and Langström (2001) cross validated the RRASOR and the Static-99 on a Swedish sexual offender population. They found that the instruments "showed similar and moderate predictive accuracy for sexual reconvictions whereas the Static-99 exhibited a significantly higher accuracy for the prediction of any violent recidivism" (p. 629). In another development Hanson and Harris (1998) undertook a study to identify dynamic factors related to sexual offending that are amenable to deliberate intervention. Subsequently they used this data set to construct a new structured risk assessment scale that could be used to evaluate change in risk among sexual offenders, the Sexual Offender Need Assessment Rating

(SONAR; Hanson & Harris, 2000). This scale showed moderate ability to differentiate between recidivists and non-recidivists, but the results should be interpreted with caution since the same data set was used to develop and test the items (Hanson & Harris, 2000).

Western Australian research

The only locally developed Western Australian assessment tool specifically designed for violent offenders that we are aware of is the Violent Offender Treatment Program Risk Assessment Scale (VOTP RAS). It is now commonly called the Level of Service Need Inventory (LOSNI) and was developed to divert high risk violent offenders to intensive violence programs. We were not able to find published information regarding the construction of this instrument, but Ward and Dockerill, (1999) report that it was designed expressly to facilitate eligibility for treatment. To date the LOSNI has not been cross validated and the reported accuracy rates (.72 to .76 based on varying time-at-risk period) are based on a limited sample of 50 Indigenous and 152 non Indigenous violent offenders (Ward & Dockerill, 1999). It contains only two dynamic predictors that are limited to substance use (drug and alcohol) and the drug use predictor was not found to contribute to the accuracy of the tool.

Recently the University of Western Australia Crime Research Centre (Maller & Lane, 2002) developed the Adult Actuarial Risk Instrument (AARI) to predict general recidivism. The AARI uses linked police, prison, and Community Justice databases to estimate risk of future offending using gender, ethnicity (Indigenous versus non Indigenous), age, arrest cardinality and most serious offence of the offender against a similar cohort within the database. All arrest events in the similar cohort are identified and survival analysis is applied using the Kaplan-Meier estimator to predict risk (some adjustment is made to account for differences between the offender and the similar cohort). Maller and Lane (2002) have reported that the AARI provides good accuracy, however, due to the recent development of the instrument no published rates of accuracy were available for this report.

Conclusion

This limited review confirms that Steadman (2000) was probably correct when he said that the "work in this area to date offers more in the way of promises than actual tools" (p. 270). In particular there are still concerns about the generalisability of all these instruments (Rogers, 2000). However, they serve an important function. At the worst they provide a checklist that practitioners can use to ensure that essential areas of inquiry are recalled and evaluated. At the best they provide hard actuarial data on the probability of general and sexual violence among

certain groups of people (Borum, 1996). Whether, and how, they should be used to predict the risk of violent re-offending will be discussed in the next rubric.

Options

As there is no specialist prediction of risk of violence instrument that practitioners can use on Indigenous people in Western Australia it appears to us that there are four possible options they can consider:

(e) Rely on their clinical judgement.

(f) Use one of the instruments discussed above.

(g) Select one of the available instruments and examine the degree to which the psychological constructs and models are valid for Indigenous culture, and adjust the instrument if necessary. The traditional manner of doing this involves administering the risk tool in question on a large sample of Indigenous people and comparing these results with that of the developmental sample.

(h) Study the dynamics of violent offending in Indigenous communities and identify predictors of risk of violence amongst Indigenous people. Then use this information to develop a unique instrument that will take these predictors into account, as well as the needs of the practitioners who must administer the instrument.

Option (a) is clearly not indicated. There is a large body of research that demonstrates that clinical judgement on its own is not accurate enough (Grove & Meehl, 1996). Such judgement is likely to be even poorer if the assessor and assessee are from different cultures as will very often be the case with Indigenous people. From a legal, ethical, and practical perspective this is not an approach that should be used.

We believe that neither option (b), even though it is often used, nor option (c), which is more acceptable, is an appropriate option to choose. As our five reasons for rejecting these two options overlap we will discuss them together.

Firstly, the literature that we consulted (for example Cunneen & Libesman, 1995; Howells, et al., 1999; Mals et al., 2000; McRae, Nettheim & Beacroft, 1997; O'Shane, 1992; Payne, 1992; Wootten, 1992) suggests that the risk factors for Indigenous violence may be different. This was confirmed by a series of focus groups that we undertook prior to this study (Dawson & Allan, 2000; 2001). The participants were groups of experienced Indigenous and

non Indigenous correctional officers, prison officers, and members of community organisations and services working with violent Indigenous people from five different geographical areas in Western Australia. The results suggested that Indigenous offenders constitute a diverse population that do appear to have different risk and needs factors in comparison to non Indigenous offenders. Importantly, the data confirmed that differences also occur within the Indigenous population as a function of geography, traditional versus non-traditional status, language group and age. A distinct factor identified by most of the focus groups was the importance and complexity of extended family obligations in Indigenous communities. While this factor could have a positive effect, it also has a negative effect such as the occurrence of inter-family feuding in Indigenous communities. This problem has been reported as reaching chronic levels with disputes spilling over into schools and prisons and almost always ending in physical violence (Australian Institute of Criminology, 1995; 1996). Not one of the instruments that we reviewed takes this variable into account.

Secondly, those instruments that are based on theories (for example the PCL-R and the DBRS) use constructs that are embedded in Western culture. For instance, the PCL-R (and consequently to some extent the other instruments that incorporate it) is based on the construct psychopathy as defined by Cleckley (1976) and Hare (1980; 1991; 1996). These instruments are therefore loaded with Western values. The relevant constructs, such as psychopathy for example, may or may not be valid in Indigenous culture. (For a different, but parallel, debate about the validity of the construct psychopathy in the context of juveniles see Frick, 2002; Hart, Watt & Vincent, 2002; Lynam, 2002;. Seagrave & Grisso, 2002; and for criticism of the construct itself see Gendreau, Goggin & Smith, 2001). We are not aware of any research that has examined the existence, or the usefulness, of psychopathy in Indigenous communities. Given the unique socio-historical circumstances, lifestyles, customs and world views of Indigenous people we believe that it would be inappropriate to assume that psychopathology, and other Western constructs, are valid in the Indigenous culture. In fact, there is good reason to believe that this may not be the case. For example, the anthropologist Burbank's (1994) study of Indigenous women suggests that there may be cultural differences in how members of the Indigenous community perceive and understand anger and aggression. Blagg (2000), likewise found that Indigenous people's perception of family violence differed from that of the general Australian population.

Thirdly, instruments based on a regression model, use factors obtained from a specific population. The accuracy of such a risk tool is dependent on risk markers that best characterise the population of interest (Brown, 1996; Clear, 1995; Tonry, 1987). As our brief review demonstrates the developmental populations for most of the instruments were, with some exceptions, from North America. Even in North America scholars are cautioning against the

use of these instruments on people from other cultures, see for example Rogers (2000) and the research he refers to. In an earlier work Rogers (1995) cautioned psychologists who make risk predictions on the PCL-R to limit such predictions to White males with criminal histories. We would even be reluctant to uncritically adopt an instrument that had been developed using a North American Indigenous group as different Indigenous groups, even though they may share many commonalties, are still very unique and distinct culture groups. Furthermore, because the risk prediction research has been driven by the needs of the mental health and correction systems in North America the developmental populations often consist of, or include, people in psychiatric hospitals. This is especially true of the work of the MacAurthur group. Given that we are primarily interested in an instrument that will have utility in correctional and forensic setting this is an added concern. In conclusion, the research we reviewed does not convince us that any of the relevant instruments could be applied to Australian Indigenous people. Especially in respect of the PCL-R there is enough research to challenge the belief that it can be used on populations that it has not been validated for. Considering research that has been done in other countries, particularly in England with the PCL-R (Cooke, 1995), we believe that it is possible that the PCL-R may have utility in an Anglo-Australian male population, but we do not believe it can be generalised across cultures to Indigenous males.

Another concern is that even if these instruments prove to be very accurate in predicting re-offending of Indigenous males, it is always possible that there may be better culture specific predictors that are not included. Not only will this be a problem for risk prediction, but it may also limit our understanding of the dynamics of violent offending, and restrict the development of possible ways of addressing the situation. The latter aspect, while not the main aim of this report, is for us ultimately the most important reason for collecting information of this nature.

Our next concern is the stage of development of risk prediction instruments. Even though there is some debate about this (see Mossman, 2000; Steadman, 2000) it appears as if much work must still be done before these instruments will be in such a form that they will be practical and satisfy ethical and legal expectations (Gendreau, Goggin & Smith, 2001; Rogers, 2000). The sexual offending instruments need even more developmental work (Hanson, 1997). Such instruments must take into account the different typologies of sexual offenders (Prentky, Lee & Knight, 1997; Prentky, Lee, Knight & Cerce, 1997) because sexual offenders are heterogeneous (Knight & Prentky, 1993) and offender type is related to recidivism (see for example Furby, Weinrott, & Blackshaw, 1989; Hanson & Bussière, 1998; Marshall, 1997). It does not seem worthwhile to delay an exploration of the factors that predict re-offending by Indigenous violent offenders until the North American instruments have been refined.

Finally, we believe that the developers of the instruments reviewed have generally been too preoccupied with risk (static) factors. For an instrument of this nature to be useful locally it

should also take into account offender needs (dynamic factors) as they may predict re-offending. For example, it is possible that offenders with a specific combination of needs may be more likely to reoffend than those who do not have those needs. We further believe the presence of preventative factors should also be taken into account as they may influence the risk of re-offending, but did not examine this aspect in this project.

We consequently prefer option (d). While we have a high regard for the instruments discussed above and the research that underlies them, we believe that it would be inappropriate to use them, even if adapted, with Indigenous people without a more thorough investigation. We concede that it is possible that the available instruments may accurately predict the risk of violence by Indigenous males, but we believe that the appropriate approach is to assume that this is not the case until the contrary is demonstrated. Despite choosing option (d) we believe that it is important for researchers, including us, who want to develop a unique instrument for a specific population, to take into account the methodology the developers of existing instruments used, and the range of variables they examined, when they developed existing instruments. These instruments will also be useful when we, at a later stage do cross validation studies.

Aims of the study

The primary aim of this study is to empirically identify those risk factors that characterise Indigenous Australians who violently re-offend and on this basis construct a population specific risk assessment tool. A secondary aim is to attempt to contribute quantitative information that will lead to a better understanding of the dynamics of violence in the Indigenous community and can be used to introduce primary prevention measures.

Definitions

The operational definitions proposed for the present study were guided primarily by the work of other researchers in the field of risk assessment or were developed in consultation with the Department of Justice. This was an acknowledgment that risk tools are applied in an environment that is governed by localised policy, values and sentencing acts.

Indigenous and Non Indigenous

Offenders who stated for the purpose of their Department of Justice intake forms that they were Aboriginal or Torres Strait Islander were defined as Indigenous and persons

identifying themselves as any of other origin were defined as non Indigenous. While this definition was limited by overlooking "tribal and regional" variations (Reidpath & Diamond, 1998, p. 31) it was a consequence of using historical file data.

Re-Offender and Non Re-Offender

Offenders found guilty by a court of law of committing a subsequent violent offence were defined as violent re-offenders. Offenders found guilty by a court of law of committing a subsequent sexual offence were defined as sexual re-offenders. A re-offence was deemed to occur in cases where a subsequent offence was committed while on bail but dealt with at the same time of the index offence. Time at risk was calculated from arrest date of original offence to the arrest date of the subsequent offence (excluding prison time). Those who had not been found guilty of committing further violent or sexual offences were defined as non re-offenders. Breach of order for non-compliance was not considered as a re-offence as this type of conviction is more reflective of institutional behaviour. As Quinsey et al. (1998, p. 28) have suggested, "many studies of prisoners include technical parole violations in the definition of recidivism - behaviors that would be neither criminal nor antisocial if the individual were not a parolee".

Time at Risk (Opportunity to Re-Offend)

Opportunity to re-offend was considered to begin from the moment of release to the community (in the case of Community based Orders, from the commencement of the order) until a subsequent offence occurred. Prison time was not calculated as time at risk. However, as Quinsey et al. (1998) have suggested, prisoners who are convicted of a violent offence while incarcerated were considered as recidivists and the time at risk recorded as zero.

Violent Offence

Any offence identified by Offender Programs as requiring a violence intervention program.

Family Violence Offence

Any offence identified by Offender Programs as requiring a violence intervention program and where the victim was directly related through kinship (for example, wife, de facto partner, mother, grandmother, father, grandfather, daughter, son, child in the custody of the offender or offender's partner, brother, sister, cousin brother, cousin sister).

Sexual Offence

Any offence identified by Offender Programs as requiring a sexual offender intervention program.

Sexually Violent Offence

Any offence identified by Offender Programs as requiring a sexual offender intervention program and where the offence included an act that would also be considered as assault causing harm to the person. To meet the criteria for sexually violent the act of violence had to be supported by medical reports, material facts or sentencing remarks in the relevant file.

Index offence

The first violent or sexual offence in the offender's criminal history that could be coded from file data. Where there were multiple offences the most serious violent or sexual offence was deemed the index offence.

Static Risk Predictor, Criminogenic and Non Criminogenic Needs

A static predictor of risk was defined as any predictor that is predictive of recidivism but cannot be altered or changed (Andrew & Bonta, 1994). A dynamic predictor was defined as any mutable predictor that is predictive of recidivism and when altered corresponds with increases or reductions in recidivism. However, Howells et. al (1999) have reported the importance of considering both criminogenic and non-criminogenic needs in Indigenous populations. While criminogenic needs are considered primary intervention targets, Howells et. al have suggested that Indigenous offending groups are characterized by much higher levels of non-criminogenic needs in comparison to non Indigenous groups. Thus, for the purpose of the present study,

dynamic needs were considered to be either criminogenic or non-criminogenic. Criminogenic needs were defined as needs that contribute directly to offending behaviour. Non-criminogenic needs were considered needs that could not be directly attributed to offending behaviour.

Predictor Definitions

All predictors were coded using definition manuals developed with reference to the literature and each rater was trained until 85% concordance was reached for each predictor with all raters. Where the definition of a predictor was deemed culturally inappropriate by the Indigenous Advisory Committee or the Indigenous research assistants, a definition was negotiated with both parties. For example, with the employment predictor from the Community Justice Case Needs (Case Needs) model our Indigenous advisors encouraged us to consider employment in terms of engagement in meaningful activity rather than in terms of educational background and formal work record (as per Case Needs Criteria). It was their belief that in many regions achieving formal education milestones and waged employment was not a realistic expectation and that engagement in community activity and/or traditional pursuits were the cultural equivalent of the Western concept. While such statements were not intended as an endorsement of the continued lack of opportunity for Indigenous people, our results did suggest that non re-offenders scored lower on this item in comparison to re-offenders and would have not done so using the usual Case Needs criteria. In essence without culturally relevant definitions it is likely that the general disadvantage and cultural difference of Indigenous offenders will serve to elevate scores and result in misclassification.

Predictors of the 3-Predictor Model

The outcomes of the study suggested that three predictors were salient in predicting re-offending outcome. We will refer to this model as the 3-Predictor model. The definition for each predictor is stated here to assist the reader in interpreting the results. As can be seen from the definitions they have been contextualised where required for application to Indigenous offenders.

Poor Coping Skills

Evidence on file that the offender has used alcohol or other maladaptive behaviours as a coping strategy. For Indigenous offenders the offender may state he uses one or more maladaptive behaviours to deal with "hurting inside" (Mermott et. al, 2001).

Unfeasible Release Plans

Evidence on file the offender did not have feasible or realistic release plans when he was released from prison or court. For example, where the offender planned to return to a high risk environment. For Indigenous offenders this would include returning to an area where he was involved in a feud that was ongoing and was at risk of engaging in further feuding behaviour or returned to an environment where he was not only the perpetrator of violence but also the victim. Another indicator included where there was not adequate support for the offender in the community, or he was unlikely to have the support required to maintain treatment gains post release. For Indigenous offenders this would include instances where the offender had been prohibited for either cultural or Justice reasons from returning to the community where he normally resides.

Unrealistic Long-term Goals

Evidence on file that the offender is unable to plan for the future in a realistic way. For example, plans in respect of relationships and work (pattern of meaningful activity for Indigenous offenders) he can clearly not achieve given his history and circumstances.

General Method

Ethical Considerations

In accordance with the Australian Psychological Society Guidelines for research with Aboriginal and Torres Strait Islander People an Indigenous Advisory Committee was established to monitor research. The Advisory committee took a "hands on" role by shaping the research to meet the interests of the Indigenous community. This included conducting on-site visits to monitor cultural sensitivity, identifying and selecting Indigenous research assistants,

provision of a debriefing team for Indigenous research assistants and the delivery of research outcomes to the broader community. In addition, on site Indigenous advisors were used in regional locations and the majority of research assistants were Indigenous. The Indigenous research assistants also acted as cultural advisors and implemented procedures relevant to culturally sensitive data collection.

Research design

The research design was based on retrospective data and consisted of a predictor isolation study, a model building study and a cross-validation study. The predictor variables were static and dynamic variables theoretically associated with future violence, predictors identified in the previously conducted focus group studies or identified in existing studies as accurate predictors of future violence. The obvious limitation of retrospective data was that the range of predictors that could be coded was dictated by the information available in existing records. A dichotomous criterion or outcome variable of re-offenders and non re-offenders was employed.

Entire Participant Sample

File data of adult male Western Australian Indigenous offenders who had been identified as requiring either a violent or sexual offender program (this sample included those who did not engage in or complete a program) were used for data coding. The entire sample consisted of 1838 offenders. The sample was divided into 3 random samples using the MedCalc randomization program. Offenders who were deceased were not coded as this violated cultural norms in many of the regions where the data were collected. If it could not be established if the offender was deceased or living the offender was eliminated from the study. If ethnicity could not be established the offender was eliminated from the sample. A high attrition rate was experienced in the second and third study due to the cancellation of airline services to several regional areas. In many cases this meant we were unable to access files in these areas. Thus these samples should not be considered random.

Predictor Isolation Study

Participants

There were 618 offenders in the random sample. After attrition due to deceased persons, inability to identify ethnicity, file availability and data screening there was a total sample of 525 offenders. Table 1 and 2 provide demographics relevant to the sample.

Table 1: Offence Type, Sample Sizes, Mean Age and Average Time at Risk

Offence Type	Sample Size	Mean Age at Index Offence		Average time at Risk *(days)	Average Follow Up **(years)
		Age	SD		
Violent	254	22.6	5.25	509.52	8
Family Violence	112	26.8	6.99	463.69	7
Sexual (non violent)	115	28	10.21	819.15	9
Sexual and Violence	44	25.5	7.52	315.32	8

*This is the time the offender was free prior to re-offending. Time at risk was calculated in days due to a large number of offenders not reaching the one month risk period for re-offence
** This does not take into account subsequent prison terms.

Table 2: Geographic Regions as a Function of Offence Type

Region	Violent	Family Violence	Sexual - non violent	Sexual and Violence	Total
Albany	14	2	3	1	20
Broome	5	8	8	3	24
Bunbury	11	6	2	2	21
Carnarvon	11	5	6	3	25
Derby	3	3	6	4	16
Geraldton	15	9	10	1	35
Halls Creek	10	15	8	2	35
Kalgoorlie	25	13	19	4	61
Kununurra	14	6	7	2	29
Meekatharra	5	7	6	0	18
Metropolitan	112	23	29	17	181
Newman	1	1	0	1	3
Northam	8	2	1	0	11
Pt Hedland	17	8	6	3	34
Roebourne	3	4	4	1	12
Total	254	112	115	44	Total = 525

Grouping and Isolation of Predictor Variables

From the predictors identified through literature review and the focus group studies, 67 predictors could be coded from the available offender records (Offender Program files, Community Justice files and electronic database, court transcripts, criminal records, Total Offender Management System and the Total Records Imaging Management System). See Appendix 1 for the list of predictors.

Due to the large number of predictors it was necessary (for analytic purposes) to reduce them into categories that reflected specific domains. Three different approaches were taken to check the structure of predictor domains. The first was a static and dynamic (criminogenic and non-crimonogenic) analysis of predictors. The second was a replication (as closely as could be achieved) of the structure used for prediction isolation in the development of the VRAG (including a full analysis of factor 1 and factor 2 items from the PCL-R). The final method ensured cultural difference had been accounted for and was a three category grouping of causal factors specific to Australian Indigenous violence (precipitating causes, situational factors and underlying causes). These groupings have been suggested as encompassing multiple originating causes and are proposed to represent the behavioural, psychological and emotional dimensions of Indigenous violence in Australia (Mermmott et al, 2001).

This process revealed distinct differences between violent and sexual offenders and became so problematic in terms of predictor isolation that all the analyses were re-run on these two distinct groups (violent and sexual). Therefore models that take into account the differences between sexual and violent offenders became the goal of predictor isolation and model building. While a general model could have been developed the accuracy would have been significantly decreased and it would have represented a blunt model for both groups. Moreover, in an effort to address misclassification of offenders the over-riding goal was to identify predictors and develop models that were geared toward accurate separation between re-offenders and non re-offenders.

Static, Criminogenic and Non Criminogenic Groupings

Due to the large number of predictors falling within the areas of static predictors and non criminogenic needs the following subsets of predictors were adopted. Static predictors were divided into two subsets. The first was criminal history predictors and the second was victim profile predictors. Non-criminogenic needs consisted of four subsets (childhood history, social domain, psychological/psychiatric/treatment history and personal/emotional/cognitive orientation).

Static Predictors

Subset 1 – Criminal History: Offence severity, previous violent offences, previous non violent offences, age of first offence, age of index offence, juvenile violence, previous prison term, previous sexual offences and history of perpetrating violent offences against family members.

Subset 2 – Victim Profile: Victim received medical attention, victim died, male victims, female victims, child victims and animal victims.

Criminogenic Needs

Alcohol use, drug use, solvent use, petrol sniffing, active involvement in feuding, offence related to payback behaviour, violence related to debts or money issues, offence related to paranoid behaviour, poor anger/behavioural control.

Non Criminogenic Needs

Subset 1 – Childhood History: Member of the stolen generation, lived with primary caregiver, absent father in childhood, exposure to violence/family violence from an early age, problem behaviour in childhood, sexual abuse in childhood, sexual abuse in institutions during

childhood, physical/emotional abuse in childhood and physical/emotional abuse in institutions during childhood.

Subset 2 – Social Functioning: Employment status, educational status, unfeasible release plans, had a domestic relationship, relationship instability, relationship characterized by jealousy or jealousing behaviour, parasitic lifestyle, promiscuous sexual behaviour, and criminal associates.

Subset 3 – Psychological/Psychiatric/Treatment History: Had treatment prior to re-offending, unresponsive or non compliant to treatment, treated mental illness, untreated mental illness, psychological/psychiatric report requested after current offence, suicide attempts, self harm or suicidal ideation.

Subset 4 – Personal/Emotional/Cognitive Orientation: Superficial charm, grandiose sense of self worth, becomes bored/needs stimulation, pathological liar, manipulative, perceives violent/sexual offending to be acceptable behaviour, lack of remorse, intimacy problems, unable to deal with strong emotions (affect), poor coping skills, viewing of pornographic material, lack or realistic longterm goals, impulsivity, irresponsibility, won't accept responsibility for actions/minimization, identity issues, low self-esteem, stress, stress associated with death in custody.

Isolation Study: Static, Criminogenic and Non Criminogenic Results

Forward stepwise logistic regression was used for all analyses. The outcome variable was re-offender and non-re-offender and the independent variables were all dichotomous in nature (with exception of predictors such as age and offence severity). Analyses were conducted for sexual offenders and violent offenders. Data screening and assumption testing was performed on each predictor set. Outliers that were influential in determining goodness of fit were removed (using residuals, Cook's distance, DFBeta and Leverage statistics).

Violent Offenders and Criminal History

The analysis was conducted on the 10 criminal history predictors. Discrimination amongst cases was found on the basis of previous violent offences, previous non-violent offences, age at index offence and previous related victims. The model fit on the basis of these variables was statistically reliable, $c2$ (4, N = 314) =156.584, $p < .000$ indicating that the predictors as a set distinguished between re-offenders and non re-offenders. As indicated by Table 3 all variables significantly contributed to the final model.

Table 3: Criminal History Predictors for Violent offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Previous violence	5.725	43.068	.000	306.396	55.429	1693.662
Previous non-violent	4.216	10.311	.001	67.791	5.170	888.904
Age at Index	.477	36.935	.000	1.611	1.381	1.878
Related Victims	4.178	26.303	.000	111.939	18.448	679.238

Variation in outcome was .678 using Nagelkerke R square. For re-offenders the classification accuracy was 94.3% and for non re-offenders 67.3%. This resulted in overall accuracy of 90.1%.

Sexual Offenders and Criminal History

The analysis was conducted on the 10 criminal history predictors. Discrimination amongst cases was found on the basis of previous violent offences, age at index offence, previous juvenile violence and previous sexual offences. The model fit on the basis of these variables was statistically reliable, $c2$ (4, N = 135) =129.572, $p < .000$ indicating that the predictors as a set distinguished between re-offenders and non re-offenders. As indicated by Table 4 all variables significantly contributed to the final model.

Table 4: Criminal History Predictors for Sexual offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Previous violent	3.747	10.081	.001	42.389	4.195	428.303
Age at Index	.361	15.825	.000	1.435	1.201	1.714
Previous juvenile violence	4.482	11.823	.001	88.421	6.871	1137.908
Previous sexual offences	7.862	17.120	.000	2596.039	62.661	107553.7

Variation in outcome was .823 using Nagelkerke R square. For re-offenders the classification accuracy was 85.7% and for non re-offenders 89.2%. This resulted in overall accuracy of 87.4%.

Violent Offenders and Victim Profile

The analysis was conducted on the 6 criminal history predictors. Discrimination amongst cases was found on the basis of male victims, victim died and victims needing medical attention. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N = 366) =30.127, $p < .000$ indicating that the predictors as a set distinguished between re-offenders and non re-offenders. As indicated by Table 5 all variables significantly contributed to the final model.

Table 5: Victim Profile Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Male victims	1.259	16.964	.000	3.523	1.935	6.415
Victim died	-1.546	11.897	.001	.213	.088	.513
Victims needing medical attention	.672	6.563	.010	1.959	1.171	3.277

Variation in outcome was .115 using Nagelkerke R square. For re-offenders the classification accuracy was 97% and for non re-offenders 15.5%. This resulted in overall accuracy of 90.1%. As the results suggest the predictors were very poor at separating re-offenders from non re-offenders.

Sexual Offenders and Victim Profile

The analysis was conducted on the 6 criminal history predictors. Discrimination amongst cases was found on the basis of male victims. The model fit on the basis of this variable was statistically reliable, $c2$ (1, N = 159) =23.895, $p < .000$ indicating that the predictor distinguished between re-offenders and non re-offenders. Variation in outcome was .186 using Nagelkerke R square. For re-offenders the classification accuracy was 74.4% and for non re-offenders 63.6%. This resulted in overall accuracy of 69.2%.

Criminogenic Needs and Violent Offenders

The analysis was conducted on the 9 criminogenic need predictors. Discrimination amongst cases was found on the basis of the variables alcohol, drug and poor anger/behaviour control. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N = 366) =25.671, p < .000 indicating that the predictors distinguished between re-offenders and non re-offenders. Table 6 provides detail for each predictor.

Table 6: Criminogenic Needs for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Alcohol	-.909	4.211	.040	.403	.169	.960
Drug	-772	9.158	.002	.462	.280	.762
Anger	-1.200	15.128	.000	.301	.165	.551

Variation in outcome was .09 using Nagelkerke R square. For re-offenders the classification accuracy was 95.9% and for non re-offenders 15.5%. This resulted in overall accuracy of 74.5%. As results suggest this set of predictors resulted in poor classification accuracy for non re-offenders.

Criminogenic Needs and Sexual Offenders

The analysis was conducted on the 9 criminogenic need predictors. Discrimination amongst cases was found on the basis of poor anger/behaviour control. The model fit on the basis of this variable was statistically reliable, $c2$ (1, N = 159) =19.310, p < .000 indicating that the predictor distinguished between re-offenders and non re-offenders. Variation in outcome was .153 using Nagelkerke R square. For re-offenders the classification accuracy was 82.9% and for non re-offenders 49.9%. This resulted in overall accuracy of 66.7%.

Violent Offenders and Childhood History

The analysis was conducted on the 9 childhood history predictors. Discrimination amongst cases was found on the basis of the variables exposure to violence and childhood

behaviour. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 366) =31.315, p < .000 indicating that the predictors distinguished between re-offenders and non re-offenders. Table 7 provides detail for each predictor.

Table 7: Predictors for Childhood History for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Exposure	1.144	20.052	.000	3.140	1.903	6.180
Child Behaviour	.656	4.964	.026	1.927	1.082	3.431

Variation in outcome was .120 using Nagelkerke R square. For re-offenders the classification accuracy was 91.1% and for non re-offenders 22.7%. This resulted in overall accuracy of 73%. As can be seen by the results these predictors provide poor classification accuracy for non re-offenders.

Sexual Offenders and Childhood History

The analysis was conducted on the 9 childhood history predictors. Discrimination amongst cases was found on the basis of the variables exposure to violence, childhood behaviour and sexual abuse as a child. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N = 159) = 22.183, p < .000 indicating that the predictors distinguished between re-offenders and non re-offenders. Table 8 provides detail for each predictor.

Table 8: Predictors for Childhood History for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Exposure	1.146	9.078	.003	3.144	1.492	6.624
Child Behaviour	1.104	6.993	.008	3.015	1.331	6.831
Sexual Abuse	-1.217	6.392	.011	.296	.115	.761

Variation in outcome was .174 using Nagelkerke R square. For re-offenders the classification accuracy was 66.9% and for non re-offenders 66.2%. This resulted in overall accuracy of 67.9%.

Violent Offenders and Social Domain

The analysis was performed on the 10 social domain predictors. Discrimination amongst cases was found on the basis of the variables unfeasible release plans and relationship instability. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 348) = 178.409, $p < .000$ indicating that the predictors distinguished between re-offenders and non re-offenders. Table 9 provides detail for each predictor. Variation in outcome was .610 using Nagelkerke R square. For re-offenders the classification accuracy was 89.2% and for non re-offenders 63.3%. This resulted in overall accuracy of 83.3%. Release plans had a negligible influence.

Table 9: Predictors for Social Domain for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Release Plans	11.331	.362	.547	83382.821	.000	8.8E+20
Relationship Instability	.788	5.358	.021	2.200	1.128	4.288

Sexual Offenders and Social Domain

The analysis was performed on the 10 social domain predictors. Discrimination amongst cases was found on the basis of the variables unfeasible release plans and relationship instability. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 159) = 41.873, $p < .000$ indicating that the predictors distinguished between re-offenders and non re-offenders. Table 10 provides detail for each predictor. Variation in outcome was .309 using Nagelkerke R square. For re-offenders the classification accuracy was 68.3% and for non re-offenders 79.2%. This resulted in overall accuracy of 73.6%.

Table 10: Predictors for Social Domain for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Release Plans	2.096	31.553	.000	8.136	3.915	16.907
Relationship Instability	-.760	3.930	.047	.468	.221	.991

Psychological, Psychiatric and Treatment History for Violent Offenders

The analysis was performed on the 7 psychological/psychiatric and treatment history predictors. Discrimination amongst cases was found on the basis of the variable non responsive to treatment. The model fit on the basis of this variable was statistically reliable, $c2$ (1, N = 356) = 71.967, $p < .000$. However, all non re-offenders were incorrectly classified suggesting that this predictor provided very poor separation between groups.

Psychological, Psychiatric and Treatment History for Sexual Offenders

The analysis was performed on the 7 psychological/psychiatric and treatment history predictors. Discrimination amongst cases was found on the basis of the variables had treatment prior to offence and non responsive to treatment. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 157) = 35.123, $p < .000$ indicating that the predictors distinguished between re-offenders and non re-offenders. Table 11 provides detail for each predictor. Variation in outcome was .267 using Nagelkerke R square. For re-offenders the classification accuracy was 62.2% and for non re-offenders 77.3%. This resulted in overall accuracy of 69.4%.

Table 11: Psychological, Psychiatric and Treatment History Predictors for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Had Treatment prior to offence	1.121	6.385	.012	8.217	1.286	7.320
Non responsive to treat	2.106	20.805	.000	.078	3.324	.20.311

Personal, Emotional and Cognitive Orientation for Violent Offenders

The analysis was performed on the 18 personal, emotional and cognitive orientation predictors. Discrimination amongst cases was found on the basis of the variables unrealistic long term goals and irresponsibility. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 358) = 50.281, $p < .000$ indicating that the predictors distinguished between re-offenders and non re-offenders. Table 12 provides detail for each predictor.

Table 12: Personal, Emotional and Cognitive Orientation for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Unrealistic long-term goals	1.478	30.950	.001	4.385	2.605	7.382
Irresponsibility	1.087	10.932	.000	2.965	1.557	5.647

Variation in outcome was .194 using Nagelkerke R square. For re-offenders the classification accuracy was 100% and for non re-offenders 0%. This resulted in overall accuracy of 75.1%. As the results suggest the classification accuracy was very poor for non re-offenders.

Personal/Emotional/Cognitive Orientation and Sexual Offenders

The analysis was performed on the 18 personal, emotional and cognitive orientation predictors. Discrimination amongst cases was found on the basis of the variables unrealistic long-term goals, impulsivity and denial/minimization. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N = 159) = 29.324, $p < .000$ indicating that the predictors distinguished between re-offenders and non re-offenders. Table 13 provides detail for each predictor.

Table 13: Personal, Emotional and Cognitive Orientation for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Unrealistic long-term goals	1.273	12.208	.000	3.570	1.748	7.290
Impulsivity	.715	4.022	.045	2.044	1.016	4.111
Denial/Minimization	.851	5.870	.015	2.342	1.177	4.664

Variation in outcome was .225 using Nagelkerke R square. For re-offenders the classification accuracy was 64.6% and for non re-offenders 67.5%. This resulted in overall accuracy of 66%.

VRAG Groupings

The strategy adopted by Quinsey et al. (1998) in developing the VRAG was replicated and modified to include variables specific to the current study. In addition, predictor items relating to psychopathy were categorized according to factor 1 or factor 2 of the PCL-R (Quinsey et al (1998) used the total score). It should be noted that coding of these predictor items was not based on PCL-R assessments and that the current study definitions varied from those used for the PCL-R items. On the basis of the file information available for coding the items it was necessary to use more simplistic or culturally appropriate definitions. This, however, was not considered a limitation as the goal of using the PCL-R factor 1 and 2 domains was to logically categorize psychological predictor items (albeit less rigidly defined) according to previously used groupings.

This strategy resulted in 7 predictor categories. The adult adjustment and sociodemographic predictors were combined into the one category as the sociodemographic category was represented by only two predictors in the current study. This was not considered problematic as Quinsey et al. (1998) also combined items from these categories as their analyses progressed. In the present study a new category was added that comprised offence history predictors. This category was included as many of the predictors reflected both adult and juvenile historical information that did not fit into existing categories or had been coded differently to the Quinsey et al. study. The assessment predictors also differed from the Quinsey et al. category as they were not assessment scores. The predictors listed in this category were assessment items routinely recorded in DOJ files as part of an assessment schedule or as alerts (for example stress associated with a death in custody or self-harming behaviour) and were included in the predictor pool because they had either been identified in the literature as risk factors or had been identified by the focus groups as risk factors associated with Indigenous males. As previously suggested the two additional categories of the PCL-R factor 1 and factor 2 scores were also added. The predictor items included in each of the seven categories are listed in the following and based on the unique characteristics of Indigenous offenders comprise several predictors not assessed previously for predictive accuracy.

Childhood History Predictors: juvenile history of violent offences; educational background (did not complete year 10), member of the stolen generation, lived with primary caregiver, absent father in childhood, exposure to violence/family violence from an early age, sexual abuse in childhood, sexual abuse in institutions during childhood, physical/emotional abuse in childhood and physical/emotional abuse in institutions during childhood.

Adult Adjustment/Socio Demographic Predictors: alcohol misuse, drug misuse, solvent misuse, petrol sniffing, poor coping skills, criminal associates, relationship instability, relationship characterized by jealousy or jealousing behaviour, promiscuous, treated mental illness, untreated mental illness, employment status and marital status.

Offence History Predictors: age of first offence, previous violent offences, previous non-violent offences, history of sexual offences, history of family violence, child victims, male victims, female victims, animal victims, victim died, victim required medical attention (including medical checks of rape victims), previous prison terms.

Index Offence Predictors: age at the time of index offence, offence severity, offence related to payback behaviour, offence related to violence associated with active involvement in inter-family, inter-community or inter-region feuding, offence related to debts or money issues, unfeasible release plans.

Assessment Predictors: intimacy problems, viewing of pornographic material, low self-esteem, suicide attempts, suicidal ideation and/or self harming behaviour, high levels of stress, stress associated with a death in custody, unresponsive to and/or non compliant with treatment, had treatment prior to re-offending, psychological/psychiatric report requested as a consequence of the index offence, evidence of identity issues and paranoid behaviour.

Factor 1 PCL-R Predictors: superficial charm, grandiose sense of self worth, pathological liar, manipulative, lack of remorse or empathy, restricted emotional responses, won't accept responsibility for actions.

Factor 2 PCL-R Predictors: boredom, parasite, poor anger management/behaviour control, childhood problem behaviour, aggression or offending behaviour, lack of realistic long-term goals, impulsive, irresponsible, breach of orders.

Predictor Isolation Study: VRAG Results

Childhood History and Sexual Offenders

The analysis was conducted on the 10 childhood history predictors. Discrimination amongst cases was found on the basis of the predictors juvenile violence, exposure to violence and sexual abuse. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N = 159) =30.124, $p < .0001$, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. As indicated by the results and the step statistic for step 3, $c2$ (1, N = 159) =3.875, $p < .049$, the sexual abuse variable was questionable. Table 14 provides statistical detail for each predictor.

Table 14: Childhood History Predictors for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Juvenile violence	1.350	14.636	.000	3.858	1.932	7.704
Exposure to violence	1.088	7.867	.005	2.968	1.388	6.348
Sexual abuse as a child	-.970	3.87	.051	.379	.143	1.003

It should also be noted that classification accuracy for both re-offenders and non re-offenders did not improve as a consequence of adding exposure to violence to the model. Based on these outcomes the predictor of sexual abuse was considered to decrease classification accuracy and the exposure to violence predictor was considered a questionable inclusion in the model. The classification accuracy for juvenile violence alone was 65.9% for re-offenders, 70.1% for non re-offenders and 67.9% overall. Variation in outcome for this model was .203 using Nagelkerke R square. This accuracy rate did not change with the inclusion of exposure to violence. With all three predictors in the model the accuracy for re-offenders was 80.5%, for non re-offenders 49.4% and overall accuracy of 65.4%.

Childhood History and Violent Offenders

The analysis was conducted on the 10 childhood history predictors. Discrimination amongst cases was found on the basis of the juvenile violence and exposure to violence predictors. The model fit on the basis of these two variables was statistically reliable, $c2$ (2, N = 351) = 74.029, $p < .0001$, indicating that the two predictors as a set distinguished between re-offenders and non re-offenders. Table 15 provides statistical detail for each predictor.

Table 15: Childhood History Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Juvenile Violence	1.452	30.255	.000	4.270	2.409	7.570
Exposure to violence	1.709	89.475	.000	5.521	3.004	10.149

The variation in outcome accounted for was .287 using Nagelkerke R square. For re-offenders the classification accuracy was 82.9% and for non re-offenders 51.2%. This resulted in overall accuracy of 75.5%. As these results suggest, despite achieving reasonable overall classification accuracy, the accuracy for non re-offenders was only slightly better than chance.

Adult Adjustment and Socio-Demographic Predictors for Sexual offenders

The analysis was conducted on the 13 Adult Adjustment and Socio-Demographic Predictors. Discrimination amongst cases was found on the basis of the poor coping skills and the marital predictor . The model fit on the basis of these two variables was statistically reliable, $c2$ (2, N = 159) = 12.557, $p < .002$, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. Table 16 provides statistical detail for each predictor.

Table 16: Adult Adjustment and Socio-Demographic Predictors for Sexual offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Cope	.338	6.893	.000	.009	2.430	1.252
Marital	.347	3.962	.000	.048	.503	.255

The variation in outcome accounted for was .101 using Nagelkerke R square. For re-offenders the classification accuracy was 70.7% and for non re-offenders 51.9%. This resulted in overall accuracy of 61.6%. It should be noted that this classification accuracy was poor for non re-offenders and the marital variable did not contribute.

Adult Adjustment/Socio Demographic Predictors for violent offenders

The analysis was conducted on the 13 Adult Adjustment and Socio-Demographic Predictors. Discrimination amongst cases was found on the basis of alcohol use, solvent use, criminal associates, relationship instability and employment. The model fit on the basis of these variables was statistically reliable, $c2$ (5, N = 347) = 92.689, $p < .000$, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. As the results suggest solvent use made a negligible contribution to the model. Table 17 provides statistical detail for each predictor.

Table 17: Adult Adjustment and Socio-Demographic Predictors for Sexual offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Alcohol Use	2.417	14.851	.000	11.213	3.280	38.335
Solvent use	8.519	.370	.543	5010.097	.000	4.1E+15
Criminal Associates	1.215	11.530	.001	3.370	1.671	6.794
Relationship Instability	1.529	22.609	.000	4.613	2.456	8.664
Employment	1.190	14.714	.000	3.286	1.789	6.034

The variation in outcome accounted for was .354 using Nagelkerke R square. For re-offenders the classification accuracy was 77% and for non re-offenders 24.7%. This resulted in overall accuracy of 80.1%. As the results suggest this represents very poor accuracy for non re-offenders.

Offence History and Sexual Offenders

The analysis was conducted on the twelve offence history predictors. Discrimination amongst cases was found on the basis of age of first offence and previous male victims. The model fit on the basis of these two variables was statistically reliable, $c2$ (2, N = 159) = 31.345, $p < .0001$, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. Table 18 provides statistical detail for each predictor.

Table 18: Offence History predictors for Sexual offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Age of First offence	.103	6.322	.000	1.108	1.023	1.201
Previous Male Victims	1.549	19.085	.000	4.706	2.349	9.429

The variation in outcome accounted for by Nagelkerke R square was .239. For re-offenders the classification accuracy was 70.7% and for non re-offenders 67.5%. This resulted in overall accuracy of 69.2%.

Offence History and Violent Offenders

The analysis was conducted on the twelve offence history predictors. Discrimination amongst cases was found on the basis of age of first offence, previous violent offences, male victims, the death of a victim and a victim requiring medical attention. The model fit on the basis of these variables was statistically reliable, $c2$ (5, N = 318) = 142.061, $p < .0001$, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. Table 19 provides statistical detail for each predictor.

Table 19: Offence History Predictors for Violent offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Age of First Offence	.465	31.506	.000	1.591	1.353	1.872
Previous Violent Offences	3.532	40.188	.000	34.203	11.476	101.941
Previous Male Victims	2.195	16.497	.000	8.978	3.113	25.891
Victim Died	-3.797	27.091	.000	.022	.005	.094
Victim need medical attent	1.932	13.731	.000	6.904	2.485	19.181

The variation in outcome was accounted for by a Nagelkerke R square of .611. For re-offenders the classification accuracy was 94% and for non re-offenders 50%. This resulted in overall accuracy of 86.8%. Examination of the classification accuracy suggested that greater accuracy for the non re-offending outcome was achieved at step 3 in comparison to step 5. This represented a very small improvement in terms of cases. Overall the classification accuracy was poor for non re-offenders.

Index Offence for Sexual Offenders

The analysis was conducted on the 6 index offence predictors. Discrimination amongst cases was found on the basis of age of index offence and unfeasible release plans. The model fit

on the basis of these variables was statistically reliable, $c2$ (2, N = 159) = 114.246, p < .000, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. Table 20 provides statistical detail for each predictor.

Table 20: Index Offence Predictors for Sexual offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Age at Index Offence	.277	15.492	.000	1.320	1.149	1.515
Unfeasible Release Plans	6.249	21.770	.000	517.630	37.492	7146.568

The variation in outcome was accounted for by a Nagelkerke R square of .73. For re-offenders the classification accuracy was 82.9% and for non re-offenders 80.3%. This resulted in overall accuracy of 81.7%.

Index Offence for Violent Offenders

The analysis was conducted on the 6 index offence predictors. Discrimination amongst cases was found on the basis of active involvement in feuding and unfeasible release plans. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 348) = 177.616, p < .000, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. However, as the results suggest the unfeasible release plans predictor made a negligible contribution to the model. Table 21 provides statistical detail for each predictor.

Table 21: Index Offence predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Feuding	1.903	4.329	.037	2.984	1.065	8.359
Unfeasible release Plans	11.475	.367	.545	96304.982	.000	13E+21

The variation in outcome was accounted for by a Nagelkerke R square of .608. For re-offenders the classification accuracy was 80.3% and for non re-offenders 92.4%. This resulted in overall accuracy of 83%.

Assessment Predictors for Sexual Offenders

The analysis was conducted on the 11 assessment predictors. Discrimination amongst cases was found on the basis of non responsive to treatment and had treatment prior to re-offending. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 157) = 35.123, $p < .000$, indicating that the predictors as a set distinguished between re-offenders and non re-offenders. Table 22 provides statistical detail for each predictor.

Table 22: Assessment Predictors for Violent offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Non Responsive to Treatment	2.106	20.805	.000	8.217	3.324	20.311
Had Treatment Prior to Re-offending	1.121	6.385	.012	3.068	1.286	7.320

The variation in outcome was accounted for by a Nagelkerke R square of .219. For re-offenders the classification accuracy was 62.2% and for non re-offenders 77.3%. This resulted in overall accuracy of 69.4%.

Assessment Predictors for Violent Offenders

The analysis was conducted on the 11 assessment predictors. Discrimination amongst cases was found on the basis of the non responsive to treatment predictor. The model fit on the basis of this variable was statistically reliable, $c2$ (1, N = 356) = 71.967, $p < .000$, indicating that the predictor distinguished between re-offenders and non re-offenders. However, classification accuracy was untenable with 100% for re-offenders and 0% for non re-offenders. Variance explained was also poor with a Nagelkerke R square of .273.

Factor 1 PCL-R Predictors and Sexual Offenders

The analysis was conducted on the seven Factor 1 PCL-R predictors. Discrimination amongst cases was found on the basis of restricted emotional responses (affect), won't accept responsibility for actions (denial). The model fit on the basis of this variable was statistically reliable, $c2$ (2, N = 159) = 13.096, p < .001, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 23 provides statistical detail for each predictor.

Table 23: Factor 1 PCL-R Predictors for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Affect	.822	5.297	.021	2.274	1.130	4.579
Denial	.931	7.766	.005	2.538	1.318	4.887

A poor variation in outcome was accounted for by a Nagelkerke R square of .105. The classification accuracy for non re-offenders was also very poor. For re-offenders the classification accuracy was 82.9% and for non re-offenders 42.9%. This resulted in overall accuracy of 69.4%.

Factor 1 PCL-R Predictors for Violent Offenders

The analysis was conducted on the seven Factor 1 PCL-R predictors. Discrimination amongst cases was found on the basis of grandiose sense of self worth (grandiosity), restricted emotional responses (affect), won't accept responsibility for actions (denial). The model fit on the basis of this variable was statistically reliable, $c2$ (3, N = 353) = 52.572, p < .000, indicating that the predictors distinguished between re-offenders and non re-offenders. However, as the results suggest, both grandiosity and affect were questionable inclusions in the model. Table 24 provides statistical detail for each predictor.

Table 24: Factor 1 PCL-R Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Grandiosity	-7.104	.186	.667	.001	.000	9.0E+10
Affect	12.061	.280	.596	172930.3	.000	4.2E+24
Deny	.774	5.170	.023	2.169	1.113	4.228

Variation in outcome was accounted for by a Nagelkerke R square of .207. The classification accuracy for non re-offenders was untenable. For re-offenders the classification accuracy was 100% and for non re-offenders 1.2%. This resulted in overall accuracy of 76.2%.

Factor 2 PCL-R Predictors for Sexual Offenders

The analysis was conducted on the nine Factor 2 PCL-R predictors. Discrimination amongst cases was found on the basis of the poor anger/behavioural control (anger) and unrealistic long-term goals (goals) predictors. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N = 159) = 29.846, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 25 provides statistical detail for each predictor.

Table 25: Factor 2 PCL-R Predictors for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Anger	1.245	10.205	.001	3.472	1.618	7.452
Goals	1.166	10.242	.001	3.208	1.571	6.549

Variation in outcome was accounted for by a Nagelkerke R square of .228. The classification accuracy for re-offenders was untenable. For re-offenders the classification accuracy was 50% and for non re-offenders 79.2%. This resulted in overall accuracy of 64.2%.

Factor 2 PCL-R Predictors for Violent Offenders

The analysis was conducted on the nine Factor 2 PCL-R predictors. Discrimination amongst cases was found on the basis of the poor anger/behavioural control (anger) and unrealistic long-term goals (goals) and breach of order (breach) predictors. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N = 335) = 148.127, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. However, the anger and goals predictors made negligible contributions to the model. Table 26 provides statistical detail for each predictor.

Table 26: Factor 2 PCL-R Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Anger	10.746	19.833	.588	46443.353	.000	3.5E+21
Goals	10.877	19.832	.583	52945.950	.000	4.0E+21
Breach	.825	.386	.033	2.282	1.071	4.863

Variation in outcome was accounted for by a Nagelkerke R square of .555. The classification accuracy for non re-offenders was untenable. For re-offenders the classification accuracy was 93.9% and for non re-offenders 42.3%. This resulted in overall accuracy of 83%.

Causal Factors Specific to Australian Indigenous Violence

As stated previously the groupings of underlying causes, precipitating causes, and situational factors have been suggested as encompassing the behavioural, psychological and emotional dimensions of Indigenous violence in Australia (Memmott, et al. 2001). Underlying causes have been explained in terms of Indigenous dispossession and the history of Australian non Indigenous and Indigenous relations (Memmott, et al. 2001). Examples of underlying causes related to the present study is state removal as a child (member of the stolen generation) or identity issues. Precipitating causes have been defined as "one or more particular events that trigger a violent episode by a perpetrator" (Memmott, et al. 2001). Situational factors have been described as "secondary exacerbating circumstances in the social environment" (Memmott, et al. 2001). In a conceptualization similar to non criminogenic needs these factors are seen as indirect contributors to violent behaviour.

Underlying Causes: member of the stolen generation, lived with primary caregiver, absent father in childhood, exposure to violence/family violence from an early age, sexual abuse in childhood, physical/emotional abuse in childhood, a victim of physical/emotional abuse as child in an institution, a victim of sexual abuse as child in an institution and identity issues.

Precipitating causes: alcohol misuse, drug misuse, solvent misuse, petrol sniffing, poor anger management, paranoid, jealousy or jealousing behaviour, active involvement in feuding, payback behaviour, debts or money issues, stress, stress associated with a death in custody.

Situational factors: employment status, school problems, marital status, lack or realistic long-term goals, poor coping skills, criminal associates, unfeasible release plans, relationship instability, boredom, perceives violent/sexual offending behaviour to be acceptable, viewing of pornographic material.

Situational factors – Subset 2 Psychological: low self esteem, intimacy issues, had treatment prior to re-offending, unresponsive or non compliant to treatment, treated mental illness, untreated mental illness, psychological/psychiatric report requested after current offence, suicide attempts, self harm or suicidal ideation.

Situational Factors – Subset 3 PCL-R Predictors: superficial charm, grandiose sense of self worth, pathological liar, manipulative, lack of remorse or empathy, restricted emotional responses, won't accept responsibility for actions, parasite, childhood aggression or offending behaviour, impulsive, irresponsible, promiscuous sexual behaviour.

Situational Factors – Subset 4 Criminal History Predictors: offence severity, age of first offence, age at the time of index offence, previous violent offences, previous non-violent offences, juvenile violence, previous prison terms, breach of orders, history of sexual offences, history of family violence, child victims, male victims, female victims, animal victims, victim died, victim required medical attention (including medical checks of rape victims).

Predictor Isolation Results: Causal Factors Specific to Australian Indigenous Violence

Underlying Causes for Sexual offenders

The analysis was conducted on the six underlying cause predictors. Discrimination amongst cases was found on the basis of the exposure to violence/family violence from an early age (exposure) and sexual abuse in childhood (sexual abuse) predictors. The model fit on the

basis of these variables was statistically reliable, $c2$ (2, N = 159) = 14.866, p < .001, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 27 provides statistical detail for each predictor.

Table 27: Underlying Causes Predictors for Sexual offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Exposure	1.329	13.082	.000	3.777	1.838	7.760
Sexual Abuse	-1.066	5.136	.023	.344	.137	.866

Variation in outcome was accounted for by a Nagelkerke R square of .119. For re-offenders the classification accuracy was 59.8% and for non re-offenders 70.1%. This resulted in overall accuracy of 64.8%.

Underlying Causes for Violent Offenders

The analysis was conducted on the six underlying causes predictors. Discrimination amongst cases was found on the basis of the exposure to violence (exposure) predictor. The model fit on the basis of this variable was statistically reliable, $c2$ (1, N = 366) = 26.465, p < .000, indicating that the predictor distinguished between re-offenders and non re-offenders. However, the classification accuracy was untenable for non re-offenders (0%). For re-offenders the classification accuracy was 100% and overall accuracy was 73.5%. Variation in outcome was accounted for by a Nagelkerke R square of .102.

Precipitating Causes and Sexual Offenders

The analysis was conducted on the 12 precipitating causes predictors. Discrimination amongst cases was found on the basis of the poor anger management predictor. The model fit on the of this variable was statistically reliable, $c2$ (1, N = 159) = 19.310, p < .000, indicating that the predictor distinguished between re-offenders and non re-offenders. Variation in outcome was accounted for by a Nagelkerke R square of .153. For re-offenders the classification accuracy was 82.9 for re-offenders and 49.4% for non re-offenders. This resulted in overall classification accuracy of 66.7%.

Precipitating Causes and Violent Offenders

The analysis was conducted on the 12 precipitating causes predictors. Discrimination amongst cases was found on the basis of the alcohol, drug and poor anger management predictors. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N =366) = 25.671, p < .000, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 28 provides statistical detail for each predictor.

Table 28: Precipitating Causes Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Alcohol	.909	4.211	.04	2.481	1.042	5.911
Drug	.772	9.158	.002	2.164	1.313	3.568
Anger	1.200	15.128	.000	3.320	1.814	6.079

Variation in outcome was accounted for by a Nagelkerke R square of .099. For re-offenders the classification accuracy was 95.9% and for non re-offenders 15.5%. This resulted in overall accuracy of 74.6%.

Situational Factors and Sexual Offenders

The analysis was conducted on the 11 situational factor predictors. Discrimination amongst cases was found on the basis of unfeasible release plans and the lack of realistic long-term goals predictors. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N =159) = 45.829, p < .000, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 29 provides statistical detail for each predictor.

Table 29: Situational Factors and Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Goals	1.073	7.881	.005	2.925	1.383	6.189
Release Plans	1.878	24.464	.000	6.541	3.108	13.767

Variation in outcome was accounted for by a Nagelkerke R square of .334 For re-offenders the classification accuracy was 68.3% and for non re-offenders 79.2%. This resulted in overall accuracy of 73.6%.

Situational factors and Violent Offenders

The analysis was conducted on the 11 situational factor predictors. Discrimination amongst cases was found on the basis of unfeasible release plans and the relationship instability predictors. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N =348) = 178.409, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 30 provides statistical detail for each predictor.

Table 30: Situational Factors and Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Release plans	11.331	.362	.547	83382.821	.000	8.8E+20
Relationship Instability	.788	5.358	.021	2.200	1.128	4.288

Variation in outcome was accounted for by a Nagelkerke R square of .610 For re-offenders the classification accuracy was 89.2% and for non re-offenders 63.3%. This resulted in overall accuracy of 83.3%.

Situational factors – Psychological for Sexual Offenders

The analysis was conducted on the 9 situational-psychological predictors. Discrimination amongst cases was found on the basis of the predictors had treatment prior to re-offending and non responsive to treatment. The model fit on the basis of these variables was statistically reliable, $c2$ (2, N =157) = 35.123, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 31 provides statistical detail for each predictor.

Table 31: Situational Factors and Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Treat prior to re-offend	1.121	.444	.6.385	3.068	1.286	7.320
Non responsive to treat	2.106	.462	.20.805	8.217	3.324	20.311

Variation in outcome was accounted for by a Nagelkerke R square of .267 For re-offenders the classification accuracy was 62.2% and for non re-offenders 77.3%. This resulted in overall accuracy of 69.4%.

Situational Factors – Psychological for Violent Offenders

The analysis was conducted on the 9 situational-psychological predictors. Discrimination amongst cases was found on the basis of the non responsive to treatment predictor. The model fit on the basis of this variable was statistically reliable, $c2$ (2, N =356) = 31.375, $p < .000$, however, the classification accuracy was untenable for non re-offenders (0%). Accuracy for re-offenders was 100%.

Situational Factors – PCL-R Predictors for sexual offenders

The analysis was conducted on the 12 situational-PCL-R predictors. Discrimination amongst cases was found on the basis of the predictors denial, problematic childhood behaviour and impulsivity. The model fit on the basis of these variables was statistically reliable, $c2$ (3, N =158) = 30.535, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 32 provides statistical detail for each predictor.

Table 32: Situational Factors - PCL-R Predictors for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Deny	1.044	8.440	.004	2.839	1.404	5.741
Child behaviour	1.470	11.364	.001	4.348	1.850	10.220
Impulsivity	1.121	9.788	.002	3.068	1.520	6.192

Variation in outcome was accounted for by a Nagelkerke R square of .234 For re-offenders the classification accuracy was 79% and for non re-offenders 58.4%. This resulted in overall accuracy of 69%.

Situational Factors – PCL-R Predictors for Violent Offenders

The analysis was conducted on the 12 situational-PCL-R predictors. Discrimination amongst cases was found on the basis of the predictors restricted emotional responses (affect), denial, problematic childhood behaviour, impulsivity and irresponsibility. The model fit on the basis of these variables was statistically reliable, $c2$ (5, N =335) = 104.549, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. However, as indicated by the results the affect and denial predictors made poor contributions to the outcome. Table 33 provides statistical detail for each predictor.

Table 33: Situational Factors - PCL-R Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Affect	9.606	.114	.735	14846.598	.000	2.2E+28
Deny	9.779	.128	.721	17656.368	.000	3.5E+27
Child Behaviour	1.128	8.933	.003	3.091	1.475	6.477
Impulsivity	.674	3.968	.046	1.961	1.011	3.805
Irresponsibility	1.972	14.206	.000	7.186	2.577	20.041

Variation in outcome was accounted for by a Nagelkerke R square of .424 for re-offenders the classification accuracy was 94.4% and for non re-offenders 26.9%. This resulted in overall accuracy of 80.9%.

Situational Factors – Criminal History Predictors and Sexual Offenders

The analysis was conducted on the 16 situational-criminal history predictors. Discrimination amongst cases was found on the basis of the predictors age of index offence, juvenile violence, sexual offences and male victim. The model fit on the basis of these variables was statistically reliable, $c2$ (4, N =139) = 126.542, $p < .000$, indicating that the predictors distinguished between re-offenders and non re-offenders. Table 34 provides statistical detail for each predictor.

Table 34: Situational Factors - Criminal History Predictors for Sexual Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Age at Index Offence	.289	16.896	.000	1.334	1.163	1.531
Juvenile violence	4.553	14.486	.000	94.951	9.102	990.491
Previous sexual offences	3.904	11.194	.001	49.618	5.039	488.588
Male Victim	3.606	16.512	.000	36.824	6.467	209.665

Variation in outcome was accounted for by a Nagelkerke R square of .798 for re-offenders the classification accuracy was 83.6% and for non re-offenders 89.4%. This resulted in overall accuracy of 86.3%.

Situational Factors – Criminal History Predictors and Violent Offenders

The analysis was conducted on the 16 situational-criminal history predictors. Discrimination amongst cases was found on the basis of the predictors offence severity, age of index offence, previous violence, non violent offending, number of previous prison terms, family victims, male victims, female victims, previous of current victim died and previous or current victims requiring medical attention. The model fit on the basis of these variables was statistically reliable, $c2$ (10, N =305) = 246.85, $p < .000$, indicating that the predictors

distinguished between re-offenders and non re-offenders. Table 35 provides statistical detail for each predictor.

Table 35: Situational Factors - Criminal History Predictors for Violent Offenders

Variable	B	Wald	Sig.	Exp(B)	95% C.I for EX (B)	
					Lower	Upper
Offence severity	-4.323	8.253	.004	.013	.001	.253
Age of index offence	1.957	12.994	.000	7.075	2.442	20.498
Previous violence	13.838	11.184	.001	1023155	307.414	3.4E+09
Previous non violent offences	11.647	6.472	.011	114331.7	14.501	9.0E+08
Previous prison terms	10.862	10.855	.001	52142.729	81.472	3.3E+07
Family victims	19.476	12.339	.000	2.9E+08	5628.418	1.5E+13
Male victims	7.123	11.793	.001	1240.701	21.283	72328.227
Female victims	-10.320	10.926	.001	.000	.000	.015
Previous or current victim died	-20.872	12.369	.000	.000	.000	.000
Previous or current victims requiring medical attention	9.676	10.783	.001	15935.062	49.448	5135232

Variation in outcome was accounted for by a Nagelkerke R square of .920 for re-offenders the classification accuracy was 98.4% and for non re-offenders 96.2%. This resulted in overall accuracy of 98%.

Predictor Isolation Study Summary

Predictor Isolation Summary for Sexual Offenders

For sexual offenders complete concordance was found for 10 predictor items, partial concordance for 4 predictor items and 3 items were identified by one approach (see Table 36). The unexpected outcome was the number of dynamic predictors (including several criminogenic needs) identified as accurate predictors of re-offence. While a review of the results suggest that

static items performed well, based on previous findings in non Indigenous populations, it was not expected that predictors such as unfeasible release plans, exposure to violence (learned patterns of violence) and relationship instability would be predictive. For example, several theorists contend that the absence of intimate relationships is predictive of sexual offending, yet in this Indigenous sample it is the nature of relationships that is predictive of re-offending behaviour rather than the absence of a relationship. This finding gains greater clarification when the results of our previous focus groups study are considered. As mentioned previously, many of our participants sited the nature of familial relationship patterns could act in either a negative or positive manner on offending behaviour.

The findings of the predictor isolation study are encouraging in the sense that in addition to identifying traditionally accurate static predictors of risk it was also found that a range of dynamic predictors that provide intervention targets were also identified. However, due to the nature of the statistical procedure, shrinkage is expected in the model building and cross validation procedures and it is this undertaking that will ultimately determine the ability of dynamic predictors to compete with traditionally more accurate static predictors.

Predictor Isolation Summary for Violent Offenders

For violent offenders complete concordance was found for 9 predictor items and partial concordance for 11 predictor items (see Table 36). The predictors grandiosity, breach of order, impulsivity, age of first offence, employment, criminal associates, non violent offences, solvent use and previous prison terms were all identified by one of the theoretical approaches. Again these analyses demonstrated that a number of dynamic predictors performed as well as static predictors. However, in contrast to the sexual offending sample the static predictors gained greater concordance and were in the main more superior in predicting offending behaviour. However, as stated previously, shrinkage is predicted in further analyses and this will ultimately determine the utility of both types of predictors.

Table 36: Predictor Concordance for Sexual Offenders

Predictor	Static, Criminogenic & Non Criminogenic Grouping	VRAG Grouping	Factors Specific to Indigenous Violence
Age of index offence	√	√	√
Juvenile violence	√	√	√
Male Victims	√	√	√
Anger Management	√	√	√
Release Plans	√	√	√
Exposure to violence	√	√	√
Unrealistic goals	√	√	√
Denial	√	√	√
Non responsive to treatment	√	√	√
Treatment prior to re-offending	√	√	√
Marital Relationships	√	√	-
Impulsivity	√	-	√
Previous Sexual Offences	√	-	√
Child behaviour	√	-	√
Sexual Abuse as child	-	√	√
Poor coping skills	-	√	-
Age of first Offence	-	√	-
Previous Violent Offences	√	-	-

Table 37: Predictor Concordance for Violent Offenders

Predictor	Static, Criminogenic & Non Criminogenic Grouping	VRAG Grouping	Factors Specific to Indigenous Violence
Previous Violence	√	√	√
Victim died	√	√	√
Alcohol Use	√	√	√
Male Victims	√	√	√
Anger Management	√	√	√
Release Plans	√	√	√
Exposure to violence	√	√	√
Relationship instability	√	√	√
Non responsive to treatment	√	√	√
Irresponsibility	√	-	√
Unrealistic goals	√	√	-
Juvenile violence	-	√	√
Denial	-	√	√
Drug Use	√	-	√
Feuding	-	√	-
Victim medical attention	√	√	-
Affect	-	√	√
Age of index offence	√	-	√
Family victims	√	-	√
Child behaviour	√	-	√

Predictor Isolation Study Conclusions

Several other findings of importance forced a re-evaluation of the planned research strategy. The first relates to the impact of offence nature within the violence and sexual offending groups. For violent offenders it was found that the accuracy of predictors was degraded by the inclusion of family violence perpetrators in the analysis. Moreover, when separate analysis was conducted on family violence participants key predictors for the general violence participants lost salience or had no utility for the family violence perpetrators. The same finding became apparent when separate analysis was run for sexually violent offenders in comparison to non violent sexual offenders. These outcomes suggested to us that separate models would be required for the sub-groups within violent and sexual offending. Thus, although we planned to continue to examine each of the modes of offending in the model building process our central goal would be to develop models for the prediction of general violent and non violent sexual offending behaviour. We did not feel that the literature review and focus group studies that had driven the predictor isolation process had encompassed the specialised areas of family violence and sexually violent offending behaviour. Therefore it is likely that dimensions of these behaviours that contribute to re-offening risk had not been accounted for in the initial predictor item pool.

The second finding is in relation to geographical location. We had planned to look at the accuracy of predictors as a function of geographic location. During the data collection process it became apparent to each of the researchers that the division of Western Australia on the basis of Community Justice locations was highly inappropriate for Indigenous people. As this was the only possible way to make geographical distinctions on the basis of retrospective data it was concluded that the goal of making geographical comparisons should be abandoned. We found that Community Justice locations did not take into account traditional versus urban status, varying language groups within one justice location and that in some cases near the borders of Western Australia that justice locations were meaningless in respect to traditional lands. We felt proceeding on the basis of justice locations would be misleading and essentially unethical research.

Model Building Study

There were 582 offenders in the random sample. After attrition due to deceased persons, inability to identify ethnicity, file availability and data screening there was a total sample of 380 offenders. Table 38 provides demographics of the sample.

Table 38: Offence Type, Sample Sizes, Mean Age and Average Time at Risk

Offence Type	Sample Size	Mean Age at Index Offence		Mean Time at Risk Before Re-offence (days)*	Mean Follow-Up Period (days)*
		Age	SD		
Violent	157	22.58	5.77	269.31	2167.76
Family Violence	63	26.46	6.88	349.94	1942.21
Sexual (non violent)	116	26.18	8.43	1575.30	2681.93
Sexual and Violence	44	24.73	7.36	611.72	2557.84

*Days in prison excluded

The primary source of predictors used in the model building process came from the predictor isolation study. While concordance was not found for all the predictors across all the theoretical approaches it was decided that all identified predictors would be included in the model building process. Sample size suggested a cautious approach and therefore we did not discount predictors that had been identified by any approach. For both groups the following predictors was used: age of first offence, age of index offence, previous violent offences, juvenile violence, male victims, anger, exposure to violence during childhood, problem behaviour during childhood, unfeasible release plans, non responsive to treatment, lack of realistic long-term goals, impulsivity, denial, and affect.

However, this meant that there was a strong emphasis on risk predictors. In order to provide a needs companion for the risk models the Community Justice Case Needs (Case Needs) model was coded. The Case Needs is a model that is used by the Community Justice Services of the Western Australian Department of Justice as a needs assessment for offenders undertaking a range of community based sanctions including Parole Board Orders.

The model has eight domains that capture; occupation/employment; marital /family; associates/social interaction; alcohol use; substance use; community functioning; personal/emotional orientation and attitude. The domains originated from work undertaken by the Canadian Corrective Service and were localised through research undertaken by the University of Western Australia Crime Research Centre (Maller & Lane, 2002). Each domain is covered by a set of comprehensive questions that guide the clinician in rating each domain on a 0 to 3 rating scale. Maller and Lane (2002) have reported that a study conducted on operational data suggested a positive correlation between actuarial risk and case need scores for individual. Although no statistical outcomes have been reported, they suggest the correlation was not as strong as expected.

For the violence group (not sexual offenders) the following predictors were coded: previous non violent offences, breach of past orders, previous prison terms, family victims, victim death, victim required medical attention, employment, alcohol misuse, drug misuse, solvent misuse, relationship instability, criminal associates, irresponsibility, active involvement in feuding behaviour, grandiose sense of self worth.

For the sexual group the following predictors were coded: previous sexual offences, marital relationships, had treatment prior to re-offending, sexual abuse in childhood and poor coping skills.

Model Building Results

Based on the nature of the data and sample size Discriminant Function Analysis (DFA) was used for all analyses. The outcome variable was re-offender and non-re-offender and the independent variables were the predictors identified in the isolation study (where possible these predictors were coded during data collection as continuous measures). Analyses were conducted for sexual offenders and violent offenders. Data screening and assumption testing was performed on each predictor set. Outliers that were influential were removed (using stem and leaf plots for univariate and mahalanobis distances for multivariate). Box's M and pooled correlation matrix analyses were used to assess the remaining assumptions. As with the previous study, predictor items were tested for utility using static and dynamic groupings and then were merged as a final model. The results of the final models for violent and sexual offending are reported here.

Violent Offenders (Family Violence Included)

The analysis was conducted on the full sample of 195 offenders (family violence = 52). Family violence offenders did not exert the same influence over the model as in the predictor isolation phase (perhaps a function of the reduced sample size). All of the predictors with the exception of juvenile violence were tested for utility. This predictor was correlated with prior violent offences and age of first offence. This finding was not unexpected as the information pertaining to juvenile violence is captured by both of these predictors. The final model consisted of: age of first offence, impulsivity, unfeasible release plans and personal/emotional orientation from the cases needs model.

One significant discriminant function was found to separate re-offenders from non re-offenders (Wilks lambda, .742, chi-square 57.091, df = 4, p < .000). The centroids for the two groups was -1.737 for non re-offenders and .199 for re-offenders. The univariate F values and structure coefficients (Table 39) indicated that the best predictor for distinguishing between non re-offenders and re-offenders was impulsivity. The loading for this variable had the strongest correlation with the function. Unfeasible release plans and personal/emotional orientation had moderate correlations with the function. The age of first offence predictor made a poor but significant contribution to the discriminant function.

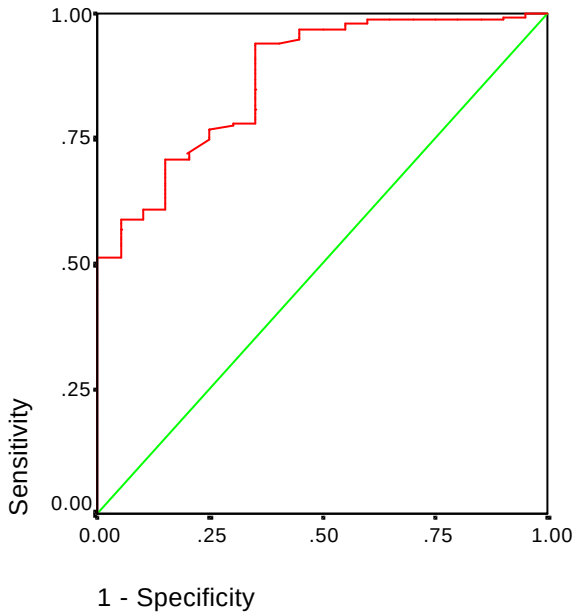
Table 39: Discriminant Function Indicators of Relative Importance of Predictor Variables for Violent Offenders

			Non Re-offender		Re-offender	
Variable	Structure Coefficient	Univariate F (1, 193)	M	SD	M	SD
Age-first offence	-.314	6.619**	15.45	3.75	13.53	3.09
Release Plans	.693	32.256*	.65	.99	2.11	1.10
Impulsivity	.830	46.294*	1.85	.88	2.73	.50
Personal Orient	.570	21.818*	2.05	.69	2.44	.52
Canonical R	.508					
Eigenvalue	.348					

*.000 ** .05

The percentage of grouped cases correctly classified was 91.3%. For re-offenders the classification accuracy was 95.4% and for non re-offenders 55%. As the results suggest the model provided very poor discrimination for non re-offenders. Probabilities of group membership were used to generate ROC results for the model. The sample size for non re-offenders (20) suggest the ROC curves should be interpreted with caution. The outcome suggested that at least one tie between the positive actual state group and the negative actual state group existed and thus the outcome may have been biased. The area under the curve (AUC) was .87 (95% confidence interval was .80 to .95).

Graph 1: ROC for Violent Offenders



Sexual Offenders

Based on the findings from the predictor isolation study where sexually violent cases had a bearing on predictor utility analyses were run with violent sexual offenders included and then without. Again the sexually violent group had a bearing on predictor utility and consequently classification accuracy. Sexual abuse by a relative, relationships, total Case Needs score, previous number of interventions, age of index offence and age of first offence became salient depending on the composition of the sample. Due to the small number of sexually violent offenders an analysis could not be run on this group. Thus, analysis of non sexually violent offenders was undertaken and all predictors identified on the basis of both groups will be assessed in the final study.

Analysis of Non Violent Sexual Offenders

After assumption testing and the removal of sexually violent offenders there were 83 offenders in the sample. One significant discriminant function was found to separate re-offenders from non re-offenders (Wilks lambda, .650, chi-square 34.057, df = 4, p < .000). The centroids for the two groups (non re-offenders = -.517; re-offenders = 1.016.) suggested re-offenders had higher discriminant scores than non re-offenders. The univariate F values and structure coefficients (Table 40) indicated that the best predictor for distinguishing between non re-offenders and re-offenders was unrealistic long-term goals. The loading for this variable had the strongest correlation with the function. Unfeasible release plans was the only other predictor correlated with the function. The Case Needs substance use predictor and child behaviour did not make significant contributions to the discriminant function and the loading with the function was low for both.

Table 40: Discriminant Function Indicators of Relative Importance of Predictor Variables for Sexual Offenders

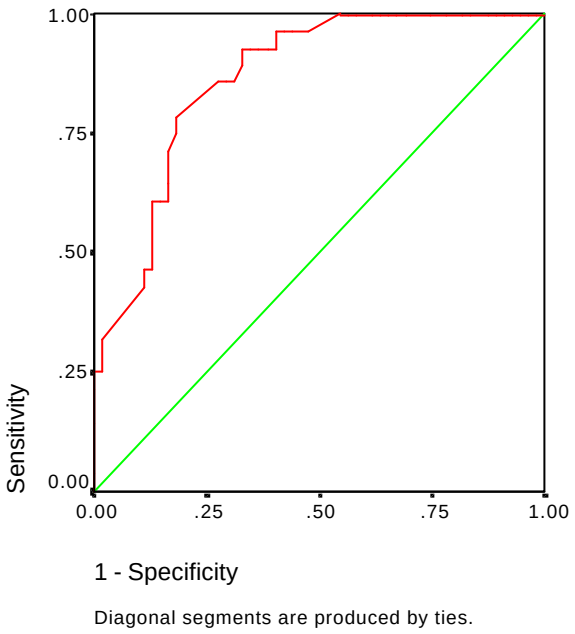
			Non Re-offender		Re-offender	
Variable	Structure Coefficient	Univariate F (1, 83)	M	SD	M	SD
Goals	.655	18.721*	2.68	.61	1.71	1.10
Release Plans	.569	14.121*	2.71	.81	1.69	1.32
Substance use	-.246	2.645**	1.14	1.41	1.67	1.40
Child Behaviour	-.064	.179**	1.93	1.05	2.04	1.12
Canonical R	.592					
Eigenvalue	.539					

* p < .000 ** not significant

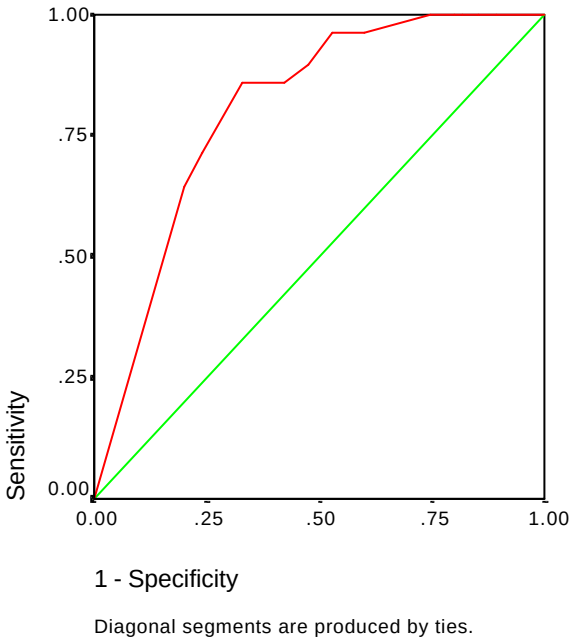
The percentage of grouped cases correctly classified was 79.5%. For re-offenders the classification accuracy was 75% and for non re-offenders 81.8%. Probabilities of group membership were used to generate ROC curves for the full model and for the two main predictors (2 predictor model). Graph 2 indicates the results found for the full model. The outcome suggested that at least one tie between the positive actual state group and the negative actual state group existed and thus the outcome may have been biased. The AUC was .89 (95%

confidence interval was .79 to .94). Graph 3 indicates the results found for the two predictor model. The outcome suggested that at least one tie between the positive actual state group and the negative actual state group existed and thus the outcome may have been biased. The AUC was .80 (95% confidence interval was .71 to .90).

Graph 2: ROC for Non Violent Sexual Offenders Full Model



Graph 3: ROC for Non Violent Sexual Offenders - 2 Predictor Model



Model Building Study Conclusions

Model Building Summary for Violent Offenders

As the results suggest, we were unable to achieve a model where classification accuracy was acceptable for non re-offenders. While the accuracy for re-offenders was very good (95.4%), the accuracy for non re-offenders (55%) was only marginally better than a chance prediction. As the goal of our research was to build a model that accurately classifies both re-offenders and non re-offenders this was a disappointing finding. The surprising outcome was that the final model consisted of only one static predictor (age of first offence) and three dynamic predictors (impulsivity, unfeasible release plans and the Community Justice Case Needs predictor of personal/ emotional orientation). It should be noted that the Case Needs predictor encompasses a range of sub predictors related to the individuals personal and emotional orientation. These sub items were coded for future research that will examine the contribution of each sub item in terms of predictive utility.

Model Building Summary for Sexual Offenders

As the results suggest the model for sexual offenders was accurate for both re-offenders and non re-offenders. As with violent offenders the model comprised primarily dynamic predictors. However, as found in the predictor isolation study, predictive utility was mediated by offence type (sexually violent and non sexually violent). For example, when the analysis was conducted without sexually violent offenders, age of first offence and number of previous interventions became salient predictors. Other predictors such as relationship stability became less salient. As a consequence it was decided to test a model during the cross validation process that took into account the range of predictors identified by both offence types.

Model Building Conclusions

The model building process supported the findings of the predictor isolation study in respect to the differences found for predictor saliency between offence types (family violence offences versus violent offences; non violent sexual offences versus violent sexual offences). As reported previously, this was not unexpected based on previous findings relating to sexually violent offenders (Dempster, 1998) and family violence within Indigenous communities (Blagg, 2000).

For violent offenders the Department of Justice Case Needs model was not predictive of re-offending outcome, however, the Case Needs personal/emotional orientation predictor was found to have good predictive utility. For sexual offenders the model had some predictive utility (including some sub predictors) and although not found to be significant in the analyses it was decided to test the model again in the cross validation procedure as a needs companion.

The findings related to the accuracy of the violence model are of concern. In our opinion a model geared toward identifying re-offenders at the expense of non re-offenders would only heighten the over representation of Indigenous people within the prison system. We are mindful that the models we are developing are relevant to offenders that commit offences that are most abhorrent to the community and therefore are the most likely to be incarcerated if deemed as being a high risk of re-offence. Thus our strategy is to test the model at cross validation and determine if the classification of non re-offenders remains untenable in a new sample.

In comparison, the outcomes for the sexual model suggest good accuracy for both re-offenders and non re-offenders. The positive outcome here is that model includes predictors that provide intervention targets for the reduction of risk. At this stage it is speculative to suggest that this finding may only be applicable to Indigenous offenders and thus creates greater relevance for the outcomes of the model testing on non Indigenous offenders in the final study.

Cross Validation Study

There were 739 offenders in the sample. After attrition due to deceased persons, inability to identify ethnicity and file availability there was a total sample of 354 violent and sexual offenders (see Table 41). Of these offenders, 96 were non Indigenous sexual offenders that were included for the purpose of assessing the accuracy of the sexual offender model as a function of ethnicity. Both samples represented a convenience sample (although the Indigenous sample had been selected randomly several factors prohibited the authors from drawing from the full sample).

Based on the problems encountered with family violence perpetrators in the two previous reported studies, family violence perpetrators were only included in the current study if their criminal history demonstrated offending behaviour not primarily associated with perpetration of family violence. Sixteen offenders fell within this category. Table 41 provides demographics.

Table 41: Offence Type, Sample Sizes, Mean Age and Average Time at Risk

Offence Type	Sample Size	Mean Age at Index Offence		Mean Time at Risk Before Re-offence (days)*	Mean Follow-Up Period (days)*
		Age	SD		
Violent (Indigenous)	135	22.80	5.40	384.90	1193.11
Sexual (Indigenous and non Indigenous)	219	28.95	10.83	1107.95	2698.28

*Days in prison excluded

Based on the findings of the predictor isolation study the following predictors were used for the cross validation study. For sexual offenders the predictor items were: age of index offence; age of first offence; unfeasible release plans; childhood behaviour; unrealistic long-term goals; number of previous interventions, sexual abuse as a child; sexually abused by a relative; poor coping skills; Case Needs marital/family item; Case Needs substance misuse item; and

Case Needs total score. While concordance was not found for all the predictors across the differing sub groups (non violent sexual offences, violent sexual offences, violence and family violence) it was decided that all identified predictors would be tested for the purposes of assessing a general model. For violent offenders the predictors were: age of index offence; age of first offence; unfeasible release plans, impulsivity; and the Case Needs personal/emotional orientation item.

For the purpose of establishing concurrent validity, the RRASOR developed by Hansen (1997) was used for sexual offenders. Based on the lack of locally developed tools for sexual offenders in Western Australia two locally developed measures of risk of recidivism were also used, viz. LOSNI and the AARI (see introduction for a discussion of the RRASOR and LOSNI). It should be noted that the application of the AARI was questionable as many of the offenders in the study were not from the cohort the AARI was designed for. The AARI has been developed over the past five years and thus the parameter values may not be accurate for offenders in the present study. Lane and Maller (2002) have stated this was a consideration in the development of the AARI. It was however used as no other locally developed tool had been as rigorously validated on the Western Australian sample. Thus, the poor results may lend support for the assumption that tools must be validated for intended sample.

The definitions routinely used for predictors in each instrument as per manual instructions were used for the LOSNI, RRASOR and AARI. For the 3-Predictor model and the Case Needs model, definitions that had been modified to ensure cultural relevance were used (see definition section of this report).

Cross Validation Results

Discriminant Function Analysis and Receiver Operating Characteristic Curves (ROC) were used for all analyses. Analyses were conducted for sexual offenders and violent offenders. Data screening and assumption testing was performed on each predictor set. Outliers that were influential were removed (using stem and leaf plots for univariate and mahalanobis distances for multivariate). Box's M and pooled correlation matrix analyses were used to assess the remaining assumptions.

The results of the final models for sexual offending are reported here. As experienced in the earlier studies we were not successful in developing a violence model that provided adequate separation between re-offenders and non re-offenders. While high levels of accuracy were achieved for re-offenders the accuracy for non re-offenders was untenable. As stated previously, we were not prepared to develop models that inaccurately and routinely classify non re-

offenders as re-offenders on the basis of the ethical implications. Thus, the outcomes for sexual offenders are reported here.

Analysis of Indigenous Sexual Offenders

After assumption testing and the removal of outliers there were 109 offenders in the sample. Missing scores (coping skills = 1; unrealistic long-term goals = 12) were replaced using a median split (comparative results were found when cases with missing data were not included in the analysis). One significant discriminant function was found to separate re-offenders from non re-offenders (Wilks lambda, .382, chi square 101.491, df = 3, p <.000). The centroids for the two groups (non re-offenders = .940 re-offenders = 1.688) suggested re-offenders had higher discriminant scores than non re-offenders. The univariate F values and structure coefficients (Table 42) indicated that the best predictors for distinguishing between non re-offenders and re-offenders was unrealistic long-term goals, unfeasible release plans and poor coping skills (3-Predictor model).

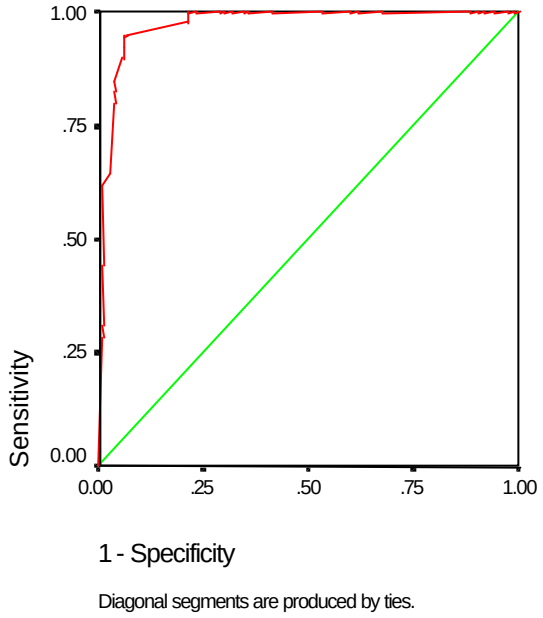
Table 42: Discriminant Function Indicators of Relative Importance of Predictor Variables for Indigenous Sexual Offenders

			Re-offender		Non Re-offender	
Variable	Structure Coefficient	Univariate F (1,109) p < .000	M	SD	M	SD
Goals	.701	95.597	2.538	.478	1.336	.680
Release Plans	.747	84.975	2.769	.627	1.457	.755
Poor Coping	.695	60.797	2.462	.790	1.357	.660
Canonical R	.786					
Eigenvalue	1.617					

The percentage of grouped cases correctly classified was 93.6%. For re-offenders the classification accuracy was 92.3% and for non re-offenders 94.3%. Probabilities of group membership were used to generate ROC results for the model comprising the three predictors.

Graph 4 indicates the results. The outcome suggested that at least one tie between the positive actual state group and the negative actual state group existed and thus the outcome may have been biased. The AUC was .97 (95% confidence interval was .94 to 1.00). The ROC curves should be interpreted with caution, as the sample size for re-offenders was only 39.

Graph 4: ROC for 3-Predictor Model for Indigenous Sexual Offenders



For the purpose of establishing concurrent validity the Case Needs model, the LOSNI, the AARI and the RRASOR were applied to the sample. Table 43 and 44 and Graph 5 indicate the results of the DFA and ROC curves. As the results indicate the 3-predictor model outperformed all of the models in terms of predictive accuracy for both re-offenders and non re-offenders. While the Case Needs model provided good accuracy for re-offenders it did not provide comparable accuracy for non re-offenders.

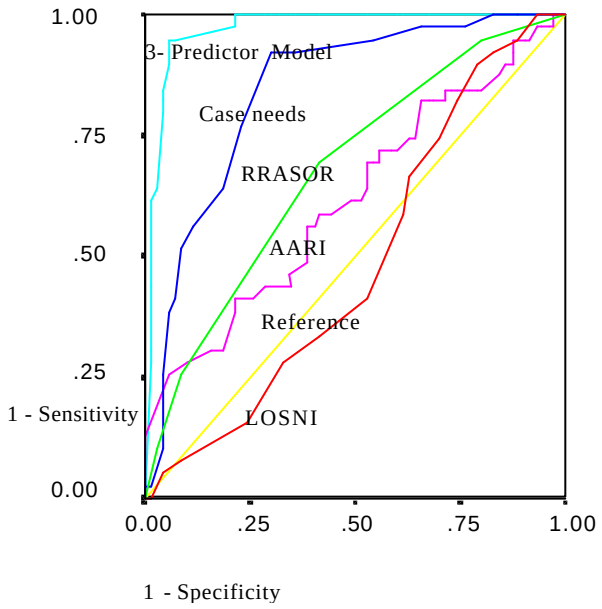
Table 43: Discriminant Function Results for Competing Models for Indigenous Sexual Offenders

Risk Method	Wilks Lambda	Chi-square	Df	Sig	Centroids re-offend	Centroids non re-offend	Eigenvalue	Canonical R
Case Needs	.685	40.279	1	.000	.900	-.501	.460	.561
LOSNI	.999	.093	1	.760	3.922E-02	-2.18E-02	.001	.030
AARI	.973	2.943	1	.086	.222	-.124	.028	.165
RRASOR	.902	11.033	1	.001	.439	-.244	.109	.314

Table 44: Discriminant Function Classification Accuracy and ROC Curve Results for Competing Models for Indigenous Sexual Offenders

Risk Method	ROC	95% Confidence Interval	DFA Classification Accuracy Re-offender	DFA Classification Accuracy Non re-offender	DFA Classification Accuracy Overall
Case Needs	.844	Lower Bound .769 Upper Bound .919	56.4%	88.6%	77.1%
LOSNI	.487	Lower Bound .377 Upper Bound .597	0%	100%	64.2%
AARI	.618	Lower Bound .505 Upper Bound .731	0%	100%	64.2%
RRASOR	.679	Lower Bound .575 Upper Bound .783	25.6%	91.4%	67.9%

Graph 5: ROC for all Risk Models – Indigenous Sexual Offenders



Analysis of Non Indigenous Sexual Offenders

After assumption testing and the removal of outliers there were 92 offenders in the sample. Missing scores (unrealistic long-term goals = 5; unfeasible release plans = 1) were replaced using a median split (comparative results were found when cases with missing data were not included in the analysis). The three predictors (3 –predictor model) identified for Indigenous offenders were used with the non Indigenous sample (unrealistic long-term goals, unfeasible release plans and poor coping skills). One significant discriminant function was found to separate re-offenders from non re-offenders (Wilks lambda, .176, chi square 153.865, df = 3, p <.000). The centroids for the two groups (non re-offenders = -1.797. re-offenders = 2.553) suggested re-offenders had higher discriminant scores than non re-offenders. The univariate F values and structure coefficients are reported in Table 45.

Table 45: Discriminant Function Indicators of Relative Importance of Predictor Variables for Non Indigenous Sexual Offenders

Variable	Structure Coefficient	Univariate F (1, 92) $p < .000$	Re-offender M	Re-offender SD	Non Re-offender M	Non Re-offender SD
Goals	.725	221.548	2.05	.57	.35	.52
Release Plans	.607	155.285	2.68	.62	1.09	.59
Poor Coping	.445	83.583	2.58	.55	1.33	.70
Canonical R	.908					
Eigenvalue	4.689					

The percentage of grouped cases correctly classified was 98.9%. For re-offenders the classification accuracy was 100% and for non re-offenders 98.1%. Probabilities of group membership were used to generate ROC results for the model comprising the three predictors. A graph is not shown as the AUC was 1.0 and this is not visible on a graph (95% confidence interval was 1.00 to 1.00). The ROC curves should be interpreted with caution, as sample size for re-offenders was 38.

For the purpose of establishing concurrent validity the Case Needs model, the LOSNI, the AARI and the RRASOR were applied to the sample. Table 46 and 47 and Graph 6 indicate the results of discriminant function analysis and ROC curves. Similar results were found for the non Indigenous group in that the three predictors outperformed all of the models in terms of predictive accuracy for both re-offenders and non re-offenders. The Case Needs model and RRASOR however also provided reasonable accuracy for both groups.

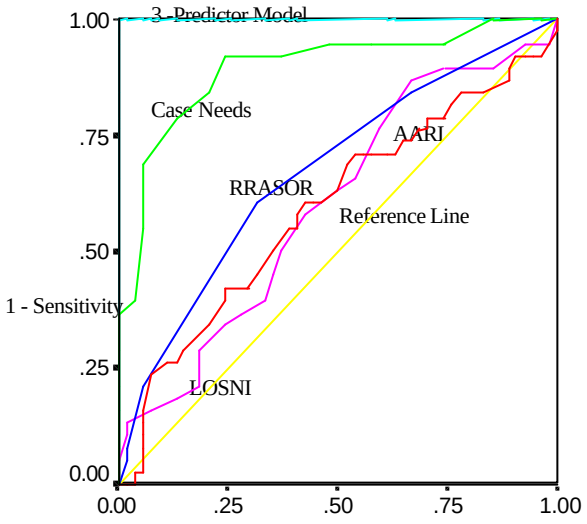
Table 46: Discriminant Function Results for Competing Models for Non Indigenous Sexual Offenders

Risk Method	Wilks Lambda	Chi-square	Df	Sig	Centroids re-offend	Centroids non re-offend	Eigenvalue	Canonical R
Case Needs	.551	50.917	1	.000	1.098	-.725	.814	.670
LOSNI	.984	1.389	1	.239	.156	-.103	.016	.127
AARI	.990	.895	1	.344	.125	-8.24E-02	.011	.102
RRASOR	.901	8.872	1	.003	.402	-.266	.109	.314

Table 47: Discriminant Function Classification Accuracy and ROC Curve Results for Competing Models for Non Indigenous Sexual Offenders

Risk Method	ROC	95% Confidence Interval	DFA Classification Accuracy Re-offender	Non re-offender	Overall
Case Needs	.896	Lower Bound .826 Upper Bound .966	77.1%	86.8%	83%
LOSNI	.601	Lower Bound .483 Upper Bound .718	11.4%	98.1%	63.6%
AARI	.592	Lower Bound .471 Upper Bound .713	2.9%	96.2%	59.1%
RRASOR	.673	Lower Bound .560 Upper Bound .786	60%	69.8%	65.9%

Graph 6: ROC for all Risk Models – Non Indigenous Sexual Offenders



Diagonal segments are produced by ties.

Analysis of Indigenous and Non Indigenous Sexual Offenders (Combined Group)

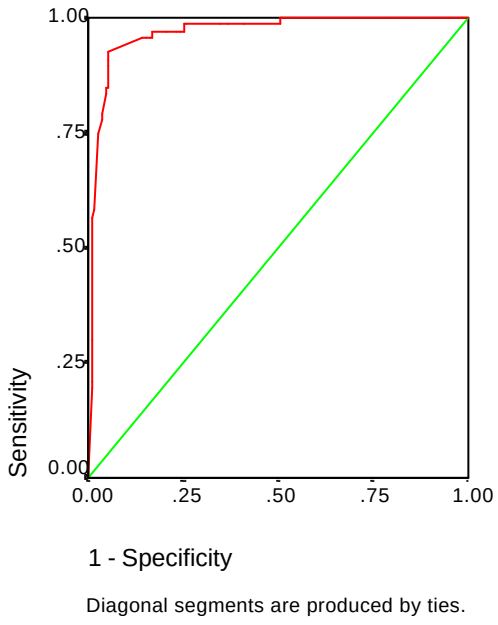
After assumption testing and the removal of outliers there were 178 offenders in the sample. Missing scores (unrealistic long-term goals = 17; unfeasible release plans = 1; poor coping skills = 1) were replaced using a median split (comparative results were found when cases with missing data were not included in the analysis). The three predictors were applied to the combined group of both Indigenous offenders and non Indigenous offenders. One significant discriminant function was found to separate re-offenders from non re-offenders (Wilks lambda, .361, chi square 177.683, df = 3, p <.000). The centroids for the two groups (non re-offenders = -1.027. re-offenders = 1.702) suggested re-offenders had higher discriminant scores than non re-offenders. The univariate F values and structure coefficients are reported in Table 48.

Table 48: Discriminant Function Indicators of Relative Importance of Predictor Variables for Indigenous and Non Indigenous Sexual Offenders Combined

Variable	Structure Coefficient	Univariate F (1,178) p < .000	Re-offender M	Re-offender SD	Non Re-offender M	Non Re-offender SD
Goals	.679	143.501	2.358	.556	1.041	.790
Release Plans	.730	165.825	2.716	.714	1.324	.690
Poor Coping	.584	106.060	2.493	.683	1.396	.691
Canonical R	.799					
Eigenvalue	1.768					

The percentage of grouped cases correctly classified was 89.3%. For re-offenders the classification accuracy was 95.5% and for non re-offenders 85.6%. Probabilities of group membership were used to generate ROC results for the model comprising the three predictors. Graph 8 indicates the results. The AUC was .967 (95% confidence interval was .941 to .993).

Graph 7: ROC Curves for 3-Predictor Model – Indigenous and Non Indigenous Sexual Offenders



For the purpose of establishing concurrent validity the Case Needs model, the LOSNI, the AARI and the RRASOR were applied to the sample. Table 49 and 50 and Graph 8 indicate the results of discriminant function analysis and ROC curves. Similar results were found for the non Indigenous group in that the three predictors outperformed all of the models in terms of predictive accuracy for both re-offenders and non re-offenders. The Case Needs model again provided reasonable accuracy for both groups.

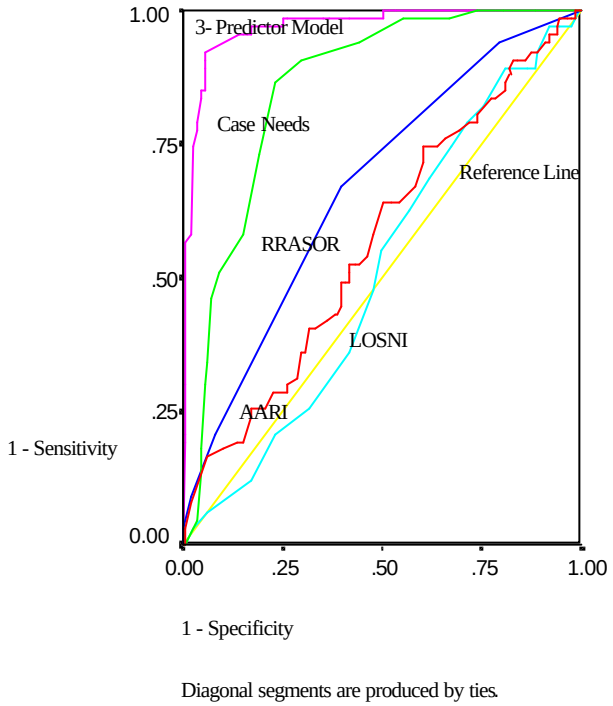
Table 49: Discriminant Function Results for Competing Models for Indigenous and Non Indigenous Sexual Offenders Combined

Risk Method	Wilks Lambda	Chi-square	Df	Sig	Centroids		Eigenvalue	Canonical R
					re-offend	non re-offend		
Case Needs	.673	69.419	1	.000	.892	-.538	.485	.572
LOSNI	.998	.285	1	.594	5.157E -02	-3.11E-02	.002	.040
AARI	.988	2.123	1	.145	.141	-8.52E-02	.012	.110
RRASOR	.922	14.051	1	.000	.377	-.221	.084	.279

Table 50: Discriminant Function Classification Accuracy and ROC Curve Results for Competing Models for Indigenous and Non Indigenous Sexual Offenders Combined

Risk Method	ROC	95% Confidence Interval	DFA Classification Accuracy		
			Re-offender	Non re-offender	Overall
Case Needs	.854	Lower Bound .799 Upper Bound .910	58.2%	84.7%	74.7%
LOSNI	.511	Lower Bound .426 Upper Bound .597	0%	100%	62.4%
AARI	.569	Lower Bound .482 Upper Bound .655	0%	100%	62.4%
RRASOR	.670	Lower Bound .578 Upper Bound .742	18.5%	91.9%	64.8%

Graph 8: ROC Curves for all Risk Models – Indigenous and Non Indigenous Sexual Offenders



Cross Validation Study Conclusions

The analysis of Indigenous Sexual Offenders suggested that the best predictors for distinguishing between non re-offenders and re-offenders were unrealistic long-term goals, unfeasible release plans and poor coping skills (3-Predictor model).

For the purpose of establishing concurrent validity we compared the 3-Predictor model with the LOSNI, RRASOR, AARI and Case Needs. We choose these instruments because practitioners in Western Australia currently use them. However, we acknowledge that they have not been developed as risk prediction instruments in Western Australia. For example, the RRASSOR is a Canadian instrument and the AARI was developed for a different sample. It is worthy to note that in contrast to the majority of existing risk models, the 3-Predictor model

and the Case Needs model were comprised of criminogenic and non criminogenic predictors. Consequently the findings reported here must be interpreted with caution.

The 3-Predictor model outperformed all of the models in terms of predictive accuracy for re-offenders and non re-offenders when applied to the Indigenous male sexual offenders. While the Case Needs model provided good accuracy for re-offenders it did not provide comparable accuracy for non re-offenders.

The 3-Predictor model identified for Indigenous offenders and the comparison instruments was also applied to a Western Australian non Indigenous convenience sample. The definitions routinely used for predictors in each instrument (not contextualised for Indigenous offenders) were used for this group in an effort to test the accuracy of the models as a function of ethnicity using culturally appropriate definitions. The 3-Predictor model again outperformed the comparison models and achieved remarkable accuracy for re-offenders and non re-offenders.

A final analysis was conducted on a pooled Indigenous and non Indigenous sample to assess the accuracy of all the models on a combined ethnicity group. This analysis also allowed us to test the models on a sample size that did not violate any statistical assumptions. The outcomes suggested that the 3-Predictor model remained the most accurate model in comparison to the other models. Accuracy for non re-offenders did decline but was still reasonable and exceeded the accuracy of the other models.

Final Conclusion

This study established that the factors that best distinguish between non re-offenders and re-offenders in a population of Indigenous male sexual offenders in Western Australia are unrealistic long-term goals, unfeasible release plans, and poor coping skills (the 3-Predictor model). The predictive accuracy of recidivism (sensitivity) of the 3-Predictor model was 92.3%, while the predictive accuracy of desisting (specificity) was 94.3%.

These findings must be interpreted with caution. To start with, the sample size in all three studies (predictor isolation, model building and cross validation) meant that assumptions were not strictly met. Many participants in the random samples of the model building and cross validation studies failed to meet the inclusion criteria and of those who met the criteria, a notable number of files were not available even after we extended the data collection period. Due to this high attrition the samples in these studies may not have been as random as we would have wished them to be. Despite these problems we believe the results remain relevant based on comparative results across the three studies and the comparison sample of non Indigenous offenders. We are, currently undertaking further research to validate the present findings. The second limitation was a problem that is inherent in retrospective studies, namely that the predictors that one identifies is limited by the information available in the files. It is possible that important factors relevant to Indigenous offenders were not coded during the predictor isolation process because there was no data about them in the files. However, the results from the cross validation study would suggest very little variance remained unaccounted for in respect of sexual offenders.

We were not able to construct a single instrument for violent and sexual Indigenous male offenders in Western Australia as we set out to do. While our literature review and some of the existing instruments suggested that it should be possible to do this, we were only prepared to construct a single instrument if, at the predictor isolation stage, our data met all the assumptions on which the planned statistical analyses are based. As our data did not meet the assumptions we could not proceed to construct a single instrument and we therefore separated the non sexual violent offenders (general and family violence) and the sexual offenders (violent and non violent).

Nor were we able to construct an instrument for non sexual violent offenders. The model developed during the model building study was very sensitive in that it was able to predict with high accuracy those who are likely to re-offend. However, its specificity was poor in that it miss-classified almost all desisters as potential recidivists. Given the over-representation of

Indigenous males in the corrections system we did not believe that it would be ethically responsible to proceed with the work on this model. Two factors probably contributed to the poor specificity. First, we suspect our retrospective study failed to identify some factors relevant to the violent behaviour of Indigenous offenders because the relevant information was not in the files. Second, the very low number of desisters, because of the very low non re-offending rates, meant that we could not meet the necessary statistical assumptions.

Nevertheless, the findings of this study are very important and seven salient aspects of the findings will be discussed next.

First, it appears important to proceed with the development and refinement of a risk of sexual offending tool for male Indigenous offenders given the relative accuracy of the 3-Predictor model viz a viz the other instruments we compared it with.

Second, despite the promising findings in respect of sexual offenders in general, our findings during the predictor isolation and model building phases suggest that the violent sexual offender group is distinct from the non violent sexual offender group. However, due to the small size of the violent sexual offender group, it was only possible to note the impact on predictor accuracy by analysing the non violent sexual offenders separately.

Third, regarding the violent group it appeared at the predictor isolation stage as if the profile of offenders who commit family violence differs from the profile of those who commit general violence. This was in accordance with our expectations based on our literature review (see for example Blagg, 2000) and our focus groups with experts (Dawson, & Allan, 2000; 2001). However, at the model building stage family violence offenders did not exert the same influence over the model as in the predictor isolation phase. This may have been a function of the reduced sample size and this is an area that should be explored further.

Fourth, this study also confirmed to us how little we know about those Indigenous males who do not re-offend and their protective factors. Moreover, it confirmed that a retrospective study that uses official records is unlikely to yield much useful information about desisters and that an alternative approach will be required to study them, such as the qualitative methodology used by Maruna (2000).

Fifth, the greater accuracy of the 3-Predictor model in predicting sexual re-offending than the Canadian developed RRASOR, suggests that further research should be undertaken to examine the need of developing a population specific prediction tool for non Indigenous male sexual offenders in Western Australia. Meanwhile this finding must be interpreted cautiously given the small convenient sample that we used.

Sixth, despite our expectation that dynamic predictors would be prominent for Indigenous offenders (Dawson & Allan, 2000; 2001) the fact that all three predictors in the 3-Predictor model were dynamic predictors was a surprise. The finding confirms the view of several contemporary research groups (Borum 1996; Howells et. al, 1999) regarding the importance of dynamic predictors of risk.

Seventh, a positive aspect of the prominence of dynamic predictors is that it implies that it is potentially possible to reduce sexual re-offending of male Indigenous sexual offenders by attending to these factors. Poor coping is something that could be attended to while offenders are in prison, however, it is also important to assist offenders after release when they will have to cope with the stress of reintegrating in society. An offender whose release plans are unfeasible would likewise benefit from guidance and support pre and post release. Though, to address the unrealistic long-term goals problem it may be necessary go beyond individuals and bring about change in communities and maybe even in Australian society as whole. Currently the perceived lack of opportunities for Indigenous males, especially those from rural communities, make it very difficult for them to have realistic long-term goals. For example, how realistic is it to aim not to use substances, if substance use is endemic in the community they live in and financial and personal factors make it difficult for them to relocate? Nevertheless, if it is possible to attend to the identified predictors, it will later also be necessary to gauge reductions or increases in risk on each of the dimensions comprising the risk assessment. Further research is necessary to develop such an instrument

To conclude, as mentioned in the introduction there is a dearth of studies investigating the predictors of crime in general, and violence in particular, in Indigenous communities (Broadhurst, 1997; Sarre, 1997). This is particularly true in respective of non-descriptive quantitative research (see Memmott et al., 2001). This study was an attempt to address this lack of research. In the execution of the research project we tried to be sensitive to the concerns about research concerning Indigenous people (see for example Smith, 1999; Worby, & Rigney, 2002) by involving an Indigenous Advisory Committee in all aspects of the project. We also employed Indigenous research assistants to collect data from the offender files where possible. At another level we tried to move the focus away from static factors to include dynamic factors and the needs of offenders. That we were only able to develop a model for sexual offenders is a disappointment, but this study confirmed that it is possible to develop highly accurate models comprising of dynamic factors. The challenge now is to build further on the findings of this study in respect of sexual offenders and to continue with our endeavour to develop a model for violent male Indigenous offenders as well.

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Appendix 1

Predictor List for Predictor Isolation Study

1. Previous violent offences
2. Previous non violent offences committed
3. Age of first offence
4. Age at time offence was committed
5. Juvenile history of violent behaviour
6. Previous prison terms
7. Breach of any order
8. History of sex offences
9. History of perpetrating family violence/related to victims
10. Child victims
11. Male victims
12. Female victims
13. Animal victims
14. Victim died
15. Victim received medical attention
16. Member of stolen generation
17. Lived with primary caregiver until age of 16 years
18. Absent father Graph in childhood
19. Exposure to violence/family violence from an early age
20. Problems with school
21. Childhood problem behaviour, aggression and offending
22. Sexual abuse during childhood
23. Sexual abuse in institutions
24. Physical or emotional abuse during childhood
25. Physical or emotional abuse in institutions
26. Alcohol misuse
27. Drug misuse
28. Solvent misuse
29. Petrol sniffing
30. Superficial charm
31. Grandiose sense of self worth
32. Becomes bored/need stimulation
33. Pathological liar
34. Manipulative
35. Had a domestic relationship for at least six months when outside prison
36. Employment problems
37. Perceives violent/sex offending to be acceptable behaviour
38. Lack of remorse
39. Restricted emotional responses/unable to deal with strong emotions
40. Intimacy problems
41. Parasitic lifestyle
42. Poor anger/ behaviour control
43. Poor coping skills
44. Promiscuous sexual behaviour
45. Lack of realistic long-term goals
46. Impulsivity-unplanned behaviour without thought for consequences
47. Irresponsibility and not caring about the needs of significant others
48. Won't accept responsibility for actions/minimization/victim takes responsibility

49. Criminal associates/inappropriate or procriminal social behaviours
50. Evidence of identity issues/overidentification with masculine roles/stereotypes
51. Violence associated with paranoid behaviour
52. Low self esteem
53. Suicide attempts or suicidal ideation
54. Unfeasible release plans
55. Stress associated with deaths in custody
56. High levels of stress
57. Had treatment prior to re-offending
58. Unresponsive to or non compliant with treatment (exclude mental illness)
59. Treated mental illness
60. Untreated mental illness
61. Psychological/psychiatric report requested for index offence
62. Relationship instability
63. Relationship characterised by jealousy or jealousing behaviour
64. Violent behaviour associated with active involvement in inter-family/community/region feuding
65. Offence related to payback behaviour
66. Violence related to debts or money issues
67. Viewing of pornographic material