Analysis of the Tasmania Police Risk Assessment Screening Tool (RAST)

Final Report

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Ron Mason
Roberta Julian

TASMANIAN
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STUDIES

TILES Mission:
To conduct and promote evidence based research that improves the quality of law enforcement and enhances community safety.

Tasmanian Institute of Law Enforcement Studies
University of Tasmania
Churchill Ave, Sandy Bay, Australia 7005

Private Bag 22
Hobart Tas 7001

Tel: (03) 6226 2328
Fax: (03) 6226 2864
E-mail: tiles@utas.edu.au
TILES website: www.utas.edu.au/tiles

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CART	Classification and Regression Trees
RAST	Risk Assessment Screening Tool
TILES	Tasmanian Institute of Law Enforcement Studies

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The Authors

Roberta Julian (PhD) is Associate Professor and Foundation Director of the Tasmanian Institute of Law Enforcement Studies at the University of Tasmania.

Ron Mason (M.Soc.Sci) is the TILES Senior Research Analyst at the University of Tasmania.

Executive Summary

Background

Safe at Home involves a range of initiatives, expanded and new services that represent a significant change in the way the Tasmanian Government responds to family violence: family violence is treated as a crime rather than a private matter.

Included in the *Safe at Home* Strategy was the implementation of a Risk Assessment Screening Tool (RAST) developed by Tasmania Police and the Department of Justice. The RAST is utilised by operational police at the attendance of family violence incidents to assist in assessing the risk of a victim experiencing future violence.

Objective

In May 2008, TILES was contracted by Tasmania Police to undertake a statistical analysis of the RAST.

The objective of this project was:

- to undertake an analysis of incidents in which the RAST is used in order to determine the validity and reliability of the RAST with respect to the Tasmanian population.

Terms of Reference

The Terms of Reference for the report stated that it will:

- establish the relationship between the overall RAST score and the likelihood that an offender will perpetrate further acts of violence against the victim;
- identify how a RAST score changes over time for individual offenders;
- identify which characteristics (RAST items) are the most useful in predicting the likelihood of re-offending;
- quantify the relative predictive value of the RAST items, controlling for the effect of others, in relation to the likelihood of violence;
- provide a system of weightings for each of the identified characteristics based on the above;
- identify items that may not be useful in predicting re-offending;
- identify whether a reduction in the number of items on the RAST is appropriate;
- determine the overall predictive value of the RAST; that is, how much the items included in the current assessment tool, explain or predict the likelihood of re-offending.

Data

Two sets of data were used in this analysis of the RAST.

The first data set comprised 5,721 instances of family violence over a two year period from 2005 to 2007, committed by 3,320 de-identified individuals. These were drawn from electronic databases held by Tasmania Police. Data on each incident included age and sex of offender and victim as well as their relationship status, number of children and if they were present at the time of the offence. Additionally, threats, injuries sustained and any treatment received was also recorded together with the individual RAST score for each incident.

A descriptive analysis was undertaken of this data to provide a general description of offenders and offences (e.g. number of offences, marital status, threats used, violence perpetrated).

In the second data set, a random sample of 1,406 de-identified individuals was drawn from electronic databases held by Tasmania Police. Non-repeat offenders were defined as those individuals with only one family violence entry on the databases for the period January 2000 – July 2008. Repeat offenders were defined as those individuals who had more than one incident recorded on family violence databases. There were 767 non-repeat offenders and 639 repeat offenders.

Importantly, the data has some inherent limitations. Of greatest significance is the fact that the data refers to family violence incidents reported to police only. This does not provide a complete picture of family violence in the community as a whole; nor may it necessarily provide an accurate picture of an individual's family violence history as incidents may remain unreported to police. Furthermore, it should be noted that, according to the definition used in this analysis, an 'offender' may not have been and may never be convicted of a family violence offence.

Statistical testing

Whenever the term significant difference is used in this report it refers to a statistically significant difference between observations or groups. Statistical testing of data is undertaken to determine if any observed differences between observations or groups are genuine – that is they are not random or spurious, or due to sampling error.

Descriptive analysis of the data

Initially, a descriptive analysis was undertaken of the first set of data to examine how RAST scores related to family violence incidents.

In this analysis, significant differences emerged in relation to threats and RAST scores. In summary, the RAST score is affected by the number of incidents of family violence as well as the use of threats and violence (specifically where the victim sustains injuries). Threats do not necessarily lead to injury nor is injury preceded by the threat of physical violence; nor is the likelihood of injury related to the number of offences committed. This suggests that it may be difficult to predict when physical violence is likely to occur.

High Risk Factors for Repeat Offending

The second data set was analysed to examine the risk of re-offending and to determine the predictive validity of the RAST.

Of the 18 high risk characteristics contained in the RAST, eight were identified as significantly related to re-offending. These were:

- breach
- separation
- assault
- assault in the past
- stalked
- arrest for sexual assault
- bizarre, paranoid or delusional behaviour
- firearms

However, there is little apparent difference between the repeat and non-repeat offender groups in relation to these risk factors.

Other Risk Factors

Of the original 16 'other' risk factors contained in the RAST, a number of factors were identified as significantly related to re-offending. These were:

- past threats
- jealousy
- any violence
- depression
- afraid
- alcohol
- unemployed

Once again, however, both non-repeat and repeat offenders displayed 'relatively' similar proportions for each characteristic.

Risk factors and repeat offending

There are risk factors in which repeat offenders are significantly over represented:

- repeat offenders exhibit a significantly greater proportion of those who made past threats than non-repeat offenders;
- repeat offenders are over represented as being jealous when compared with non-repeat offenders;
- repeat offenders are more likely to have used any violence against persons in the past than non-repeat offenders;

- alcohol problems and unemployment are also more prevalent in the repeat offender group than the non-repeat offender group.

In summary, of the 34 risk factors contained in the RAST, 18 were significantly related to offender status, and while the repeat offender group was over-represented in a number of risk factors relative to the non-offender group, the distinction was not large. What is apparent from the analysis is that each of these risk factors does not operate in isolation from the others nor does each one have a direct effect on repeat offending. Rather, the analyses undertaken indicate a complex dynamic operating between risk factors.

Predictive utility of the RAST

The RAST is an actuarial assessment tool used to classify offenders and their risk of re-offending according to the score they receive, which is based on the type and number of characteristics they exhibit.

Accuracy is measured by the area under the curve (AUC) statistic. The AUC is a measure of discrimination; that is, the ability of the schedule to correctly classify those rated as a high risk and those rated as a low risk.

As a rough guide, AUC scores of between .50 and .60 are regarded as failures – the schedule is really no better than chance at discriminating low from high risk individuals; .60 to .70 is modest; .70 to .80 is fair; .80 to .90 is good; and .90 to 1.0 is excellent. Importantly, however, it should be noted that most risk assessment tools in the field of criminal justice have an AUC score of between 0.6 and 0.7 (Andrews & Bonta 2006).

In the current study, the analysis of the RAST revealed an AUC score for the total risk score (i.e. for all items on the schedule) of .602 representing modest predictive utility.

Further analysis was undertaken using only those risk factors identified by the analysis as significantly related to re-offending. These risk factors were analysed to see if they were any better at predicting repeat violence than the existing weighting system.

In this analysis, the AUC Score is .726, suggesting that those risk items identified as significantly related to re-offending are correct 72% of the time in defining membership in the repeat offender category. This is a significant improvement on the overall RAST predictive utility score of .602.

In summary, whilst the current scoring system employed has modest predictive utility (AUC .602), with an increased risk of misclassification in the medium and high categories, those characteristics identified through regression modelling provided a significantly greater level of accuracy (AUC .726). This reflects good predictive utility in that it is correct in predicting repeat offending in nearly 75% of cases (i.e. in approximately 3 out of 4 cases). It should be noted that this compares favourably with other risk assessment tools used across a variety of behaviours (Andrews and Bonta 2006)

Separating high risk from low risk

Despite the advantages actuarial assessments may have over other methods of assessment in predicting risk, most actuarial assessment tools have modest predictive utility and cannot separate high risk from low risk in a majority of cases (Andrews and Bonta 2006). In part, this is related to the use of generalised models of behaviour, such as those produced through logistic regression to predict individual behaviour. Simply, generalised models do not account for individual differences because they are based on an average or proportional membership in some normative group.

Multi-colinearity and cumulative effects

It is apparent from the analysis undertaken for this report that family violence is a complex dynamic, where risk factors not only impact upon each other but also upon the likelihood of repeat incidents of family violence.

This leads to the problem of multi-colinearity. This refers to the fact that a number of risk factors were related to each other (in some cases the effect was stronger than the relationship to the criterion variable i.e. family violence). This situation confounds interpretation because these interrelationships between risk factors or predictor variables weaken the direct effect of each on the criterion variable.

Furthermore, it was also determined that risk factors may have a cumulative effect on the likelihood of re-offending.

Policy context

It is important to acknowledge the fact that this analysis of the RAST was undertaken in the context of the introduction of the *Safe at Home* program in Tasmania. This involves a series of interventions (including police and judicial interventions) that aim to restrict opportunities for offenders to re-offend. The ultimate objective of such interventions would be to reduce re-offending to a very low level. Such an outcome would lead to a situation in which the predictive utility of the RAST would be extremely low.

In other words, whilst the objective of the current project was to examine the rate of re-offending based on the RAST *independent* of any action taken by police (and other agencies), it is important to recognise and acknowledge that such intervention does occur and it will impact on the results. If these interventions are successful in addressing re-offending, then this will reduce the predictive utility of the RAST. However, data on police (and other) interventions was not included in the analysis; thus, it is not possible to assess empirically the impact (if any) of these interventions.

Conclusion

In conclusion, it can be stated that the use of an actuarial assessment tool, such as the RAST, is an improvement on informal, subjective assessments traditionally used by Tasmania Police to assess risk of re-offending. The RAST increases the rigour and accountability of the process of risk assessment. Additionally, it provides a transparent record of decision-making processes with respect to the management of risk and safety of victims. While an analysis of how the RAST is implemented lay outside the scope of this project, it should be noted that there are other protocols in place that impact upon the actions and decisions that follow the determination of a RAST score; for example, the admiralty scale and the capacity for professional over-ride by supervisors. Furthermore, the RAST is one tool among a suite of tools employed by Tasmania Police to assist in the management of risk and safety.

This report has provided the details of a statistical analysis of incidents in which the RAST was used in order to determine the validity of the RAST with respect to the Tasmanian population. It has demonstrated that in its current form the RAST has modest predictive utility and is thus comparable to other risk assessment tools in the field of criminal justice. Finally, the analysis has identified some potential improvements to the RAST schedule that could increase its predictive utility from ‘modest’ to ‘good’.

Recommendations

Recommendation 1:

That consideration be given to redefining the criterion variable more narrowly (e.g. limiting it to physical violence). This would enable the development of a risk assessment tool with greater predictive validity. It should be noted, however, that this may be considered inappropriate in the context of current policy given that the *Family Violence Act 2004* purposefully defines family violence in a manner that is inclusive of a wide range of behaviours. The RAST has been developed as a tool that attempts to assess risk in the context of this legislation.

Recommendation 2:

That consideration be given to the RAST schedule being revised in the following ways:

a. the number of items on the schedule reduced to include only those items that are significantly correlated with repeat offending;

b. the rating system and scores changed to reflect the likelihood scores obtained through the modelling of data using logistic regression;

c. the cumulative effects of the items investigated further and the scores adjusted accordingly. For example, stalking and breaching might be given a combined rating to reflect the cumulative effect of these two factors.

Recommendation 3:

That consideration be given to trialling and evaluating a revised RAST schedule. One method would be to apply the new scoring system to the data that has been analysed to date. The analysis could be re-run to determine whether the new scoring system enables a better separation of high-, medium- and low-risk offenders.

Recommendation 4:

That consideration be given to including the factors identified as impacting on the likelihood of re-offending and the relationships between them in a training package for Tasmania Police members.

Recommendation 5:

That consideration be given to undertaking further research to:

- evaluate the impact of police interventions on patterns of re-offending;
- increase the available knowledge and understanding of patterns of family violence through further analysis of data collected by the RAST and the Aide Memoire; and
- investigate patterns of behaviour associated with stalking through a more detailed analysis of data collected by the RAST.

1. Background

1.2 Safe at Home and the Risk Assessment Screening Tool (RAST)

Safe at Home involves a range of initiatives, expanded and new services that represent a significant change in the way the Tasmanian Government responds to family violence: family violence is treated as a crime rather than a private matter.

The legislation (*Family Violence Act 2004*) and related policy serve to reaffirm the pro-arrest, pro-prosecution approach to family violence by Tasmania Police and allows for victims to access an expanded range of support services. The *Family Violence Act 2004* recognises the process of 'risk screening' undertaken by police, that is particularly relevant to the granting of both police and court bail with the safety, wellbeing and interests of affected adults and children being the paramount consideration. The *Safe at Home* strategy provides better training and enhanced accountability for service providers than existed previously. It also provides programs for offenders to assist them to change their behaviour.

The initial programs in the *Safe at Home* strategy were established from September 2004. The key components of the strategy are outlined in Table 1 (below).

Table 1: Key components of *Safe at Home*

Specific legislation	Focuses on the criminal nature of family violence. Allows for family violence orders, police family violence orders, increased penalties for breaches and harsher penalties for violent acts in the presence of children
Family Violence Response and Referral Line	24 hour/ 7 day telephone hotline where operators are specifically trained and make immediate and active referrals for victims.
Victim Safety Response Teams	Additional police recruited and trained to provide enhanced safety management to victims of family violence and a liaison point between affected person, police and other agencies.
Risk Assessment Screening Tool (RAST)	Development and implementation of an actuarial tool to assess the risk of the victim being subjected to further violence.
Police Prosecutions	Additional police prosecutors employed to cover increased workload
Additional court activity	Funding provided to ensure courts have resources to cope with increased workload and to ensure that breaches of FVOs are dealt with as quickly as possible.
Legal Aid	Extension of legal aid to all eligible victims to ensure that they are not disadvantaged by lack of legal representation and advice
Aboriginal family violence working group	Supports the implementation of culturally appropriate responses for aboriginal people under *Safe at Home*.
Court Support and Liaison Service	New state-wide service to assist victims navigate the legal and court processes and also provide information and referral to services for family violence victims
Child Witness Program	A new service to provide information and support to children participating in legal processes
Family Violence Counselling and Support Service (Adult and Children)	Enhanced counselling and support program for adult and victims including new telephone counselling service. Also a new service to provide specialised counselling and support to child victims
Family Violence Offender Intervention Program	New program to assess the ongoing risk an offender poses to their family (using SARA – Spousal Assault Risk Assessment tool) and to provide rehabilitation programs for suitable offenders .

The strategy is based on 'best practice' components identified through drawing on national and international research into what works, and through extensive community consultation.

Included in this Strategy was the implementation of a Risk Assessment Screening Tool (RAST) developed by Tasmania Police and the Department of Justice. The RAST is utilised by operational police at the attendance of family violence incidents to assist in assessing the risk of a victim experiencing future violence.

1.3 Previous Research on the Risk Assessment Screening Tool (RAST)

In 2005, the Tasmanian Institute of Law Enforcement Studies (TILES) was contracted by Tasmania Police to undertake an independent literature review and methodological analysis of the work conducted in the development of the RAST and to provide an academic professional opinion as to the robustness of the RAST. Two reports were submitted to Tasmania Police:

- Winter, R. (2005) Literature Review: Family Violence Risk Assessment Tools

- TILES (2005) Methodological Analysis: Family Violence Risk Assessment Screening Tool (RAST).

The *Literature Review: Family Violence Risk Assessment Tools* (2005) included a number of key statements that are significant in relation to the current project. These include the acknowledgement that:

Research on the risk assessment or prediction of repeat domestic violence is in its infancy, with data on reliability, validity and accuracy very scarce (Winter, 2005: 5).

And further, that:

- These specialised tools (for assessing the risk of family violence) are still in the early stages of development. The literature advises that the environment surrounding intimate partner abuse is complex and not reducible to numeric assessments alone. There is danger that the 'scientific' tools turn complex situations into a blunt score (Winter, 2005: 40).

The conclusion to the *Literature Review* states:

- There are no short cuts to assessing risk of any kind. However, this report has shown that the available risk assessment/prediction instruments have important limitations. It is an area under development and progress in tool design, reliability and validity should be monitored regularly (Winter, 2005: 44).

In order to undertake a methodological analysis of the RAST and to provide an academic professional opinion as to the robustness of the RAST, TILES was contracted in 2005 to:

- Convene a panel of experts across a range of academic faculties to consider the research and analysis conducted by Tasmania Police pertaining to the assessment of risk at family violence incidents (TILES, 2005: 2).

The report *Methodological Analysis: Family Violence Risk Assessment Screening Tool (RAST)* includes the following finding which is relevant to the current project:

- The academic review panel considers the implementation of the RAST to be a rigorous and accountable practice. An evaluation of the RAST based on a review of the literature suggests that the instrument is as robust as similar instruments employed nationally and internationally. It has the strengths of being developed on the basis of a thorough review of on-scene assessments in other jurisdictions, is informed by an analysis of cases of family violence in Tasmania, and it has been designed specifically for the Tasmanian context.

- The design of the RAST reflects best practice models nationally and internationally and it incorporates a number of components that have been identified in the literature as important. These include a professional over-ride facility and an admiralty scale.

- As noted throughout the report, the issue of validation of the items and reliability of the instrument is crucial. The panel noted that validity and reliability cannot be determined on the basis of currently available data; however, this could be determined on the basis of a longitudinal analysis to be undertaken over the next twelve months (TILES, 2005: 6).

Recommendation 3 of this report stated:

That a longitudinal analysis be undertaken of incidents in which the RAST is used, in order to determine:

- which items have the greatest predictive value;

- the validity of the instrument with respect to the Tasmanian population;

- the reliability of the RAST.

1.4 The Current Project

In May 2008, TILES was contracted by Tasmania Police to undertake a statistical analysis of the RAST.

The RAST has been in use for approximately three years and Tasmania Police have identified the need for an analysis of the RAST in order to:

- validate police action in relation to RAST scores; and
- give further weight to the RAST score when used in court to support an application for a family violence order or to oppose bail.

The objective of the current project was:

to undertake an analysis of incidents in which the RAST is used in order to determine the validity and reliability of the RAST with respect to the Tasmanian population.

1.5 The Final Report

This report constitutes the Final Report for the project. The Terms of Reference for the report stated that it will:

- establish the relationship between the overall RAST score and the likelihood that an offender will perpetrate further acts of violence against the victim;
- identify how a RAST score changes over time for individual offenders;
- identify which characteristics (RAST items) are the most useful in predicting the likelihood of re-offending;
- quantify the relative predictive value of the RAST items, controlling for the effect of others, in relation to the likelihood of violence;
- provide a system of weightings for each of the identified characteristics based on the above;
- identify items that may not useful in predicting re-offending;
- identify whether a reduction in the number of items on the RAST is appropriate;
- determine the overall predictive value of the RAST; that is, how much the items included in the current assessment tool, explain or predict the likelihood of re-offending.

1.6 Structure of the Report

Chapter 2 of this report provides a discussion of the Tasmanian context in relation to family violence, including the *Family Violence Act 2004*, the *'Safe at Home'* strategy (including RAST) and an analysis of longitudinal data from the Tasmania Police Family Violence database.

Chapter 3 discusses issues surrounding risk assessment tools and the analysis of risk assessment tools. This chapter is important in that it provides an overview of the current status of knowledge surrounding the development, use and validity of risk assessment tools, particularly in relation to the assessment of risk in family violence. Importantly, it emphasises that the development of risk assessment tools is a relatively recent phenomenon and that, in an international context, most risk assessment tools perform poorly in terms of predicting re-offending.

Chapter 4 provides details of the analysis conducted on the RAST and Chapter 5 discusses the results of the analysis.

Chapter 6 provides a conclusion regarding the validity of the RAST (in the context of current 'best practice') and makes a number of recommendations that may assist in increasing the tool's capacity to predict re-offending.

2. The Tasmanian Context

2.1 Incidence in Australia

In the most recent Australian Personal Safety Survey (2005), 40% of women reported experiencing some form of physical or sexual assault, and while men who experience violence are most likely to be assaulted by a stranger, women continue to be assaulted by a current or former partner or family member. This figure reflects previous research which suggests around a third of all women have experienced physical harm from their partner or former partner. The economic cost of family violence to the community has been estimated at $8.1 billion (Powell 2009).

2.2 Response in Tasmania

The *Safe at Home* strategy is a criminal justice framework for responding to family violence in Tasmania. It adopts pro-intervention, pro-arrest, pro-prosecution policies which aim to reduce family violence in the medium to long term through a criminal justice response. The *Family Violence Act 2004* (the Act) gives police authority to intervene in family violence incidents to address victim safety and if necessary, employ measures to manage the offender. Family violence is regarded as a crime and offenders are unable to hide behind the silence of their victims. Securing the safety of victims and children affected by family violence is the objective of the Act.

The Act enables police and the courts to issue protective orders: Police Family Violence Orders (PFVO) (issued by police) and Family Violence Orders (FVO) (issued by the Court) to enhance the safety of victims and children. The pro-intervention policy means that in most cases an offender's behaviour will be restrained by a protective order following police intervention in a family violence incident.

The conditions of these orders vary greatly from a basic order stipulating that the offender refrain from certain behaviour towards the victim to an order prohibiting any contact (including by phone or text message) with the victim. The Act enables an offender to be excluded from the residence when the offender's presence there is regarded as a threat to the safety of the victim. In all cases, an offender's firearms licence is cancelled or suspended for the duration of any order. Where firearms are accessible to offenders, police take possession of these.

The Strategy also provides for enhanced therapeutic counselling and new support services for victims and children and a mandated Family Violence Offender Intervention Program for suitable offenders.

Police may facilitate responses that enable victims to remain in the home, reflecting the philosophy of the Strategy. In some circumstances, victims may be moved to premises unknown to the offender.

Where an offender has allegedly committed a breach of a protective order and arrested they may not be granted bail by a police officer and must be placed before the court.

2.3 The RAST (Risk Assessment Screening Tool)

In order to assess the risk of re-offending, the Department of Justice and Tasmania Police developed a risk assessment instrument to be utilised by members of Tasmania Police.

Traditionally, informal risk assessments conducted by Tasmania Police consisted of:

- an officer's mental appreciation of circumstances
- a subjective assessment of the level of danger
- application of the relevant policy (pro-arrest/pro-active)

In the context of the *Safe at Home* initiative, Tasmania Police acknowledged the need to improve robustness and accountability in the risk assessment process.

The Risk Assessment Screening Tool (RAST) is an instrument that was developed by combining aspects of existing tools. These included:

- Professional judgment
- Actuarial support
- Admiralty scale
- Plus a professional override facility.

It was also designed to accommodate three types of offenders: (a) generally violent individuals who are also violent to their partners, (b) family violence specific offenders, and (c) psychotic offenders (typically stalkers). A large number of items are contained in the RAST in order to 'capture' all three types of offenders.

From a law enforcement perspective, the purpose of the RAST is to assess the likelihood of repeat violence by the offender. The RAST is used by police to classify offenders as at low, medium or high risk of reoffending, with the score obtained affecting the type of police response. The RAST is employed by members of Tasmania Police to inform decisions relating to the management and bail of offenders, not treatment or rehabilitation.

"The RAST was developed to achieve consistency in decision making and response by operational police attending a family violence incident" (Justice 2007).

Purpose of the RAST

The RAST is used by Tasmania Police in family violence situations to assess the likelihood of an individual re-offending and, as noted above, it was developed as part of a 'pro-arrest and pro-prosecution' approach to family violence. The RAST employs a rating system to determine a 'risk score' (low, medium and high). The total risk score is dependent upon the number and type of risk factors the offender possesses, as perceived by the victim.

The instrument itself was developed from an analysis of relevant national and international literature and, as noted above, was reviewed by an expert panel comprising academics from a number of disciplines including sociology, psychology and law (TILES, 2005).

There was a threefold basis upon which the risk assessment tool and process was initiated:

1. **Internal working document**
   To provide a guide for police actions at family violence incidents and to enhance the accountability of the decision making process undertaken by operational police.

2. **First level screening tool**
   To provide a screening process to identify offenders for further assessment as to the appropriateness for entry into offender rehabilitation programmes (via Spousal Assault Risk Assessment – SARA) conducted by the Department of Justice.

3. **Salient information pertaining to bail**
   To provide a court with valuable information that in addition to other matters, is likely to affect the prospect of a suspect receiving court bail, based upon the likelihood and consequences of the offender being involved in a future violent act.

Thus, originally there appeared to be three potential aims of the RAST:

(a) risk factor identification in relation to antecedents to family violence,

(b) a screening tool, and

(c) a risk assessment tool.

In recognition of these divergent aims, members of the Academic Review Panel who undertook the methodological analysis of the RAST in 2005 expressed the concern that the RAST may be 'trying to do too much' (TILES, 2005: 20). They identified the need to distinguish the purpose(s) of the instrument. Specifically, the panel stated that it should be clear whether the RAST is:

- An on-scene assessment to be used for decision making in reference to referrals, or

- An instrument for assisting in the decision to arrest/separate or mediate, or

- Both an on-scene instrument for future referral purposes as well as a decision to arrest/mediate/separate guideline instrument.

The Academic Review Panel identified that follow-up on this matter clarified that the RAST is:

- An instrument that aims to predict the likelihood of re-offending. It provides information that, in addition to other matters, may affect the prospect of a suspect receiving bail. While it may assist in identifying what course of action may be best with respect to referrals this is not its intended purpose. It is not used as a basis for decisions regarding arrest because arrest is automatic; bail is decided on the score obtained via a total score after administration of the RAST (TILES, 2005: 21).

Importantly, then, the primary purpose of the RAST is to assess the *victim's* risk of experiencing further violence. It is a victim-based tool aimed at assessing risk of re-offending. It is not primarily a tool to assess the dangerousness of the offender/perpetrator (although clearly the two are inter-related).

2.4 Family Violence Incidents in Tasmania

The following section presents the results of a longitudinal analysis of selected offenders based on the number of offences committed. A general description of the data is presented including an analysis of the relationship between a numbers of variables (see below) and consequent RAST score.

Methodology

The data set comprised 5,721 instances of family violence over a two year period from 2005 to 2007, committed by 3,320 de-identified individuals. Data on each incident included age and sex of offender and victim as well as their relationship status, number of children and if they were present at the time of the offence.

Additionally, threats, injuries sustained and any treatment received was also recorded together with the individual RAST score for each incident.

A descriptive analysis was undertaken of the data to provide a general description of offenders and offences (e.g. number of offences, marital status, threats used, violence perpetrated).

Because there were hundreds of threat types and types of violence committed, these variables were collapsed to create a dichotomous variable indicating whether the offender had made threats (1=no threat; 2=threat made) and whether violence was perpetrated (1=no violence; 2=violence committed). This was also the case for instances where the victim may have received treatment (1=no treatment; 2=treatment).

Additionally, time series analysis was employed to track offenders in relation to the number of incidents committed, the frequency of offending, their RAST score for each occasion, whether threats were made, violence perpetrated and whether the victim required treatment.

Descriptive Analysis

Males comprised 87% of all offenders with females comprising the remainder (13%).

The data set comprised 5,721 instances of family violence. Of this total 2,121 were reported in 2005, 3,092 in 2006 and 498 in 2007. Table 2 below shows the breakdown of incidents committed from those who have committed a single incident to those who have committed multiple incidents.

Table 2: Longitudinal Analysis – Number of Incidents

Number of Incidents	'N'	%
1	2,089	63.6
2	676	20.5
3	284	8.6
4	129	3.9
5 or more	106	3.4
Total	3,284	100.0

As can be seen, the largest proportion of offenders are those who have been reported to police for a single incident (37%). This is followed by those who have been reported to police for two incidents (24%). Fourteen percent have been reported for three incidents, while 9% have been reported for four offences. Just fewer than 5% have been reported for five incidents. The remainder (12%) have been reported for between six and 14 family violence incidents.

Relationship Composition

Those relationships defined as partners and ex-partners were the largest groups within the data set, with ex-partners comprising 55% of the total sample, followed by partners (42%). The remainder (4%) comprised other family members, casual relationships and boyfriend or girlfriend.

Relationship and Frequency of Incidents

Generally speaking, those relationships defined as casual or boyfriend or girlfriend were under-represented in multiple incidents; however, no statistically significant differences emerged between groups in relation to those who had been reported for up to three incidents. In so far as higher rates of incidents are concerned, those who were ex-partners were significantly over-represented committing six or more incidents compared to those who were defined as partners.

The 'n' for other groups, especially casual and boyfriend/girlfriend were too small to provide a measure of statistical significance. Thus while no group 'stood out' in relation to the number of offences committed, those who are defined as ex-partners tended to offend more than all other groups, especially partners.

In relation to multiple incidents, the average RAST score for boyfriend/girlfriend and partner was significantly lower than the RAST score for family and ex-partner. Thus the average RAST score for partner was 21 compared to a score of 24 for ex-partner, while the average RAST score for girlfriend/boyfriend was 18.

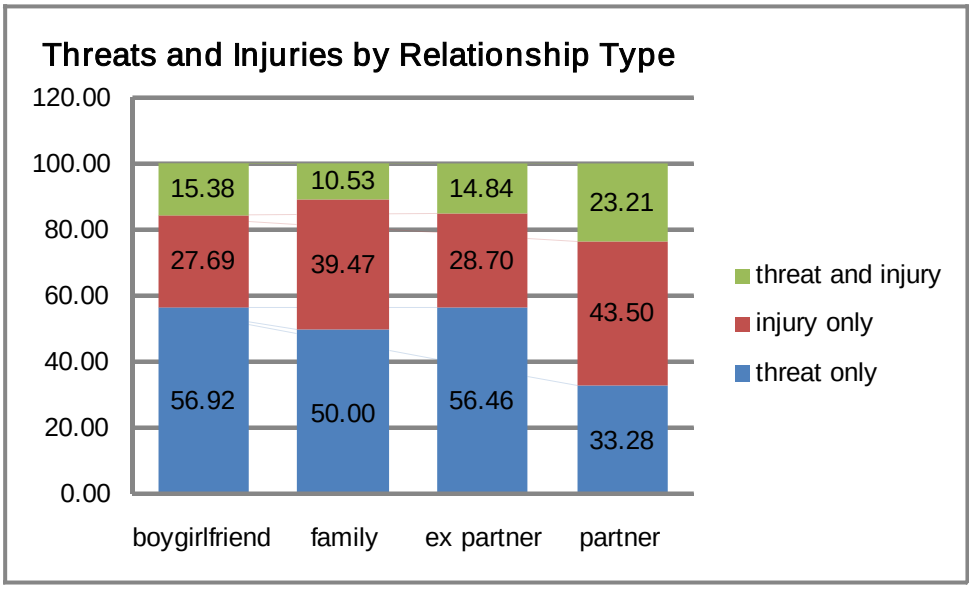
Frequency of Offending, Threats and Injuries

A total of 71% of victims did not receive an injury as a result of a family violence episode with the remainder (29%) receiving some sort of injury.
With the exception of those who had committed one incident where a significantly larger number had been injured as a result of family violence, those who committed more than five incidents were significantly more likely to have injured their victim. Thus there appears to be a relationship between frequency of offending (especially high levels of offending) and injury.

Threats and Injuries

Sixty five percent of the sample made no threat(s) to the victim while the remainder (35%) did make at least one threat to the victim. Additionally, 46% of this group made a threat only, while an additional 35% injured the victim without a threat being made. Nineteen percent made a threat and injured their victim.

Figure 1: Threats and Injuries by Relationship Type



For the status boyfriend/girlfriend 57% had made a threat only, while 28% had injured without making a threat and an additional 15% both threatened and injured their victim. In relation to family, 50% made threats only while 40% had injured without a threat being made, with the remainder (10%) making threats and injuring their victim.

For ex-partners, 57% made threats only while 29% injured only. Fifteen percent of this group both threatened and injured their partners. For the status partner, 33% had made threats only with an additional 44% injuring without any threat being made. Lastly, 23% had both threatened and injured their victim.

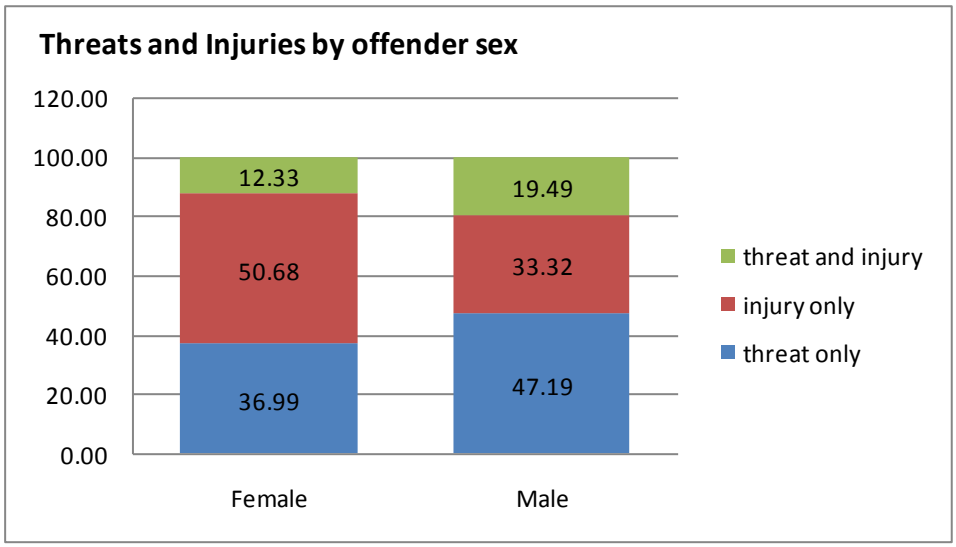
With the exception of partners, making threats appears fairly constant between groups, while partners and family members exhibited significantly higher rates of

injury without threat than the other relationship types. Additionally, partners were over represented as threatening and injuring when compared with ex-partners and family.

There appears to be no relationship between making threats and the victim receiving injuries. Thus 70% of those who did not make threats also injured their partner compared to 71% of those who did make threats yet did not injure their partner.

Threats, Injury and Offender Sex

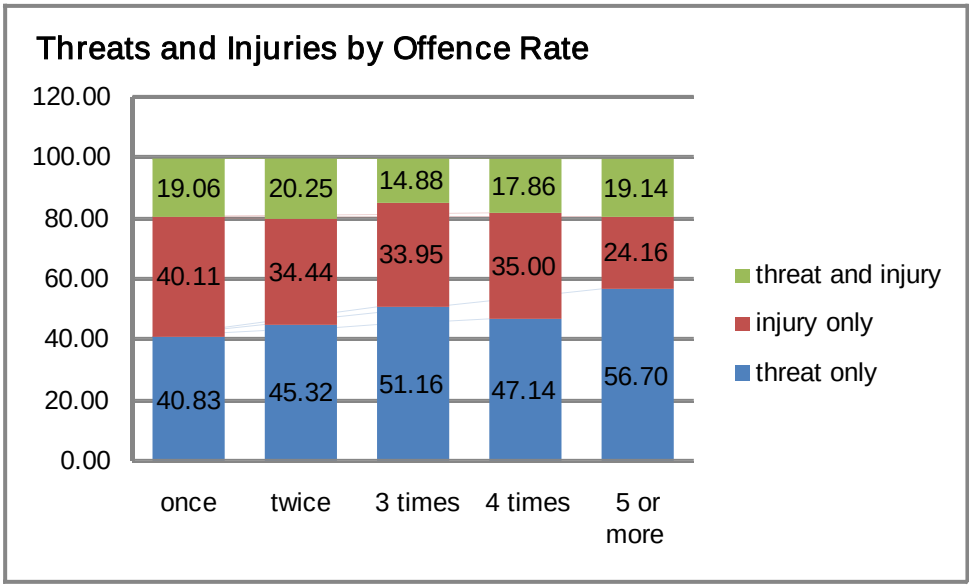
Figure 2: Threats and Injury by Offender Sex



Female offenders were significantly over-represented in terms of injuring without a threat (51%) than were males (33%), while males (47%) were significantly over-represented in terms of making threats only than were females (37%). Additionally, males were significantly over-represented in terms of making threats and injuring (19%) when compared with females (12%).

Threats, Injury and Offence Rate

Figure 3: Threats and Injuries by Offence Rate



As can be seen above, the rate of making threats only increases with incident rate; thus 41% of those with one incident made a threat with this rate increasing incrementally to 57% for those with 5 or more incidents.

Conversely, the rate of injuries without threats decreases with an increase in offending rate. Thus 40% of those with one incident had injured without threat compared to 24% of those with 5 or more incidents.

Threats, Injury and RAST Score

Significant differences emerged in relation to threats and RAST scores. Thus, the RAST score for those who made threats was significantly higher than those who did not make threats. Those who made threats scored an average of 26 on the RAST, compared to an average of 21 for those who did not make threats.

Further, those who received injuries scored significantly higher on the RAST than those who did not. Thus, those who received an injury scored an average of 25 compared to a score of 21 for those who had not received an injury. Additionally, the RAST score for those who used a weapon was significantly higher than for those who did not. Thus, the average RAST score for those who used a weapon was 27 compared to a score of 22 for those who did not use a weapon. The rate of weapon used was low with a weapon being used in 6% of all occurrences of family violence.

Correlations

Bivariate correlations were generated for the above variables to determine if any of the relationships between these variables were statistically significant as well as ascertaining the strength of any relationship.

In relation to the RAST score generated there exists a significant relationship between the number of incidents committed and the RAST score. Thus, the greater the number of incidents committed the greater the likelihood of a high RAST score (r=.188; p=000) so that the more episodes a victim experiences the greater the likelihood they will score the offender high on the RAST. Additionally, making threats also increases the likelihood of a high RAST score (r=.206; p=.000), as does injuries received (r=.188; p=000), although the effect is not large in this case.

The number of incidents committed was not related to threats being made (r=-011; p=.338) and was inversely related to injuries received (r=-.108; p=000), although the relationship is not strong as evinced by the low ‘r’. What this means is that the more incidents committed the less likely the victim is to receive an injury, although it must be repeated that the relationship, although it exists, is not strong.

Additionally, injuries are not related to threats (r=-.007; p=.571). Thus even though threats may be made they do not appear to always result in injury (the use of physical violence).

The use of firearms is correlated to an increased RAST score (r=.089; p=.000), although the relationship is not strong. Firearms use is also inversely related to the number of incidents committed (r=-.027; p=.022), but again the relationship is not

strong. Firearms use is also correlated to threats being made (r=.122; p=.000) and is also positively related to injuries received (r=.127; p=.000).

2.5. Conclusion

The RAST score is affected by the number of incidents committed as well as the use of threats and violence (specifically the victim sustaining injuries).

Threats do not necessarily lead to injury nor is injury preceded by the threat of physical violence. Nor is the likelihood of injury related to the number of offences committed. This suggests that it is difficult to predict when physical violence is likely to occur.

This report aims to explore the use and predictive utility of risk assessment and screening tools in predicting violent recidivism among family violence offenders, utilising data obtained from Tasmania Police as part of the *Safe at Home* initiative. This is a wholly quantitative approach to risk assessment and uses multivariate techniques to quantify the predictive power of the current tool and to draw conclusions regarding the use of actuarial assessment tools generally.

3. Family Violence and the Assessment of Risk

3.1 Family Violence as a Social Problem

Given the pervasiveness of family violence and the high rate of recidivism, identifying risk factors and high risk individuals is an important task in relation to addressing the crime as well as the issues of risk and safety of affected adults and children. Whether the focus is on the prediction of violence or violent recidivism or on the rehabilitation of the offender has implications in relation to the methods used and the type of risk factors employed.

Until recently, family violence has been largely hidden from view but there is now a greater awareness of not only its incidence but also the high cost to both individual and community. The immediate and long term effects on the victim and children have been well documented (see Humphrey 2008, Nutall 1999, Powell 2009).

3.2 Recidivism risk prediction

Violent crime, especially family violence, has far reaching social and economic effects on both a macro level, for society as a whole, and on a micro level for the persons and family members directly affected by this form of crime. Chappell (1995) stressed that although the true social cost nationally cannot be quantified it has been estimated that the cost to run the criminal justice system alone exceeds $1 billion per annum. The cost to adjudicate (policing, trial and imprisonment) each murder case exceeds $1 million. Of the approximate 150,000 non-sexual violent assault victims per annum, around 30% (57,000 victims) require medical attention, in many cases surgery or prolonged physical rehabilitation.

In 2003, the cost to imprison each offender per day ranged from $146 to $238 (Australian Institute of Criminology (AIC), 2004). Overall, in 2002 approximately $58,181 was spent per prisoner, whereas the average cost per year was substantially less for each offender sentenced to serve a community order (e.g., probation) at $3,541 (AIC, 2004). Taking the social and economic implications of violent crime into account, predicting risk of recidivism, especially for violent crimes (Howells & Day, 2002) has become a research focus. This interest in predicting recidivism and the rehabilitation of violent offenders is not unique to Australia but has emerged as a worldwide issue, especially given that violent offenders represent over 50% of the prison population in many countries and cause considerable social concern due to the perceived or real “risk” of their re-offending when released.

The question of whether violent recidivism can be predicted accurately or whether violent offending treatment programs have been effective in reducing recidivism rates has been a contentious issue for the past 35 years (Andrews & Bonta, 2003). This issue is not just a philosophical debate (should offenders be rehabilitated?) or empirical (does rehabilitation reduce recidivism?), it is also underpinned by the economic factor of whether the benefit (reduction in recidivism) equals or exceeds the cost (all economic units in terms of resources required for the intervention). With respect to the empirical question, one of the most controversial papers written on the topic was by Martinson (1974) who concluded that from the evidence it appeared that very little worked to predict or reduce recidivism.

In contrast to this negative position, from 2000 onwards there has been a rapidly developing research area exploring which variables reliably predict violent recidivism and which variables should and could be the target of rehabilitation with the aim of reducing risk after offenders are released into the community. Some research has found that rehabilitation programs can significantly reduce violent recidivism rates by 5 to 20% if criminogenic risk factors are the targets for intervention (refer especially Andrews & Bonta, 2003; Howells & Day, 2002).

Bourgon and Armstrong (2005) reported that a 10% reduction in recidivism following program completion can equate to an average cost benefit to the community of between U.S. $4,653 to $80,000 per offender. Of the rehabilitation programs that were found to be successful, these programs were underpinned by Andrews and Bonta's (2003) risk and needs principles. These two principles also form the basis of risk assessments tools predicting risk of violent and generalist recidivism (Ogloff & Davis, 2004).

3.3 Definition of Family Violence

The term domestic or family violence covers a wide range of experiences, with the measures used to describe it varying considerably in relation to the type of relationship defined as domestic and what constitutes violence.

The way in which domestic violence is defined has implications in relation to both the definition of risk factors and also its incident rate. The broader the definition of either relationships or what constitutes violence the higher the estimate of incidents of violence. Simply, if the definition is broad it will 'capture' more people than if it is defined more narrowly. This has implications in relation to what constitutes a risk factor, the incidence of family violence in the community, predicting the likelihood of repeat violence and the definition of need in relation to rehabilitation.

The *Family Violence Act 2004* defines family violence very broadly and thus captures a wide range of behaviours that may constitute family violence. These behaviours become criminal behaviours by virtue of their inclusion in the Act.

Section 7 of the Act defines family violence as:

(a) any of the following types of conduct committed by a person, directly or indirectly, against that person's spouse or partner:
(i) assault, including sexual assault;
(ii) threats, coercion, intimidation or verbal abuse;
(iii) abduction;
(iv) stalking within the meaning of s.192 of the Criminal Code; attempting or threatening to commit conduct referred to in subparagraph (i); (ii); (iii); or (iv); or
(b) any of the following:
(i) economic abuse
(ii) emotional abuse or intimidation
(iii) contravening an external family violence order, an interim FVO, an FVO or a PFVO.

3.4 Risk Factors

Numerous studies have attempted to identify risk factors associated with violence and intimate partner violence. These have included research aimed at identifying factors associated with those who commit acts of domestic violence and those who do not (see Dutton, Kaltman, Goodman, Weinfurt & Vankos 2005; Kropp 2004), as well as studies aimed at identifying factors associated with repeat acts of domestic violence (see Cattaneo and Goodman, 2005, Hilton, Harris, Rice, Lang & Cormier 2004).

In recent studies, a large number of potential risk factors have been identified as 'related' to either violence generally or intimate partner violence specifically. It has been suggested that the risk factors for violence are also those encountered in intimate partner violence (Hanson 2007). Indeed, it has been questioned whether specific spousal risk scales are necessary given that 'several studies have found that the risk scales designed for general and violent recidivism also predicted spousal assault recidivism' (Hanson 2007).

Risk factors for family violence fall into two main types; static and dynamic. Static risk factors refer to those risk factors that do not change or change in only one direction (Gottfredson & Moriarty 2006). These risk factors include age, gender, criminal history and education, and tend to be objective rather than subjective in character. In other words, static variables are tangible and observable and therefore easy to measure.

Dynamic risk factors are those factors that measure change in the offender and include factors such as employment status, substance abuse and mental states (e.g. depression) or state of mind (e.g. anger). These factors can also be subjective in character because they can involve the definition of mental states or personality constructs, factors that tend to be intangible and not readily amenable to quantification and objective measurement.

Within these two broad categories of risk factors fall a number of discrete classes of risk factors. While there appears to be no uniform definition of these classes in the literature they fall into the following types;

Interpersonal – generally focuses on the relationship between the perpetrator and the victim including history of physical violence, marital status, length of relationship, children in common, level of fear, conflict resolution, and the level of conflict, anger and jealousy in the relationship. Included in this class of risk factor are also social factors including poor social networks, lack of education and lack of work skills. There are, as well, psychosocial factors that include the individuals' characteristics or temporary states that influence their interaction with others, and ways of expressing anger or behaving under the temporary influence of alcohol, drugs or stress (National Institute of Justice 1994).

Psychological - Focuses mainly on mental states (e.g. depression, suicidal ideation) and personality types or constructs (e.g. stalker, psychopathic personality, antisocial personality disorder). Substance abuse has also been included within this class of risk factor (see Kropp & Hart 2004).

Personal History – These factors normally revolve around the history of the perpetrator (sometimes the victim as well) and include family of origin, sex, history of abuse, drug use/abuse.

Situational – These risk factors refer to those that occur within the context or setting of family violence. Mullens (2000) defines situational triggers as those factors that are likely to trigger a violent response and include loss, demands and expectations, confrontations, availability of weapons, and physical illness. Others have defined situational risk factors as those circumstances that surround an encounter between people that increase the chance of either violence or harm occurring as a result (NIJ 1994).

Research into violence generally, and family violence specifically, has ranged from studies which focus on specific risk factors such as alcohol use and its relationship to domestic violence to the identification of multiple risk factors (see Dutton & Kropp 2000). Other work has focused on the life experience and perceptions of risk by the victim (Heckert & Gondolf 2004) or who is at risk (Romans, Forte, Cohen, Du Mont & Hyman 2007, Nuttal 1999) while others have focused on the impact of interventions on domestic violence recidivism (Hilton et al 2007).

Additional research has focused on the methodological issues associated with risk assessment including the types of methods used and the validity and predictive utility of risk factors specifically and assessment tools more generally (see Gottfredson 2004, Mills 2005, Kropp, 2004 Bonta 2004; Hilton et al 2005).

While there exist a large number of potential risk factors associated with repeat violence, it has been suggested that considerable consensus exists with regard to the most important risk factors. These important risk factors include: a history of violent behaviour; a history of physical, sexual or emotional abuse toward the partner; access to lethal weapons; antisocial behaviour and attitudes; relationship instability (recent divorce or separation); lifestyle stressors (employment, finances); history of family violence from family of orientation; mental health issues or personality disorder; resistance to change; and, attitudes that support violence toward women (Kropp 2004, Hilton et al 2005)

A number of assessment schedules and psychometric tests have been developed from meta-analyses of existing research. These have been used to identify high risk individuals and assess criminogenic need using those variables that appear empirically linked to violence or violent recidivism. Criminogenic need refers to those risk factors that are highly correlated with criminal conduct and include such variables as anti-social peer associations, substance abuse, lack of problem solving and self-control skills.

A number of assessment schedules exist that are used to classify individuals and provide a framework for treatment programs aimed at rehabilitating an offender. Although typically used on forensic and prison samples they have also been employed to predict domestic violence recidivism (Kropp & Dutton 2000). For example, the psychopathy checklist (PCL) has been designed and used mainly on forensic patients and those in prison but has also been shown to be a robust predictor of violent behaviour generally as well as for domestic violence perpetrators although these results are equivocal (Kropp & Dutton 2000; Hilton et al 2005). The Danger Assessment (DA) schedule, while used primarily within a domestic homicide

setting has also been shown to be a good predictor of domestic violence recidivism (Kropp & Dutton 2000).

Between 1979 and 2003, over 33 different assessments were designed specifically for spousal assault (Waltermaurer 2005). The most common approaches involve risk assessment by the partner (victim), spousal assault risk scales (actuarial and professional structured judgement) and risk scales designed for general or violent recidivism.

The Spousal Assault Risk Assessment (SARA) focuses specifically on domestic violence and comprises 20 risk factors that reflect criminal history, social functioning and mental health and was compiled via a review of professional and scientific literature (Kropp & Hart 2004). More recently there has been an attempt to simplify SARA (B–SAFER) for use with frontline police in Canada. The reason for this development is that the SARA is not optimal for police use because of its length and also because it requires judgements regarding the mental health of the perpetrator (Kropp & Hart 2004).

Another assessment schedule is the Ontario Domestic Assault Risk Assessment (ODARA). Unlike SARA and B–SAFER that were developed through theory and prior research, the ODARA was developed empirically, and was developed for use by police for predicting subsequent police contact (Hanson 2007). Thus, it has been developed with police in mind rather than psychologists or trained professionals and does not include a professional over-ride as does the SARA for example.

The Risk Assessment Tool (RAST) used by Tasmania Police is similar to ODARA in that it is an actuarial tool aimed at predicting repeat violence. It contains 34 risk factors with a total score being obtained through summing risk factors. It also employs an admiralty system that is aimed at 'judging' the value of information received. Like the ODARA, it is meant for use by police.

In summary, research aimed at predicting violence or violent recidivism tends to focus on static variables while the management of risk and high risk individuals tends to focus on dynamic variables. This difference in orientation is fundamental to both the method employed to measure risk and its operational use. In those contexts where risk prediction is the focus (e.g. an operational law enforcement perspective) an actuarial methodology with an emphasis on static variables tends to be the preferred option (Gottfredson 2004). Where the rehabilitation or treatment of the offender is the focus a more structured decision making methodology, with an emphasis on dynamic variables, is the preferred option (see Bonta 2002).

3.5 Key Issues

A number of issues are associated with the definition and measurement of risk. First is the issue of definition; that is, what constitutes a family relationship and what constitute family violence. How a relationship is defined has implications regarding the recorded incident rate of domestic and/or family violence. If the definition is broad it will increase the recorded incident rate and if it is too broad then the risk factors for family violence may tend to be reflective of measures of general violence. This also has implications in relation to calculating base rates (the actual rate of family violence) and as a result predicting the likelihood of violence occurring or reoccurring.

Additionally, if violence is broadly defined to include threatened and actual violence then this may lead to difficulty in establishing the exact nature of the violence (this is significant in establishing the predictive utility of any assessment tool).

There are a myriad of risk factors that have been identified and associated with violence generally, and family violence specifically, with some suggestion that the risk factors associated with general violence are the same as those for family violence. In relation to this the results from a number of studies have been inconclusive; especially when the assessment is used on populations it was not originally intended. An example is the use of the PCL for predicting general violence. While it has been suggested that the PCL is 'good' at predicting general violence it is not so for violence within a domestic setting (Dutton & Kropp 2000). Further, while substance and alcohol abuse do not correlate with repeat violence, recency of use does. Thus, while a history of substance or alcohol abuse does not predict violence or repeat violence; substance or alcohol use just preceding or during the incident does (Cattaneo & Goodman 2005). Two points emerge from these examples. Firstly, the population for which the risk is being defined and measured is important in relation to predictive validity. Simply, assessment tools are often used for populations for which they are not intended (Gottfredson & Moriarty 2006). Secondly, how a risk factor is not only defined but measured has important implications in relation to the usefulness or predictive validity of not only risk factors but also risk assessment tools such as those described above.

Lastly, some assessments are used to predict violence while others are used to prevent violence through identification of risk factors and subsequent targeting of therapeutic intervention. This has implications in relation to the type of risk factor employed; namely, the use of static variables for the prediction of violence and the use of dynamic variables for the prevention of violence. This difference in focus is fundamental to how a risk assessment tool is developed, administered and analysed.

3.6 Assessing Risk

As outlined in the previous section, the issue of family violence has prompted a need for an accurate method of predicting the likelihood of violence and preventing its occurrence or reoccurrence. Tools such as RAST and SARA are used to inform decisions about responding to the problem. Additionally, to a large extent, whether one is predicting or preventing the behaviour determines the method used to measure risk.

While there are a number of different methods of assessing risk, they generally fall into three main categories; clinical, actuarial and structured professional judgement.

Clinical or Professional Judgement
In this type of procedure clinicians (psychiatrists, psychologists, doctors, and social workers) assess the risk of violence on an individual basis employing unaided or unstructured clinical judgement, sometimes referred to as a case formulation approach, to assess the level of risk posed by the individual.

The clinical approach to assessment concentrates primarily on dynamic risk factors such as personality traits, mental illness, biology, and psychopathology (John Howard Society 2002). Prior to more standardised approaches to risk assessment,

risk was determined through clinical judgements, typically measured by the intuition or “gut feelings” of the practitioner from an offenders’ self report or through a review of official records (Bonta 2007, Gottfredson & Moriarty 2006). Further, risk was based on subjective assessments that were difficult to replicate rather than standardised objective risk measures (Bonta 2007).

The clinical approach to risk assessment has been criticised on a number of grounds. These criticisms include:

- Low inter-rater reliability: because schedules (and schedule items) are not standardised it is difficult to collect uniform data and raters rarely concur in relation to schedule items.

- Low validity: because of the lack of reliability in both the schedules used and methods to collect data, the generalisability of results is limited.

- Failure to specify decision-making criteria: questions are not standardised and rely on personal judgement. Clinical assessments involve decision rules that are not easily observable (e.g. states of mind) or replicable.

- Inferior predictive utility when compared with actuarial approaches: a number of studies have confirmed that clinicians had very little expertise in predicting violent outcomes and indeed were no better than the layperson at doing so (see Gottfredson & Moriarty 2006; JHS 2000; Rosenfeld 2004; Dolan & Doyle 2000).

Clinical judgement is a wholly subjective approach to risk assessment, with no standardised method or clearly defined schedule items and rules of collection. Instead this approach relies primarily on the experiences of a clinician who makes judgements about where an individual falls on the scale of an item contained in a particular schedule (e.g. Psychopath Check List). While clinicians and correctional workers may strive to be objective and unbiased, it is recognised that any task undertaken by a person will be influenced by his or her personal experience and perspectives (Gottfredson 2003; JHS 2002). This means that this type of approach is, in the main, both an unreliable and inaccurate method of risk assessment. It is now widely accepted that objective risk assessments perform better than subjective, non structured assessments which rely on ‘professional judgement’ (Bonta 2008).

Actuarial Assessment

Actuarial tools similar to the RAST are employed in such places as Canada to predict a number of violence related incidents offences, with varying degrees of success. These models are used to assess offenders as at either high, medium or low risk of re-offending while others use a cut-off point to differentiate low risk from high risk. Often taken from a from a victim perspective, they assess the likelihood of experiencing repeat episodes of violence from their partner or significant other. From a law enforcement perspective, decisions relating to the custody of an offender may be made, based on the score obtained from the assessment tool.

The actuarial method of risk assessment is strongly associated with the prediction paradigm and is used to predict specific behavioural outcomes (e.g. violent recidivism) within a specific time frame. The stated goal of the actuarial method is to predict violence in a relative sense by comparing an individual to a norm-based reference group, and in an absolute sense by providing a precise estimate of the likelihood of future violence through the calculation of a risk score (Kropp & Hart 2004).

Actuarial assessment, in its narrowest sense, employs static variables in predicting risk. As has been often quoted, the best predictor of future behaviour is past behaviour, and this tends to be assessed using static variables (Gottfredson 2006, Bonta 2004). Those who favour a strictly actuarial approach favour static variables, while those who favour a structured judgement approach tend to favour dynamic variables. As mentioned in the previous section, this 'preference' tends to be a product of whether one is predicting risk or rehabilitating the offender.

Actuarial assessment is grounded in science and statistical theory and involves employing scientific method and statistical modelling to assess risk. In virtually all decision-making situations it has been found that actuarially developed predictions outperform human or clinical judgement (see Mills 2005; Kroner 2005; Hanson 2005, Gottfredson & Moriarty 2006)

Static assessments are useful in decisions related to placement or release of offenders (Andrews & Bonta 2003). Analysis of static assessment factors are considered to be useful in deciding such matters as whether probation is appropriate as the sentence for a particular offender or in deciding in which prison an offender should be incarcerated or whether the prisoner should be classified as low-, medium-,or high-security. Static assessments may also produce practical recidivism estimates over the long-term, but are not adaptable to changes in the offender (Harris & Hanson 2003).

Static assessments are generally brief and require only minimal training. As such, they are highly efficient in respect to staff time. These instruments may be useful to frontline personnel such as police, as static assessments are practical where there is limited time to administer the assessment or where there are no trained professionals (e.g. psychologists) who can administer a more complex dynamic assessment.

From a violence prevention perspective, actuarial methods provide information on the level of risk management that might be required. This can inform the decision-making processes in the relevant agency with respect to the determination of specific prevention strategies.

The prediction model has minimal implications for management due to its lack of sensitivity to change. Static assessments should not be used to make treatment decisions because they offer little guidance on the need or appropriateness of treatment (Bonta 2002).

Structured Decision-Making

Structured decision-making or structured professional judgement is an approach that attempts to bridge the gap between actuarial and clinical approaches to risk assessment.

The emphasis or focus of structured professional judgement assessment is on intervention and prevention and it is utilised primarily in closed settings such as forensic populations or prisons.

Structured professional assessments are more structured than clinical assessments, providing guidelines in relation to risk factors as well as operational definitions for the scoring of factors (Kropp & Hart 2004). These assessments are also more flexible than actuarial methods as they do not impose any restrictions for the inclusion, weighting or combining of risk factors. This is often referred to as professional over-ride whereby the evaluator makes decisions about the weighting and inclusion or exclusion of some risk factors.

The primary aim of the structured professional approach to risk assessment is to prevent violence. Thus, even though risk instruments may include a combination of static and dynamic risk factors, the emphasis is on dynamic or changeable risk factors which are used to tailor programs to prevent violence. They allow treatment to be modified based on the individual needs of the offender. These factors can also be used to make risk determinations. 'Even if treatment is not a concern to the correctional agency, dynamic risk-needs instruments can help staff monitor changes in offenders and their situations that influence their risk for criminal behaviour' (Van Voorhis, Brazwell & Lester 2004).

Dynamic factor assessment seems to be particularly well-suited to treatment decisions. Finding appropriate treatment (and the changes that accompany it) is closely tied to a reduction in recidivism. Dynamic assessment is more complex and, because it tends to focus on factors of a behavioural or psychological nature, it requires more highly trained staff to administer when compared with static assessment that requires very little training.

As indicated, the use of dynamic risk factors can be directly tied to attempts to reduce recidivism. This is particularly true when used to assess criminogenic needs. These are factors that are related to criminal conduct and can be treated to provide an overall or specific reduction in the risk of recidivism (Bonta 2002; Philipse, Koeter, Van Den Brink & Van Der Staak 2004). Reduction of criminogenic needs generally equates with a reduction in recidivism (Bonta 2002). These criminogenic needs can be fairly specific and include measures of substance abuse, anger, hostility, and antisocial attitudes (Bonta 2002). Identification of these needs allows for the targeting of these needs for 'resolution' in treatment (Bonta 2002).

Dynamic risk factors (those that can change) are described as an individual's criminogenic needs. Since a person's dynamic risk factors can change, the assumption remains that risk can be lowered by correcting those dynamic factors which increase risk.

Conversely, static factors (e.g. age, previous convictions) are aspects of the offender's past that are predictive of recidivism but cannot be changed (Andrews & Bonta 1994). For proponents of the prevention paradigm, identifying dynamic risk factors and linking them with the needs of the individual has proven to be successful in reducing rates of recidivism by correcting potentially damaging behaviours that increase risk. 'The most effective programs target such dynamic risk factors as antisocial attitudes, values and beliefs, delinquent and criminal peers, self-control, self-management, and problem solving skills' (Bonta 2002).

3.7 Key Issues

As previously identified, from a law enforcement perspective risk assessment is intended to answer questions in relation to the likelihood of future violence. In this case, an actuarial approach with its emphasis on static variables would appear to be the preferred option. Conversely, if treatment is the focus then a structured professional judgement approach appears the preferred method. This would emphasise dynamic variables because these measures, it is assumed, can be identified and treated and thus produce change in the individual.

The 'expertise' of the individual undertaking the assessment, and the time available to do the assessments are also important in relation to the type of assessment to be undertaken. A number of risk assessment tools employ psychological risk factors (e.g. Bontons' big four risk factors) and therefore require a level of 'professional' training in order to undertake the assessment. Further, dynamic risk assessment requires considerable time to complete and relies on information from a number of sources (e.g. the offender, official records etc).

Actuarial assessment, by contrast, can be completed with no training in psychology, psychiatry or other behavioural profession, especially given the static nature of the risk factors employed. For example, if the victim is answering questions about the offender (as is the case with the RAST), answers are much more likely to be accurate with regard to static/historical risk factors than they would be for dynamic risk factors, for the reason that it is highly unlikely that the victim (or the police) will have the requisite professional skill and knowledge to answer questions about either the personality type or mental state of the offender.

3.8 Assessment Purposes

The purpose or intended use of a risk assessment tool has important implications for the identification and definition of risk factors as well as the measurement of their reliability and validity.

Actuarial assessments are not designed to measure underlying psychological constructs or dispositions as are those used for assessing and managing an offender in the context of therapeutic intervention. The primary purpose of actuarial risk assessment is to estimate the likelihood of a particular behaviour occurring or occurring again. The primary test of risk assessment is predictive validity (Hilton et al 2004).

The divergent approaches to assessment have implications in relation to how risk factors are defined, measured and validated. In assessments aimed at therapy, the use of factor analysis for risk factor selection, internal consistency, test-retest reliability, and construct validity are the key methods used to test validity.

For actuarial instruments, multiple regression for variable selection, inter-rater reliability, predictive validity (e.g. analysis of misclassification) and cross-validation are common techniques used for variable selection and the measurement of validity (Gottfredson 2006; Hilton et al 2004; Kropp 2004).

Gottfredson and Moriarty (2006) suggest researchers need to be clear on the intended purpose of any risk assessment tool to avoid the problem of misapplication. Further, there needs to be a clear focus on what is being measured; is it public safety risk (prediction) or needs assessment (therapy)? The additional point is made that while assessment of needs can be treated as a predictive exercise, the criterion variables (what it is we are trying to predict) will be different from those required in actuarial exercises, and as a result so will the methodologies employed.

Two additional (and related) questions should also be addressed when assessing risk assessment tools: the accuracy of individual items, and the accuracy of items in combination with one another (Gottfredson & Moriarty 2006). How well do individual risk factors and risk factors in combination predict violent recidivism? Is there a relationship or association between various risk factors and re-offending, and if so, how strong is the association between them?

The RAST employed by Tasmania Police is used to predict the likelihood of repeat violence based on a total score obtained from the schedule used to assess the offender. Therefore, actuarial techniques for selecting risk factors and measuring their predictive utility are of direct relevance in measuring the predictive utility of the RAST.

3.9 Predictive Validity

It is vital for a test to be valid in order for results to be accurately applied and interpreted. How valid a risk factor or combinations of risk factors are is dependent upon the extent to which it measures what it claims to measure. This is also true in relation to multiple risk factors and assessment tools in general. How well do individual and multiple risk factors reflect and measure intimate partner violence? There are a number of statistical methods and techniques that have been used to answer these questions.

The predictive accuracy of risk assessment tools is a function of the reliability of risk factors used, the methods used to combine risk factors and the reliability of the criterion variable (dependent variable) chosen (Gottfredson & Moriarty 2006). Reliability refers to the stability with which measures can be made. Statistical validity is constrained by the extent to which the criterion (dependent variable) and predictor (independent) measurements are made. Risk assessment tools are dependent upon the quality of the data upon which they are based.

Therefore the standardisation of risk items and the reliability of the instrument in relation to measurement are critical issues. Inter-rater reliability can be used to determine the reliability of the assessment tool being used, especially where scales

are employed to measure a risk factor. The extent to which two independent individuals differ or agree in their respective ratings is an indicator of the inter-rater reliability rate. Within actuarial assessments measurements are either dichotomous or categorical so the rate would be calculated on the extent to which they agree which observation falls into each category. Static risk factors are more easily measured than dynamic risk factors. Dynamic risk factors are more difficult to observe and measure, and can change over time or be present or absent.

Measures of Predictive Accuracy

A number of statistical techniques have been employed to evaluate the validity of violence prediction tools. Several studies have attempted to demonstrate the relative utility of different statistical approaches to prediction problems with none identifying any clear-cut statistical advantage in prediction (Gottfredson & Moriarty 2006, Rosenfel 2005).

In so far as the RAST is concerned there are two main ways to measure predictive validity. These are the development of a model of offending behaviour through logistic regression and the analysis of misclassification rates.
Logistic regression is used to empirically validate risk factors and provide a measure of their effect on re-offending. Misclassification is a statistical term used to describe the distance between the classification and actual behaviour. The analysis of misclassification rates provides a measure of predictive validity based on true positive and true negative rates. Both methods provide an indication of the extent to which any model of re-offending that is developed can be generalised, or the level of confidence that can be placed in the accuracy of a particular screening tool used to differentiate low from high risk individuals.

As an initial exploratory method, Chi Square testing assists in the identification of variables of interest and is commonly used when dealing with nominal or categorical variables. Chi square testing is used to examine potential relationships between two variables (e.g. between a risk factor and repeat violence) and is appropriate for variables with a finite number of values (i.e. nominal or ordinal variables). This test is appropriate for nominal data because it focuses on frequencies in categories (Seigel 1956). Chi square is based on the null hypothesis (i.e. there is no difference between variables; they are independent) and generates a two way table of expected frequencies against observed frequencies. If the fit between the observed and expected frequencies is close (X2 is small), then the two variables are independent; if the difference is large (X2 is large), then the null hypothesis is rejected and it can be concluded that the two variables are related. The value of the chi provides an assessment of the accuracy of the difference; however it tells us nothing about the degree of the relation implied by the effect (Gottfredson & Moriarty 2006; Tabachnik & Fidell 2001). Thus the use of Chi square, while useful for the identification of risk factors of interest in relation to re-offending, does not provide information on the predictive utility of a risk factor.

To assess the strength of the relationship between two variables a measure of association is required such as Kendalls tau and/or Pearsons correlation coefficient. A correlation coefficient measures the degree of association between two variables (e.g. past violence and domestic violence). Simply put, it can be viewed as the likelihood of observing one behaviour (e.g. past violence) with another (e.g. re-

offending). Thus, if the correlation coefficient for past violence and repeat violence is r=.01 it would be concluded that the association or effect is very weak. Conversely, if the correlation coefficient is .08 it would be concluded that the association is very strong. In this case, where family violence occurs there is a very strong likelihood that the use of past violence will be present. Bivariate analysis is useful for both the empirical identification and measurement of the effect of a single risk factor on re-offending. However, outcomes such as re-offending are rarely explained by reference to a single risk factor such as the use of past violence, therefore multivariate techniques are required to more fully predict re-offending.

Model Development

Logistic Regression is often used to evaluate the validity of prediction tools. This technique represents an appropriate approach for evaluating actuarial methods of risk assessment where the expressed purpose of the assessment is to predict violence (Kropp 2004). Prediction is a statistical rather than causal exercise (that is, what causes re-offending) with the latter being both a logical and statistical exercise (Tablich & Finkel 2001). Actuarial methods focus on those factors statistically associated with the behaviour; that is, the odds of it happening, not an explanation of the behaviour (i.e. what leads to it; this is more closely associated with the prevention paradigm).

Logistic regression is a multivariate analytic technique that predicts the likelihood (in the form of an odds ratio) of an event occurring, or membership within a certain group, given the influence of any number of independent or predictor variables (Tabachnick & Fidel 2001).

Unlike bivariate analysis which provides a ‘gross’ measure of association (that is, not controlling for other variables) multiple regression techniques generate a ‘nett’ score based on the interaction of other risk factors contained in the assessment schedule and their relation to each other as well as the dependent variable. In this way it is possible to prioritise characteristics, based on a likelihood score (the odds ratio). Thus it can be said that a particular risk factor increases (or decreases) the likelihood of re-offending, to a greater degree than other characteristics, controlling for the effect of other characteristics. From this procedure albeit is possible to develop a system of weightings for those characteristics, based on their relative likelihood scores.

Logistic regression may assist in the following:

- Identifying which characteristics are the most useful in predicting the likelihood of re-offending.

- Quantifying the relative predictive value of the schedule items, controlling for the effect of others, in relation to the likelihood of repeat violence.

- Developing a system of weightings for each of the identified characteristics based on the above.

- Identifying which items are not useful in predicting re-offending. Providing an overall predictive value for the RAST.

The above procedure provides a model of offending behaviour that identifies all those risk factors that are associated with re-offending. However, an additional concern is the extent to which the model 'explains' the behaviour or membership in the criterion category of interest (i.e. re-offending) and how much is left 'unexplained'. A number of statistics can provide insights into this issue, such as the Cox and Snell R square and the Nagelkerke R square. An additional 'goodness of fit' measure is the Hosmer-Lemeshow statistic.

The Cox and Snell R square and the Nagelkerke R square provide an indication of the 'goodness of fit' of the model developed. These statistics are often referred to as 'pseudo R's' in that they provide a similar measure as the R2 in linear regression models but do not measure the proportion of explained variance by the predictor variables.

The Hosmer-Lemeshow statistic is a chi square-based statistic that tests the hypothesis that the observed data are significantly different from the predicted value computed from the model. Because a model is required that corresponds with the observed values the statistic needs to be non-significant. That is, the model needs to 'fit' the data, not be different. If it is different then it must be concluded that the model developed does not predict what is seen in the 'real world' (the observed values) and therefore there is little value in continuing with the model.

Misclassification

Mulitvariate techniques such as logistic regression provide a model of re-offending by identifying and measuring the effect of risk factors on family violence. Additionally, 'goodness of fit' measures provide an indication of the extent to which the model can be generalised. However, while these measures provide an indication of the accuracy of the model, by providing a statistic regarding the variability explained by the model, they are not a precise measurement. In recent years, the use of misclassification rates has been used to provide a more accurate measure of the predictive utility of assessment tools (Dolan and Doyle 2000).

The usefulness of any assessment tool is its ability to accurately predict future events with a high degree of accuracy. False positives and negatives and the degree of mismatch are the test of assessment tools in terms of their accuracy (JHS 2000). Ultimately the test for RAST is how useful is it at separating those at high risk of re-offending and those who are not.

Misclassification rates are determined by an analysis of true positive and true negative rates, and are directly related to cost benefit analysis. The true positive rate is where the prediction (an individual will re-offend) corresponds with the outcome (the individual does re-offend). Conversely, where an individual is predicted not to re-offend, and does not, this is referred to as a true negative.

Two additional concepts are important in misclassification; these are specificity and sensitivity. Sensitivity is the proportion of positives correctly identified as positive. Specificity is the number of negatives that are correctly identified. There is no such

thing as a perfect prediction (100% specificity and sensitivity) and under normal conditions it is a trade off (a cost benefit) between these two - true negatives against true positives. This trade off is graphically represented using a ROC curve.

Accuracy is measured by the area under the curve (AUC) statistic. The AUC is a measure of discrimination; that is, it measures the ability of the schedule to correctly classify those offenders rated as a high risk and those rated as a low risk of re-offending.

Generally, AUC scores of between .50 and .60 are regarded as poor – the schedule is really no better than chance at discriminating low from high risk individuals; .60 to .70 is modest; .70 to .80 is fair; .80 to .90 is good; and .90 to 1.0 is excellent. Importantly, however, it should be noted that most risk assessment tools in the field of criminal justice have an AUC score of between 0.6 and 0.7 (Andrews & Bonta 2006).

3.10 Conclusion

The ky issue in assessing the validity and reliability of assessment tools lies in the intended purpose of the assessment. This shapes the methods employed to analyse risk. For actuarial or predictive purposes, the main methods and tools of analysis are the use of logistic regression for risk factors selection and ‘goodness of fit’ measures such as R2 or the Hosmer-Lemeshow statistic. More recently, the analysis of misclassification rates and the use of ROC charts have provided a more accurate measure of predictive utility based on an analysis of true positive and true negative rates.

4. Analysis of the RAST: Methodology

4.1 The Schedule

A total of 34 characteristics are contained in the RAST, comprising 18 'high risk' factors and 16 'other' risk factors. The high risk factors score a 3 while 'other' risk factors score a 2. The items contained in the schedule focus on the traits of offender and are identified by the victim. Thus, the victim provides information known to them regarding the offender's history (static variables) and current characteristics (dynamic variables) such as substance abuse and psychological state.

Over half (19) of the characteristics refer to violence either past or present and range from the very specific to the very general (e.g. items 3 [specific violence] and 19 [general violence]). As mentioned above, a score of 3 or 2 is applied for each characteristic depending on whether it has been identified as a 'high' or 'other' risk factor (on the basis of a comprehensive literature review; see TILES 2005). The scores for each risk factor are then tallied to provide a total score which categorises whether the offender is at a low, medium or high risk of re-offending. The RAST along with other factors relevant to the incident and the parties are considered by police, magistrates and judges in determining bail.

4.2 Administration

RAST is administered to the victim by the police officer(s) responding to the incident An officer asks the victim if the offender has engaged in any of the various types of behaviours included in the schedule (e.g. breached court orders, assaulted the victim, threats to harm or kill), or has exhibited any psychological pathology (e.g. suicidal ideation, bizarre, paranoid or delusional behaviour). The RAST is administered by police generally using the RAST Aide Memoire, by asking questions of the victim which are recorded by the officer in a 'yes' or 'no' format. The victim provides information based on their personal knowledge of, and experience with, the alleged offender.

Victim based assessments, suggests the literature, are the most accurate, or most useful in assessing the likelihood of repeat violence, although it must be remembered that victim based predictions are not 100% accurate and are influenced by any number of factors including the victim's past history of violence from present and former partners, level of substance abuse, and the recency of violence (see Cattaneo, Bell, Goodman & Dutton 2007). While official records or information of some characteristics can be obtained by police, such as the criminal history of the alleged offender, other information such as psychological state, stalking, past threats, experience of violence and substance abuse are more likely to be obtained from asking the victim only.

The setting is also important in relation to the quality of information received and it may be that the 'heightened states' (fear and anger) involved in these events may bias any information gained (Rosenfeld, 2004). However, police make a decision to remove an offender from a residence independently of, and typically prior to, the administration of the RAST in order to address issues of risk and safety.

4.3 Analysis

Cohort Selection

A random sample of 1,406 individuals was drawn from records held by Tasmania Police. Non-repeat offenders were defined as those individuals with only one family violence entry on police databases for the period January 2000 – July 2008. Repeat offenders were defined as those individuals who had more than one incident recorded on family violence databases. Thus, there were 767 non-repeat offenders and 639 repeat offenders.

Importantly, the data refers to incidents reported to police only. This does not provide a complete picture of family violence in the community as a whole; nor does it necessarily provide an accurate picture of each individual's offending history as many cases of family violence are unreported. It should be noted that all offenders who are classified by the RAST have already shown a propensity to commit family violence. In previous research, Patten (2003) found that offenders commonly committed numerous acts of violence against their victims prior to victims reporting violence to police. It is possible, then, that some of the non-repeat offenders in the sample have been involved in a family violence incident prior to coming to the attention of police.

The sample was not designed to be representative of the community (it can not be given that the sample comprises individuals who had offended at least once), nor was it designed to provide an indication of the incidence or risk of family violence in the community, as discussed previously. Rather, the primary questions being asked are: What is the difference between repeat offenders and non-repeat offenders (as defined above), if any, in relation to those characteristics, or risk factors, contained in the RAST? and to what extent do these differences contribute toward the likelihood of membership in either group?

4.4 Limitations of the Data

The data received comprised a single RAST score for each individual offender. The following analysis is based on this single score. However, in relation to repeat offenders a score is generated for each individual incident and these scores fluctuate, sometimes radically. Thus, the predictive score obtained (specifically as it relates to repeat offenders) is based on the initial RAST score, not on all scores or the average of all scores. The implications of this in relation to the validity and reliability of the instrument are discussed later in the report.

Additionally, most risk analysis tools tend to classify offenders as either high or low risk. The RAST classifies offenders as at high, medium or low risk of re offending and this has implications in relation to the calculation of misclassification rates (discussed below).

Further, the data comprises those who have offended at least once and those with repeat offences as recorded in police databases (thus the data refers only to reported incidents). For the purposes of this report the proposition (or hypothesis) is that there exist differences between each of these groups in relation to the characteristics contained in the RAST schedule. The main purpose of this report is to test this proposition.

It may be that there are no differences between these groups or that any difference is minimal and to all intents and purposes there is little or no difference between non-repeat offenders and repeat offenders. Because there is no data pertaining to those who have *not offended,* we cannot make any conclusions regarding antecedents to family violence in so far as the characteristics contained in the RAST schedule are concerned.

4.5 Types of Analyses Undertaken

Descriptive/Exploratory

A descriptive analysis of the data was undertaken that provided a 'snapshot' of characteristics for each group as they relate to repeat offending. Additionally, data was explored to identify potential relationships/hypotheses between each of the risk factors and repeat offending.

The primary focus of this stage of the analysis was to identify those variables which provide a useful basis from which to proceed toward the development of a model of repeat offending. That is, the identification of those static and dynamic characteristics which appear associated with repeat offending, and the extent to which they do. Chi square testing was undertaken at this stage of the analysis to identify any significant difference between offender status and each of the risk factors contained in the RAST for inclusion in regression modelling.

Predictive/Multivariate Analysis

While a descriptive analysis may provide interesting insights into the characteristics of repeat offending, it does not provide a model of repeat offending and thus does not identify those factors which might explain or account for membership in that group.

To measure the strength of the relationship between risk factors and repeat offending, correlation coefficients were generated to provide an indication of the bivariate relationship (not accounting for the effect of other predictor variables) between repeat offending and the risk factors contained in the schedule.

Logistic regression (as described above) was undertaken to identify those risk factors which had a significant impact on repeat offending, controlling for the effect of other predictor variables, as well as providing a likelihood score in the form of an odds ratio for each significant predictor variable.

A Hosmer Lemeshow test was undertaken to provide a goodness of fit measure for the final model, which indicates the extent to which the model generated 'fits' with the data, or how well the derived model reflects the data.

A ROC Curve was also generated with an AUC (Area under the curve) score to provide an indication of the predictive utility of both the final model (significant risk factors) and the present system of scoring used in the RAST.

4.6 Statistical Testing

Whenever the term significant difference is used in this report it refers to a statistically significant difference between observations or groups. Statistical testing of data is undertaken to determine if any observed differences between observations or groups are genuine – that is they are not random or spurious, or due to sampling error.

The type of test employed is dependent on the type of variable(s) being analysed. In those cases where descriptive analyses are undertaken chi square testing was employed to ascertain differences between variables and 'z' scores used to ascertain differences between groupings (e.g. low repeat offenders and non-repeat offenders)

Testing was undertaken at the 95% confidence level. This means there is an assurance that the results fall within +/- 5% of the true value. Additionally, testing was undertaken at the .05 level of significance meaning that there is a less than 1 in 20 chance of any observed difference being spurious or random. In some cases the total 'n' is low. In these instances results should be treated with caution.

5. Analysis of the RAST: Results

5.1 Sample Description

The sample consisted of a total of 1 406 individuals comprising 767 non-repeat offenders and 639 repeat offenders.

All individuals had at least one episode of family violence; therefore the analysis is measuring the difference between non-repeat offenders and repeat offenders in relation to those characteristics in the RAST schedule. The analysis is not measuring the incidence or likelihood of family violence in the general community (i.e. violent recidivism), or those characteristics which predict first time offending.

5.2 Risk Factors and Offence Status

All 34 risk factors contained in the RAST were cross tabulated with offender status (repeat offender/non-repeat offender) to identify any significant relationship between predictor variables and offender status, as well as differences between each category of offender. High risk factors were analysed separately from 'other' risk factors at this stage of the analysis.

Table 3: High Risk Factors for Repeat Offending

	Repeat Offender NO %	Repeat Offender 2 YES%
Breach	18.64	53.68
Separation	27.12	33.02
Assault	48.50	39.91
Assault – past	62.19	72.30
Stalked	14.60	22.22
Sex Assault Arrest	1.30	2.97
Bizarre, paranoid or delusional behaviour	33.38	40.38
Firearms	14.08	9.39

Of the 18 high risk characteristics contained in the RAST, the eight listed above were significantly related to re-offending (see Appendix A for a full description of each risk factor). What is initially obvious is that no single characteristic is exclusive to any group, with both repeat offenders and non-repeat offenders sharing some characteristics. Thus, while it can be suggested that some characteristics are more prevalent for repeat offenders, they are not exclusive or predominant to either group. Because the observed differences between each group are not pronounced this has a negative effect on the predictive utility of the schedule; there is little difference between the groups in relation to these risk factors.

However, in relation to breaching provision orders, 54% of repeat offenders had breached protective orders compared to 19% of non-repeat offenders. This is a significant and substantial difference between each group (35 percentage points),

and is highly indicative of a strong relationship between repeat offending and breach of a protective order.

Of further interest is the difference between offenders and repeat offenders in relation to assaulting their partner in the most recent incident. Forty percent of repeat offenders had assaulted their partner in the most recent incident, compared to 49% of non-repeat offenders. Thus, there appears to be an inverse relationship between repeat offending and recent assault (Rosenfeld, 2004). Non-repeat offenders appear more likely to have assaulted their partner in the most recent episode than repeat offenders, although it must be remembered that this difference is not exclusive – a large proportion of both groups (between 40% and 49%) have assaulted their partner in the most recent incident - yet the difference between each is statistically significant.

Repeat offenders were over-represented in past assaults when compared with non-repeat offenders. Thus, while repeat offenders are over-represented in past assaults it may not be case that they will have assaulted their partner in the most recent incident, as per the above result. This may be due to the existence of a protective order, where physical access to the victim may be restrained but where a protective order may be breached as the offender has contacted the victim by some other means such as phone or text message.

Table 4: High Risk Predictors of Repeat Offending

	RO	Breach	Separation	Assault	Past Assault	Stalked	Sex Assault Arrest	Bizarre	Firearms
RO	1.000								
Breach	0.367	1.000							
Separation	0.064	0.056	1.000						
Assault	-0.086	-0.156	-0.118	1.000					
Assault – past	0.107	0.157	0.070	0.162	1.000				
Stalked	0.099	0.172	0.042	-0.127	0.052	1.000			
Sex Assault Arrest	0.058	0.031	0.070	0.001	-0.004	0.036	1.000		
Bizarre, paranoid or delusional	0.072	0.063	0.064	-0.102	0.065	0.216	-0.006	1.000	
Firearms	-0.072	0.027	0.009	0.027	0.064	0.129	0.039	0.098	1.000

The above table displays the bivariate measures of association for each of those high risk factors identified as being significantly related to repeat offending.

Breaching protective orders correlates strongly with repeat offending (r=.367) while the other risk factors have minor to moderate levels of association. This is primarily because the risk factors are related to each other as well as being related to repeat offending, effectively diluting the effect of each independently on repeat offending.

Thus, while past assaults is correlated with repeat offending (r=.107), it is more strongly correlated with recent breaching (r= .157) and recent assault (r= .162), suggesting a stronger relationship between these two risk factors than repeat offending, notwithstanding however that breaching is strongly correlated to repeat

offending. Additionally, while stalking exhibits a minor direct relationship with repeat offending (r= .099), it exhibits a stronger relationship with breaching (r=. 172). Thus, it would appear that in so far as predictors of repeat offending are concerned, breaching is the strongest predictor of repeat violence with past and recent assaults, and stalking being predictive of breach of protective orders.

Thus, those who have a history of assault are more likely to have breached a protective order and if a breach is committed then there is an even stronger likelihood of repeat offending.

Additionally, there exists a minor inverse relationship between assault in the most recent episode (r= -.086) and repeat offending, which is also inversely related to the breach of protective orders (r= -.156) and stalking (r=- .127). These results suggesting that those who have assaulted in the most recent incident are less likely to be repeat offenders and also less likely to breach protective orders or stalk. However, while the relationship between these risk predictors and repeat offending are statistically significant, the relationships are not strong, so care must be taken in the emphasis placed on these relationships – the association exists but it is not strong.

A similar inverse relationship exists between gun ownership and repeat offending (r=-.072), which is small in effect, suggesting that repeat offenders are less likely to have access to firearms. The proportion of repeat offenders who have reduced access to firearms may be explained by the removal of firearms by police from offenders at the first incident of family violence. Offenders subject to a PFVO have their firearms licence cancelled while offenders subject to a FVO have their firearms licence suspended. Interestingly, while access to firearms is inversely related to repeat offending it is positively correlated to stalking (r=.129), meaning that those defined as stalkers are more likely to have access to firearms than those who are not.

5.3 Other Risk Characteristics

Table 5: Other Risk Factors

	Repeat Offender NO %	Repeat Offender YES%
Past threats	32.86	43.51
Jealousy	67.01	78.56
Any violence	40.81	51.02
Depression	31.16	25.04
Afraid	41.33	49.95
Alcohol	42.24	48.36
Unemployed	48.50	55.56

Of the original 16 ‘other’ risk factors contained in the RAST, the above factors were significantly related to re offending. Again, it is possible to see that no single risk factor is predominant or exclusive to either group, with both non-repeat and repeat offenders displaying ‘relatively’ similar proportions for each characteristic.

However, there are risk factors in which repeat offenders are significantly over represented. Repeat offenders (44%) exhibit a significantly greater proportion of those who made past threats than non-repeat offenders (33%). Additionally repeat

offenders (79%) are over represented as being jealous when compared with non-repeat offenders (67%) and also with regard to using any violence against persons in the past than non-repeat offenders (51% repeat offenders; 41% non-repeat offenders). Problem alcohol use is also more prevalent in the repeat offender group than the non-repeat offender group, as is unemployment.

Table 6: Other Risk Factors of Repeat Offending

	RO	Past Threats	Jealousy	Any Violence	Depression	Alcohol	Unemployed
RO	1.000						
Past Threats	0.109	1.000					
Jealousy	0.128	0.171	1.000				
Any Violence	0.102	0.245	0.167	1.000			
Depression	-0.068	0.087	0.112	0.031	1.000		
Alcohol	0.061	0.110	0.133	0.144	0.074	1.000	
Unemployed	0.070	0.076	-0.033	0.107	0.087	-0.004	1.000

All risk factors exhibit small to moderate effect on repeat offending. Jealousy has the strongest association (r=0.128) to repeat offending but has a larger association with past threats (r=.171) which is also moderately related to repeat offending (r=.109). The use of any violence while being correlated albeit moderately, to repeat offending (r=.102), is more closely related to past threats (r=.245) and to jealousy (r=.167). Thus, the data appears to describe a dynamic where risk factors are interrelated, each having an effect on the other as well as re-offending. Use of any violence, past threats fuelled by jealousy may be *in toto* a stronger predictor of repeat offending than each *in solo*.

5.4 Model of Repeat Offending

The following are the results of a logistic regression analysis undertaken to model repeat offending utilising those risk factors identified above as significantly correlated to repeat offending. A forward step wise regression was undertaken of the data. Stepwise regression is the most parsimonious of the entry methods available and is especially useful for prediction (Tabachnick & Fidell, 2005).

Table 7: Risk Factors and Re-offending

						95% C.I. for Exp(b)	
Risk Factors	B	S.E	Wald	Sig.	Exp(B)	Lower	Upper
Breach	1.611	0.126	164.449	0.000	5.009	3.916	6.407
Firearms	-0.769	0.191	16.166	0.000	0.463	0.318	0.674
Past Threats	0.288	0.125	5.307	0.021	1.334	1.044	1.703
Jealousy	0.615	0.136	20.381	0.000	1.849	1.416	2.415
Depression	-0.438	0.133	10.911	0.001	0.645	0.498	0.837
Constant	-1.089	0.127	73.328	0.000	0.337		

The main interest in the table above is the Exp(B) score. This figure represents the likelihood, expressed as an odds ratio, of repeat offending for each of the risk factors listed, controlling for the effect of the other variables, or taking them and their effect on re-offending into account.

Of those variables listed, breaching protective orders exhibits by far the greatest likelihood of repeat offending and dominates the overall model. Thus, those offenders who have breached protective orders are five times more likely to repeat their offending than those who have not breached an order.

An offender who exhibits jealous or obsessive behaviour is 1.8 times more likely to re-offend than an offender who does not exhibit the behaviour. Additionally, an offender who has made threats in the past is 1.3 times more likely to re-offend than one who has not made threats in the past.

Both depression and access to firearms are inversely related to repeat offending. Thus, those offenders who are depressed are 35% less likely to re-offend than those who are not depressed, while those with access to firearms are 54% less likely to re-offend than those who do not have access to firearms.

Because breaching protective orders had such a strong influence on the model, an additional model was generated removing breaching, in order to identify risk factors that had been excluded from the model because of the strong effect of breaching protective orders.

Table 8: Risk Factors and Re-offending - Excluding Breach of Court Order

						95% C.I. for Exp(b)	
Risk Factors	B	S.E	Wald	Sig.	Exp(B)	Lower	Upper
Assault	-0.369	0.115	10.323	0.001	0.691	0.552	0.866
Past Assault	0.412	0.126	10.746	0.001	1.509	1.180	1.930
Stalked	0.423	0.150	7.924	0.005	1.527	1.137	2.050
Firearms	-0.709	0.180	15.413	0.000	0.492	0.346	0.701
Past Threats	0.324	0.122	7.083	0.008	1.383	1.089	1.756
Jealousy	0.513	0.131	15.328	0.000	1.671	1.292	2.161
Depression	-0.515	0.127	16.511	0.000	0.597	0.466	0.766
Unemployed	0.329	0.112	8.588	0.003	1.390	1.115	1.732
Constant	-0.817	0.151	29.285	0.000	0.442		

As can be seen in the above table, once breaching protective orders are excluded from the analysis a number of other risk factors appear along with the original risk factors in Table 6 above. These additional risk factors are past assaults, stalking and unemployment. An individual who has assaulted in the past is 1.5 times more likely to re-offend than those who have not assaulted in the past. A similar picture emerges for stalking, with these individuals also being 1.5 times more likely to re-offend than those who have not stalked their partners. Additionally, those who are currently experiencing unemployment are 1.4 times more likely to re-offend than those who are employed. However, those who have assaulted their partner in the most recent incident are 30% less likely to be repeat offenders.

Breaching Protective Orders

Because breaching protective orders was strongly correlated to repeat offending, it was employed as the dependent variable in order to identify those risk factors which increased the likelihood of breaching an order. This was undertaken to provide an enhanced picture of repeat offending, especially in regard to additional risk factors,

which may have been less evident, or forced out of the model, because of the strong effect of breaching protective orders.

Table 9: Risk Factors and Breaching Court Order

						95% C.I. for Exp(b)	
Risk Factors	B	S.E	Wald	Sig.	Exp(B)	Lower	Upper
Assault	-0.665	0.127	27.342	0.000	0.514	0.401	0.660
Past Assault	0.626	0.142	19.387	0.000	1.870	1.415	2.470
Escalation	-0.425	0.126	11.354	0.001	0.654	0.510	0.837
Stalked	0.637	0.152	17.615	0.000	1.891	1.404	2.546
Past Threats	0.338	0.128	6.925	0.009	1.402	1.090	1.803
Any Violence	0.664	0.125	28.031	0.000	1.943	1.519	2.484
Unemployed	0.341	0.121	7.903	0.005	1.406	1.109	1.783
Constant	-1.386	0.148	88.117	0.000	0.250		

When examining those characteristics that may define breaching protective orders then a similar picture emerges in relation to risk factors for re-offending. As with the above tables, assault in the most recent incident is inversely related to breaching protective orders (.514), meaning that those who have assaulted in the most recent incident are less likely to breach protective orders than those who have not. This suggests that non-repeat offenders are the group more likely to have committed a recent assault rather than repeat offenders. This may be explained by the fact that the offending behaviour of ‘first timers’ may be restrained by police intervention to enhance the safety of the victim. It follows that this may therefore decrease the opportunity for offenders to assault the victim in subsequent incidents.

Further, those who have assaulted in the past are 1.9 times more likely to breach protective orders than those who have not assaulted in the past. Stalking also figures prominently in breaching provision orders with these individuals also being 1.9 times more likely to have breached than those who have not stalked.

Conclusions

Of the 34 risk factors contained in the RAST, 18 were significantly related to offender status. While the repeat offender group was over represented in a number of risk factors relative to the non-offender group, the distinction was not large as exhibited by the proportional distribution of each and the relatively low association scores between each of the risk factors and repeat offending. However, a number of risk factors were ‘common’ throughout. Breaching protective orders was an obvious and strong predictor of repeat violence along with jealousy and past threats. However, the model for breaching protective orders also shows that stalking is not only a significant factor in breaching but also repeat offending. Jealousy appears to be a major motivator for a number of other factors such as past threats and stalking, as well as its direct effect on re-offending.

What is apparent from the analysis is that each of these risk factors does not operate in isolation from each other or have a direct effect on repeat offending. Rather the analyses undertaken indicate a complex dynamic operating between risk factors, each having an effect not only on each other but also on breaching and repeat offending.

5.5 Misclassification

Overall Risk Score

The above analysis identified those characteristics which increase or decrease the likelihood of repeat offending and from these characteristics a model of re-offending was developed. Below is the analysis of the scoring system employed in the RAST (to identify high, medium and low risk offenders) using misclassification rates as a measure of the predictive utility of the current measurement system.

Misclassification is a statistical term used to describe the lack of fit between the classification and actual behaviour and is part of ROC Curves, which are currently the most accurate method of testing predictive utility.

Figures 3 and 4 display the frequency distribution for overall scores for sections A and B of the schedule for both repeat and non-repeat offender groups.

Figure 4: Non-repeat Offenders - Distribution of Scores

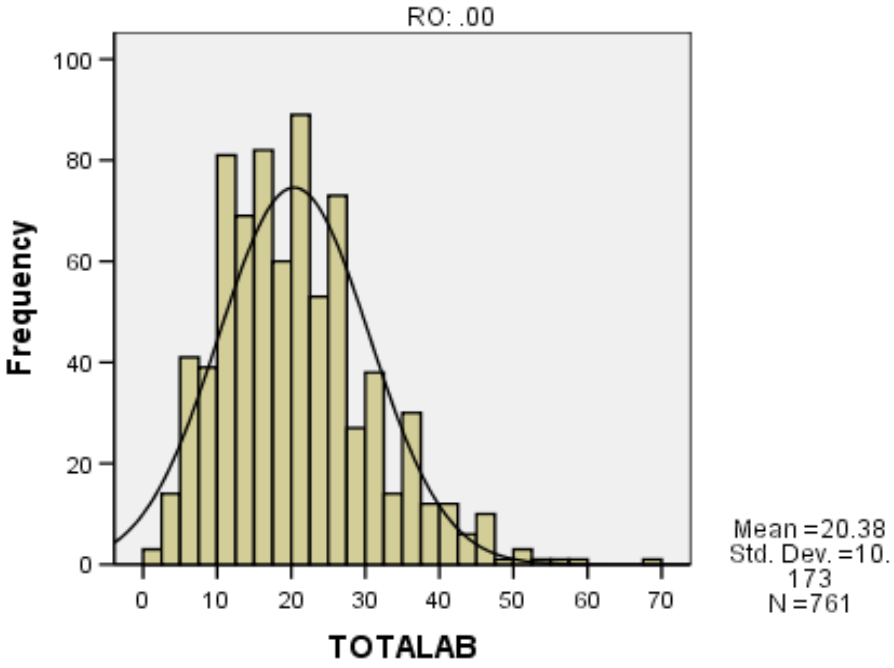
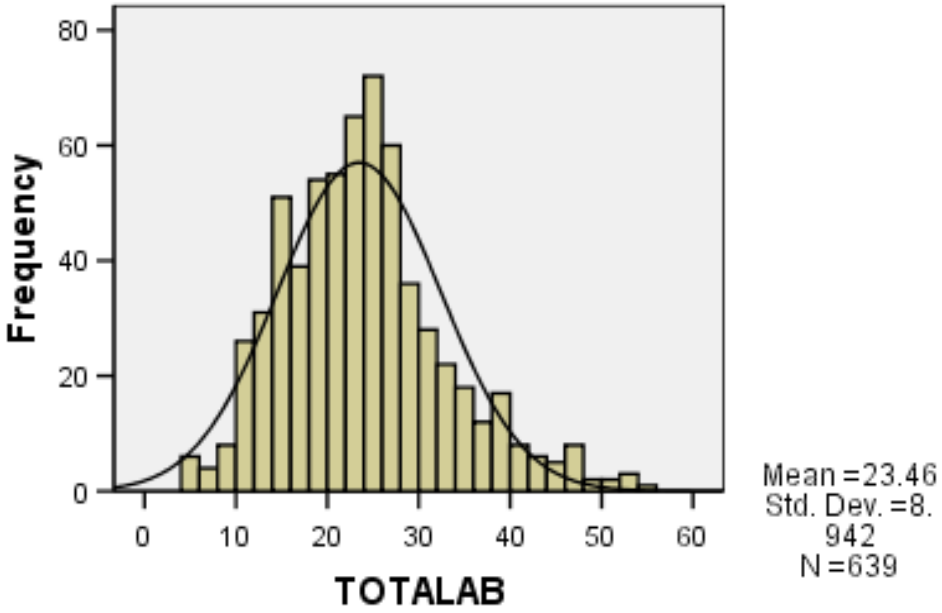


Figure 5: Repeat Offenders – Distribution of Scores



The above tables suggest that re-offenders and offenders do not differ significantly from one another in relation to the distribution of scores along the RAST scale. That is, the distribution curves for each are very similar, suggesting little difference between them in relation to the current method of scoring. The figures above are both normally distributed which is not the desired distribution for a clear classification of cases as either at high or low risk of re-offending. Ideally, the distribution should be bimodal, with a 'clear' distinction being evident between each group relative to their overall score; that is, a clear differentiation between low and high risk groups in relation to risk factors. Ideally scores should have been at either one end of the scale or the other, not congregating in the middle.

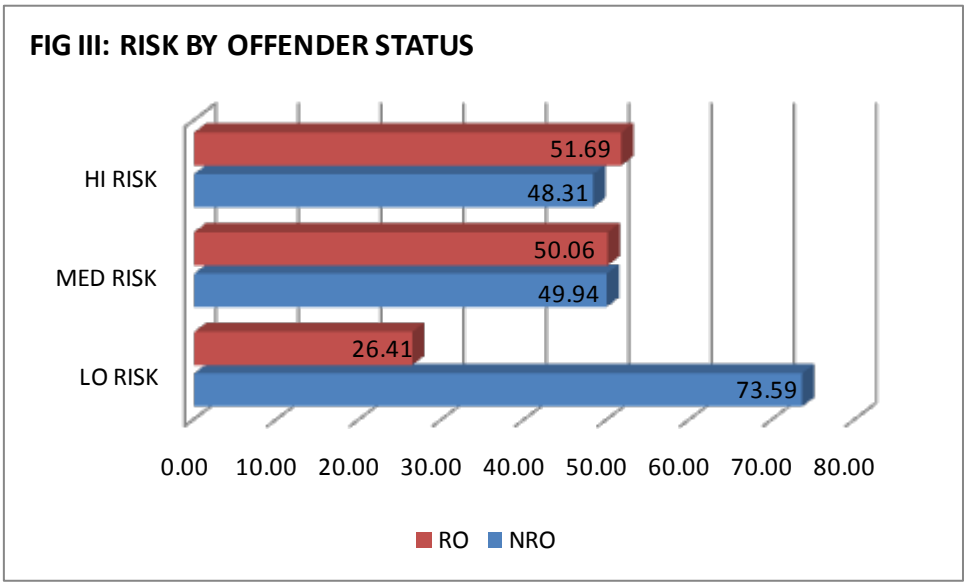
For the non-repeat offender category the mean score was 20.38 (std dev 10.17) compared to 23.46 (std dev 8.9) for the repeat offender group – a statistically significant difference between each. The standard deviation for each group differs by about 1 point, suggesting little difference in the distribution of scores for each group.

Two-thirds of all non-repeat offenders scored between 10.21 and 30.51, while for repeat offenders the range was from 14.7 to 32.36. Thus, while the average score for repeat offenders was statistically higher than that for non-repeat offenders, there is a large overlap in scores, meaning a large proportion of offenders and repeat offenders share scores. Therefore, clear distinctions between each group are difficult, and this results in a high rate of misclassification in the medium and high risk category.

High, Medium, and Low Risk Groups

As can be seen in the above figures, a very large proportion of each group were classified as at medium risk of re-offending (52% of non-repeat offenders and 62% or repeat offenders). A significantly larger proportion of non-repeat offenders (27%) were classified as low risk compared to repeat offenders (12%), while 20% of non-repeat offenders and 26% of repeat offenders were classified as high risk.

Figure 6: Misclassification Rates



The figure above shows the proportion of those defined as at either low, medium or high risk of re-offending and whether they were non-repeat or repeat offenders. Thus, 74% of those who were classified as low risk did not re-offend compared to 26% of the repeat offender group, a sizeable and significant difference, suggesting that RAST appears good at identifying low risk offenders.

However, in relation to those classified as at medium or high risk of re-offending the difference between offending groups is not large, particularly for the medium risk category. Approximately 50% of both groups (offenders and repeat offenders) were classified as medium risk, suggesting no greater likelihood than chance of predicting repeat offending. A similar picture emerges for the high risk category, where 48% of non-repeat offenders were classified as high risk compared to 53% of repeat offenders. Using these figures, those classified as high risk were as likely to be non-offenders as offenders. This suggests that the category of 'high risk' is not useful in predicting re-offending.

In interpreting these results, it should be noted that re-offending behaviour may be influenced by the level and type of police or judicial intervention following the initial incident, such as offender detention or victim relocation. Whilst this intervention is critical and may have a direct effect on re-offending it is not being examined in this research.

The level and type of police intervention is determined by a range of factors including the severity of the incident, history of the relationship and RAST score. Typically, a higher level of risk would lead to a higher level of intervention to address victim safety and reduce the likelihood and opportunity of re-offending.

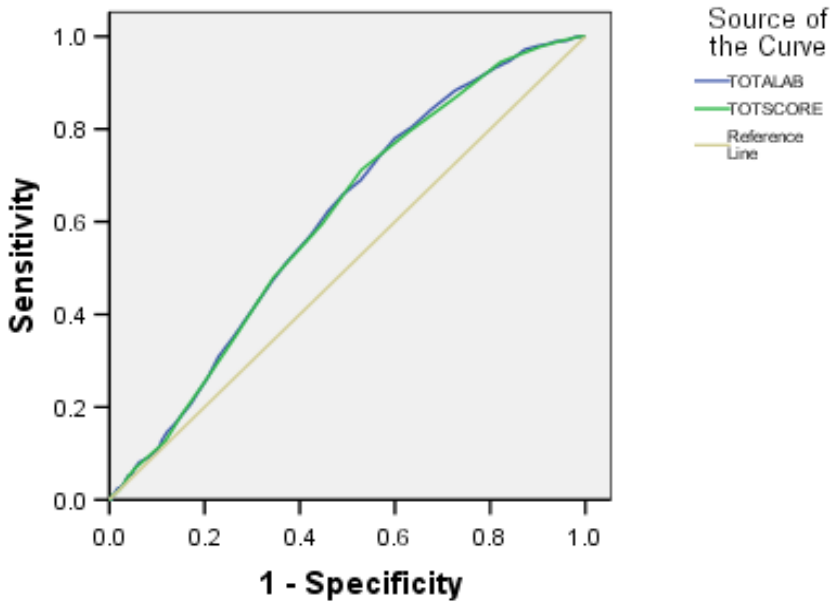
While the methods of analysis adopted in this report do not include data on police intervention, one possible interpretation of Figure 5 (above) is that for low risk offenders police intervention is successful 74% of the time, with only 26% going on to commit another family violence incident. For the high risk group, 52% of offenders go on to re-offend despite police intervention while for the medium offender group police intervention is effective 50% of the time.

5.6 Misclassification Rates

Misclassification rates are measured by analysing the false positive and false negative rates for a sample and provides an overall predictive score for those risk factors contained within the assessment schedule. This is expressed diagrammatically as a ROC Curve with an accompanying predictive score known as the "Area under the Curve" (AUC) statistic, which provides an indication of the predictive accuracy of the assessment schedule. The analysis of misclassification is the most recent and accurate method for measuring the predictive utility of actuarial tools.

The ROC curve (and the AUC statistic) is computed via the analysis of false positives (where an individual is classified as high risk and does not re-offend) and false negatives (where a person is deemed low risk yet re-offends). In a situation where there are no false positives and no false negatives the AUC score would be one (1.00), a perfect prediction. Where there are mismatches the AUC score reduces, thus if half the sample were false positives or false negatives the AUC score would be 0.5 (the reference or base line), representing chance, therefore no predictive utility.

Figure 7: Roc Curve - RAST Score

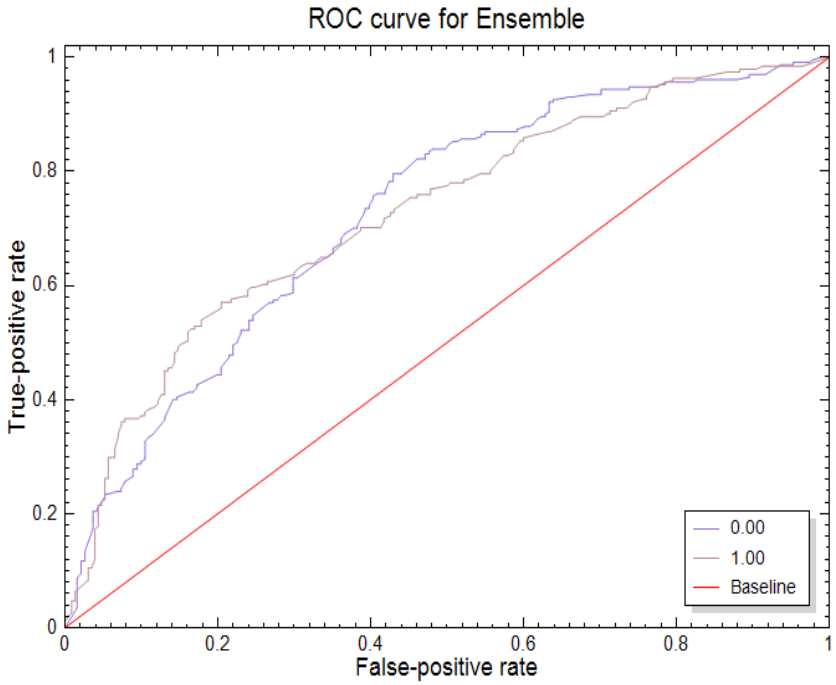


The above chart presents the predictive utility of the scoring system used in RAST to identify repeat offenders. The single diagonal line represents chance, or no predictive utility, the area under the curve (AUC) is the extent to which the scoring system is correct (or better than chance) in predicting re-offending. The AUC score for the total risk score (TotalAB) was .602, meaning that the scoring system employed is correct 60% of the time, or 10 percentage points better than chance, representing modest predictive utility.

ROC Curve - Model Items

Those risk factors included in the model of re-offending were also analysed to see if these risk factors were any better at predicting repeat violence than the current weighting system. These results are presented below.

Figure 8: ROC Curve – Model Items



The AUC Score for the above ROC Curve is.726, suggesting those risk items previously identified from modelling risk are correct 72% of the time in defining membership in the repeat offender category. Thus, the risk factors identified are *in toto* correct approximately seven out of ten times at predicting repeat offending, a significant improvement on the overall RAST score of .602. What the above also reflects is the multivariate nature of the problem, where a combination of risk factors are better predictors of repeat offending rather than a single risk factor or summative score.

Importance Ratings

As indicated above, no single risk factor can accurately predict repeat offending with any great success. Risk factors impact at varying rates; however, while one factor may predict repeat offending by a significant extent (e.g. breaching protective orders), the introduction of other risk factors, while not having any great individual effect, can have a cumulative effect when combined with one or numerous other factors (see results below). Thus, some risk factors, when combined, can have a more dramatic effect on the likelihood of repeat offending than on their own.

Figure 9: Risk Items – Importance

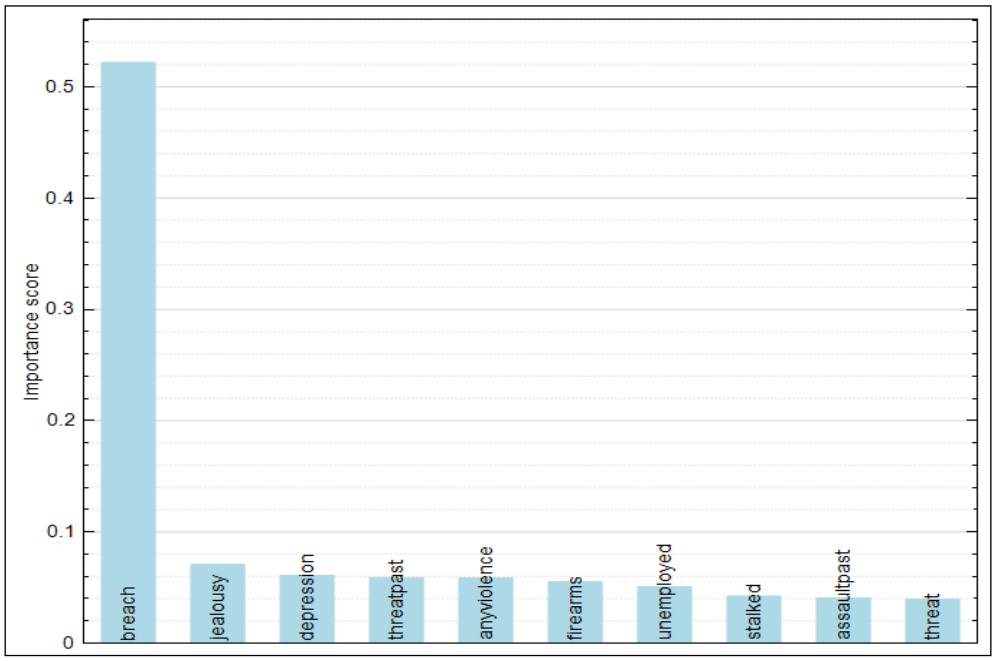


Figure 8 presents the main risk factors associated with repeat offending and their relative importance to predicting repeat offending. As can be seen, breaching protective orders is by far the most significant risk factor in repeat offending, scoring just over 5 on a scale of 10, with the remainder having minor importance compared to this factor.

However, this factor alone does not demonstrate a complete picture. While breaching protective orders is in itself the most important indicator in relation to repeat offending (with a 68% likelihood of repeat offending for those in this group), if other risk factors are added to breaching protective orders the likelihood of repeat offending increases – there is a cumulative effect. Thus, if 'breaching' is combined with stalking, the likelihood of repeat offending increases from 65% to 71%; and, when breaching is combined with jealousy the risk of re-offence increases to 76% for those offenders who exhibit both these characteristics.

Chapter 6 – Conclusion

Overview of current project

The Risk Assessment Screening Tool (RAST) is used by Tasmania Police in family violence situations to assess the likelihood of an individual reoffending. This review of the RAST involved an analysis of incidents in which the RAST was used. The overall objective was to assess the validity and reliability of the RAST with respect to the Tasmanian population.

As noted in Chapter 1, previous research undertaken by TILES regarding the RAST concluded that 'the instrument is as robust as similar instruments employed nationally and internationally. It has the strengths of being developed on the basis of a thorough review of on-scene assessments in other jurisdictions, is informed by an analysis of cases of family violence in Tasmania, and it has been designed specifically for the Tasmanian context' (TILES, 2005: 6).

However, it was also noted that the validity and reliability of the RAST could not be determined on the basis of the data available at the time of that earlier review (TILES, 2005: 6) and the following recommendation was made:

That a longitudinal analysis be undertaken of incidents in which the RAST is used, in order to determine:

- which items have the greatest predictive value;
- the validity of the instrument with respect to the Tasmanian population; and
- the reliability of the RAST.

The current project addressed this recommendation. It explored the use and predictive utility of risk assessment and screening tools in predicting violent recidivism among family violence offenders, utilising data obtained from Tasmania Police as part of the *Safe at Home* initiative. This involved a wholly quantitative approach to risk assessment; it used multivariate techniques to quantify the predictive power of the current tool.

Data

Two sets of data were used in this analysis of the RAST.

The first data set comprised 5,721 instances of family violence over a two year period from 2005 to 2007, committed by 3,320 de-identified individuals. Data on each incident included age and sex of offender and victim as well as their relationship status, number of children and if they were present at the time of the offence. Additionally, threats, injuries sustained and any treatment received was also recorded together with the individual RAST score for each incident.

A descriptive analysis was undertaken of this data to provide a general description of offenders and offences (e.g. number of offences, marital status, threats used, violence perpetrated).

In the second data set, a random sample of 1,406 individuals was drawn from electronic databases held by Tasmania Police. Non-repeat offenders were defined as those individuals with only one family violence entry on the databases for the period January 2000 – July 2008. Repeat offenders were defined as those individuals who had more than one incident recorded on family violence databases. There were 767 non-repeat offenders and 639 repeat offenders.

Importantly, the data has some inherent limitations. Of greatest significance is the fact that the data refers to family violence incidents reported to police only. This does not provide a complete picture of family violence in the community as a whole; nor may it necessarily provide an accurate picture of an individual's family violence history as incidents may remain unreported to police. Furthermore, it should be noted that, according to the definition used in this analysis, an 'offender' may not have been and may never be convicted of a family violence offence.

Descriptive analysis of the data

Initially, a descriptive analysis was undertaken of the first set of data to examine how RAST scores related to family violence incidents.

In this analysis, significant differences emerged in relation to threats and RAST scores. Thus, the RAST score for those who made threats towards victims was significantly higher than those who did not make threats. Those who made threats scored an average of 26 compared to an average of 21 for those who did not make threats. Further, victims who received injuries scored significantly higher on the RAST than those who did not. Thus, where a victim received an injury, the RAST scored an average of 25 compared to a score of 21 for those who had not received an injury. Additionally, the RAST score for offenders who used a weapon was significantly higher than for those who did not. Thus, the average RAST score for those who used a weapon was 27 compared to a score of 22 for those who did not use a weapon. Overall, the rate of weapon use was low with a weapon being used in 6% of all occurrences of family violence.

Furthermore, there exists a significant relationship between the number of incidents reported and the RAST score. Thus, the greater the number of incidents of family violence the greater the likelihood of a high RAST score and the more episodes of violence a victim experiences the greater the likelihood the offender will score 'high' on the RAST. Additionally, making threats also increases the likelihood of a high RAST score, as does injuries received by the victim, although the effect is not large in this case.

The number of incidents committed was not related to threats being made and was inversely related to injuries received by the victim. This means that the more incidents of family violence committed by the offender, the less likely the victim is to receive an injury, although it must be noted that although this relationship exists, it is not strong. Additionally, injuries received by the victim are not related to threats.

Thus, even though threats may be made they do not appear to always result in physical injury.

The use of firearms by the offender correlated to an increased RAST score, although the relationship was not strong. Firearms use was also inversely related to the number of offences committed, but again the relationship is not strong. Firearms use is also correlated to threats being made and is also positively related to injuries received.

In summary, the RAST score is affected by the number of incidents of family violence as well as the use of threats and violence (specifically where the victim sustains injuries). Threats do not necessarily lead to injury nor is injury preceded by the threat of physical violence; nor is the likelihood of injury related to the number of offences committed. This suggests that it may be difficult to predict when physical violence is likely to occur.

High Risk Factors for Repeat Offending

The second data set was analysed to examine the risk of re-offending and to determine the predictive validity of the RAST.

All 34 risk factors contained in the RAST were cross-tabulated with offender status (repeat offender/non-repeat offender) to identify any significant relationship between predictor variables and offender status, as well as differences between each category of offender. High risk factors were analysed separately from 'other' risk factors at this stage of the analysis.

Table 10: Risk Factors for Repeat Offending

	Repeat Offender NO%	Repeat Offender 2 YES%
Breach	18.64	53.68
Separation	27.12	33.02
Assault	48.50	39.91
Assault – past	62.19	72.30
Stalked	14.60	22.22
Sex Assault Arrest	1.30	2.97
Bizarre, paranoid or delusional behaviour	33.38	40.38
Firearms	14.08	9.39

Of the 18 high risk characteristics contained in the RAST, the eight listed above were significantly related to re-offending (see Appendix A for a full description of each risk factor). What is initially apparent is that no single characteristic is exclusive to any group, with both repeat offenders and non-repeat offenders sharing specific characteristics. Thus, whilst it can be suggested that some characteristics are more prevalent among repeat offenders, they are not exclusive to, nor predominant in, either group. Because the observed differences between each group are not pronounced, this has a negative effect on the predictive utility of the schedule; there is little apparent difference between the repeat and non-repeat offender groups in relation to these risk factors.

Other Risk Factors

Analysis was then undertaken of the 'other' risk characteristics in the RAST schedule.

Table 11: Other Risk Factors

	Repeat Offender NO %	Repeat Offender YES %
Past threats	32.86	43.51
Jealousy	67.01	78.56
Any violence	40.81	51.02
Depression	31.16	25.04
Afraid	41.33	49.95
Alcohol	42.24	48.36
Unemployed	48.50	55.56

Of the original 16 'other' risk factors contained in the RAST, the above factors were significantly related to re-offending. Again, it is apparent that no single risk factor is predominant or exclusive to either group, with both non-repeat and repeat offenders displaying 'relatively' similar proportions for each characteristic.

However, there are risk factors in which repeat offenders are significantly over represented. Repeat offenders (44%) exhibit a significantly greater proportion of those who made past threats than non-repeat offenders (33%). Additionally, repeat offenders (79%) are over represented as being jealous when compared with non-repeat offenders (67%); and, with regard to using any violence against persons in the past than non-repeat offenders (51% repeat offenders; 41% non-repeat offenders). Alcohol problems and unemployment are also more prevalent in the repeat offender group than the non-repeat offender group.

In summary, of the 34 risk factors contained in the RAST, 18 were significantly related to offender status, and while the repeat offender group was over-represented in a number of risk factors relative to the non-offender group, the distinction was not large. What is apparent from the analysis is that each of these risk factors does not operate in isolation from the others nor does each one have a direct effect on repeat offending. Rather, the analyses undertaken indicate a complex dynamic operating between risk factors.

Predictive utility of the RAST

The RAST is an actuarial assessment tool used to classify offenders according to the score they receive, which is based on the type and number of characteristics they exhibit. In so far as the RAST is concerned there are two main ways to measure predictive validity: these are the development of a model of offending behaviour through logistic regression and the analysis of misclassification rates.

Logistic regression is used to empirically validate risk factors and provide a measure of their effect on re-offending (as discussed above). The analysis of misclassification rates provides a measure of predictive validity based on true positive and true negative rates. Both methods provide an indication of the extent to which it is

possible to generalise any model of re-offending developed, or the degree of confidence that can be placed in the accuracy of a particular screening tool used to differentiate low from high risk individuals.

Misclassification rates are measured by analysing the false positive and false negative rates for a sample and provide an overall predictive score for those risk factors contained within the assessment schedule. This is expressed diagrammatically as a ROC Curve with an accompanying predictive score known as the "Area under the Curve" (AUC) statistic, which provides an indication of the predictive accuracy of the assessment schedule. The analysis of misclassification is the most recent and accurate method for measuring the predictive utility of actuarial tools.

Accuracy is measured by the area under the curve (AUC) statistic. The AUC is a measure of discrimination; that is, the ability of the schedule to correctly classify those rated as a high risk and those rated as a low risk.

As a rough guide, AUC scores of between .50 and .60 are regarded as failures – the schedule is really no better than chance at discriminating low from high risk individuals; .60 to .70 is modest; .70 to .80 is fair; .80 to .90 is good; and .90 to 1.0 is excellent. Importantly, however, it should be noted that most risk assessment tools in the field of criminal justice have an AUC score of between 0.6 and 0.7 (Andrews & Bonta 2006).

In the current study, the analysis of the RAST revealed an AUC score for the total risk score (i.e. for all items on the schedule) of .602, meaning that the scoring system employed is correct 60% of the time and incorrect 40% of the time, representing modest predictive utility.

Further analysis was undertaken using those risk factors identified by the logistic regression model as significantly related to re-offending. Those risk factors included in the model of re-offending were analysed to see if these risk factors were any better at predicting repeat violence than the existing weighting system.

In this analysis, the AUC Score is .726, suggesting that those risk items previously identified from modelling risk are correct 72% of the time in defining membership in the repeat offender category. Thus, the risk factors identified in the model are *in toto* correct approximately seven out of ten times at predicting repeat offending. This is a significant improvement on the overall RAST predictive utility score of .602. This also reflects the multivariate nature of the issue, where a combination of risk factors are better predictors of repeat offending rather than a single risk factor or summative score.

In summary, whilst the current scoring system employed has modest predictive utility (AUC .602), with an increased risk of misclassification in the medium and high categories, those characteristics identified through regression modelling provided a significantly greater level of accuracy (AUC .726). This reflects good predictive utility in that it is correct in predicting repeat offending in nearly 75% of cases (i.e. in approximately 3 out of 4 cases). It should be noted that this compares favourably with other risk assessment tools used across a variety of behaviours (Andrews and Bonta 2006).

Separating high risk from low risk

Despite the advantages actuarial assessments may have over other methods of assessment in predicting risk, most actuarial assessment tools have modest predictive utility and cannot separate high risk from low risk in a majority of cases (Andrews and Bonta 2006). In part, this is related to the use of generalised models of behaviour, such as those produced through logistic regression to predict individual behaviour. Simply, generalised models do not account for individual differences because they are based on an average or proportional membership in some normative group.

Being able to predict the likelihood of intimate partner violence and violent repeat offending, or more narrowly being able to accurately assess the risk an individual poses in relation to family violence incidents has obvious benefits to victims and the community. However, no assessment tool can be 100% accurate. Inevitably, some who are assessed as high risk will not re-offend and some who are deemed low risk will re-offend.

Potentially, some offenders may be refused bail when they pose minimal risk of re-offending. Conversely, the assessment tool may also fail to recognise those who will go onto re-offend and who, had they been assessed accurately as a high risk, warranted a greater level of intervention to address issues of risk and safety to victims of family violence. However, as mentioned in Chapter Three, the specificity and sensitivity of the tool (the rate of true positives and true negatives) is a trade off between the two.

There will always be instances of misclassification; therefore it is a matter of whether one is interested in minimising false positives or false negatives. This involves weighing up what are the costs, and what are the benefits of doing either? From a law enforcement perspective focussing upon the risk of re-offending and the safety of the victim, a reduction in the rate of false negatives rather than false positives may be considered the better outcome; in other words, it may be preferable that someone is falsely assessed as high risk than falsely assessed as low risk.

Importantly, however, through developing a better understanding of the limitations and possibilities of assessment tools such as the RAST, one is better equipped to ensure the least amount of harm arising from their construction and subsequent use. With this goal in mind, the findings in this report aim to contribute to the ongoing development and refinement of the RAST.

Risk assessment and risk factors

This report has identified a number of issues that impact upon the predictive utility of a risk assessment tool. These were discussed with respect to the RAST.

Static and dynamic risk factors

Risk factors for family violence fall into two main types: static and dynamic. *Static risk factors* refer to those risk factors that do not change or change in only one direction (Gottfredson &Moriarty 2006). These risk factors include age, gender, criminal history and education, and tend to be objective rather than subjective in character. In

other words, static variables are tangible and observable, and therefore easy to measure.

Dynamic risk factors are those factors that measure change in the offender and include factors such as employment status, substance abuse and mental states (e.g. depression) or state of mind (e.g. anger). These factors can also be subjective in character because they can involve the definition of mental states or personality constructs, factors that tend to be intangible and not readily amenable to quantification and objective measurement.

Some assessments are used to predict violence while others are used to prevent violence through identification of risk factors and subsequent targeting of therapeutic intervention. This has implications in relation to the type of risk factor employed; namely, the use of static variables for the *prediction* of violence and the use of dynamic variables for the *prevention* of violence. This difference in focus is fundamental to how a risk assessment tool is developed, administered and analysed.

One of the fundamental questions that needs to be addressed when developing an assessment tool is; what is the purpose of the assessment? Is it prediction or prevention? If the focus is prediction, static variables are the most useful because they do not change unlike dynamic risk factors which can be present or absent at different times.

In the context of the RAST with its focus on predicting re-offending, dynamic risk factors may be considered unsuitable, mainly because they are difficult to identify, difficult to measure and can be present or absent at any given time. Given the intangible nature of these risk factors, they are unreliable from a prediction perspective. Further, those risk factors related to psychological or mental states require the assessor to have professional training and knowledge of the mental and/or psychological state of the offender. On the other hand,, static assessments, as well as requiring no professional training are not time intensive as are assessments such as SARA, and therefore are more suited to those situations where time is limited, as is the case with the administration of the RAST.

Individuals are affected by internal mental states and these do impact on behaviour. However, the use of dynamic assessments tends to be limited to forensic and prison populations, where treatment and rehabilitation are the aims, not prediction. For proponents of the rehabilitation paradigm, identifying psychological states and criminogenic need is important; one is able to change behaviour and behavioural change may be measured through these variable types.

What is important for this analysis is that these divergent purposes impact on the type of method(s) used to collect, analyse and validate assessment tools. They are also measuring different outcomes. For actuarial tools, prediction or public safety is the aim; for structured decision-making, the aim is behaviour change and the ‘success’ or otherwise of prevention strategies is measured via dynamic risk factors.

In short, the primary purpose of the RAST is to predict the likelihood of re-offending. With prediction as its main objective, this analysis has found that the most useful risk factors on the RAST are those that reflect static variables.

The Criterion Variable

The criterion variable and how it is defined has a large impact on the development and measurement of risk factors, and as a consequence the predictive utility of the assessment tool. In relation to the RAST, the criterion variable is very broadly defined, as outlined in Chapter Three. Given this broad definition a large number of potential or actual behaviours become risk factors for intimate partner violence. This makes the criterion variable weak which has a negative impact on the predictive utility of the RAST.

As it stands, the current definitions of 'significant relationship' and what constitutes 'family violence' (in Section 7 of the Family Violence Act) capture a broad range of different behaviours and a large variety of individuals. Furthermore, the assessment tool does not clearly differentiate intimate partner violence from repeat intimate partner violence. Indeed, it may be more descriptive of general violence. Whilst statistical significance existed between some risk factors and re-offending, the difference between offender and re-offender groups was not large, as reflected in the small correlation coefficients for each.

This creates a potential problem in relation to the RAST. The family violence legislation in Tasmania, the *Family Violence Act 2004*, contains a broad and inclusive definition of 'family violence'. While the intention of the RAST is to identify potential repeat offenders in any area of family violence, this broadly-defined criterion variable has the effect of reducing the predictive utility of the risk assessment tool.

Multi-colinearity

It is apparent from the analysis undertaken for this report that family violence is a complex dynamic, where risk factors not only impact upon each other but also upon the likelihood of repeat incidents of family violence.

This leads to the problem of multi-colinearity. As shown in the results section, a number of risk factors were related to each other (in some cases the effect was stronger than the relationship to the criterion variable). This situation confounds interpretation because these interrelationships between risk factors or predictor variables weaken the direct effect of each on the criterion variable.

Cumulative effects

Furthermore, it was also determined that risk factors may have a cumulative effect on the likelihood of re-offending.

Risk factors combined may have a cumulative effect on the likelihood of re-offending; that is, each may have a small impact on its own but with the inclusion of another it may produce a large impact. These interrelationships are difficult to tease out using traditional methods such as logistic regression and it may be that a different method (e.g. decision trees) could provide a clearer understanding of these inter-relationships as well as their cumulative effect on re-offending.

Not all risk factors are equal; some impact more than others and in relation to the RAST, the weightings applied have not been empirically derived. As the RAST currently stands, the greater the number of characteristics 'ticked' the higher the overall score.

Item construction

While a number of factors were more closely related to repeat offending than non-repeat offending, the difference was not great, meaning that while we may be able to say that specific characteristics are correlated to repeat offending, we cannot say that they are strongly correlated. In part, this is due to each of the risk factors being related to each other, but it also reflects the way in which the schedule items have been constructed and are administered.

As mentioned, any predictive model is only as good as the data from which it is produced, and in the case of RAST, the assessment schedule is the source of data. It is also a potential source of error in the modelling of offending behaviour, and as such the wording of items has the potential to adversely affect the predictive accuracy of the tool.

Items that are worded very specifically and objectively in relation to particular behaviours are required so that no (or little) professional judgement is needed (e.g. 'was the offender under the influence of drugs at the time of the incident?' is more objective and specific than 'does the offender have a history of drug problems?').

Policy context

Finally, it is important to acknowledge the fact that this analysis of the RAST was undertaken in the context of the introduction of the *Safe at Home* program in Tasmania. As noted earlier, this involves a series of interventions (including police and judicial interventions) that aim to restrict opportunities for offenders to re-offend. The ultimate objective of such interventions would be to reduce re-offending to a very low level. Such an outcome would lead to a situation in which the predictive utility of the RAST would be extremely low.

In other words, whilst the objective of the current project is to examine the rate of re-offending based on the RAST *independent* of any action taken by police (and other agencies), it is important to recognise and acknowledge that such intervention does occur and it will impact on the results. If these interventions are successful in addressing re-offending, then this will reduce the predictive utility of the RAST. However, data on police (and other) interventions was not included in the analysis; thus, it is not possible to assess empirically the impact (if any) of these interventions.

Revising the RAST

This report has shown that a risk assessment tool with 'good' to 'high' predictive validity in relation to re-offending is likely to have the following characteristics:

- a narrowly-defined criterion variable (in this case, family violence is the criterion variable and it is broadly-defined to reflect the legislation and the wider *Safe at Home* policy initiatives);

- items that are worded very specifically and objectively in relation to particular behaviours so that no (or little) professional judgement is required (e.g. 'was

the offender under the influence of drugs at the time of the incident?');

- items that are independent of each other (that is, each item measures something distinctly different from each of the other items).

Furthermore, a 'good' risk assessment tool is likely to work best where no interventions exist that may be impacting on the rate of re-offending.

Because assessment tools predict the likelihood of an event or behaviour occurring, the instrument used to collect the data to make the prediction must be valid – it must measure what it purports to measure – in this instance re-offending. Thus, the items contained in the schedule and the weighting applied to them is crucial to the accuracy of the instrument.

Items on the Schedule

As mentioned above, a reason why a number of risk factors were not strongly correlated to re-offending was because a number were related to each other. This may also indicate redundancy in the schedule itself; where two separate questions are asked but are in fact the same, one is redundant.

One possible reason for the lack of 'distance' between offenders and re-offenders is because the questions are asked in a manner that captures 'everyone', where the question is so general as to refer to all (e.g. bizarre, paranoid or delusional behaviour, multi-cultural disadvantage, any violence). This can be complicated by using too many examples that include too many types of behaviours and/or refer to now or in the past. The other possible reason is that there is no difference between offenders and repeat offenders; to all intents and purposes they are the same, except for those who allegedly breach.

Furthermore, the analysis revealed that some schedule items bear no relation to repeat offending (e.g. terrified, injury, afraid), although they were useful for providing insights into other family violence behaviour, such as stalking.

Therefore, it is recommended that the schedule be reviewed and edited to remove redundancies and generalities. Additionally, the Aide Memoir should be used in conjunction with the current schedule to describe additional characteristics (e.g. length of separation, recency of violence), and also to specify others (e.g. bizarre, paranoid or delusional behaviour, stalking, drug use). Thus, the RAST - as an actuarial risk assessment tool – needs to be distinct from an Aide Memoire that collects data of relevance in identifying patterns of family violence.

Weighting of Items

The RAST schedule could distinguish more fully between each group (high, medium and low) and reduce the rate of misclassification, especially at the medium and high risk categories. This misclassification is in part due to the weightings applied to each item, with insufficient distinction being made between high risk and other risk items. The ROC Curve for the scoring system currently used, produced the same result

when each item was given a score of 1. In effect, the more characteristics an individual scored the higher their score, regardless of the scoring system.

Therefore, it is recommended that a new weighting system be considered with emphasis placed on those risk factors identified in the preceding analysis. Emphasis should be placed on those factors (and their likelihood scores) which have a cumulative effect on re-offending. In other words, the current system for determining high, medium and low risk needs to be replaced with reference to those variables identified as contributing significantly to re-offending (refer to model), and especially those variables, that in combination, have a cumulative effect on re-offending. For example, stalking and breaching have a cumulative effect on re-offending; that is, while each singularly have an effect, combined they increase the likelihood. One response would be to undertake a Classification and Regression Tree (CART) analysis that could be used to assign weightings to combinations of variables (rather than single variables). Based on this analysis, the RAST score would then be determined by following a set of rules regarding the cumulative effect of various combinations of variables.

Conclusion

In conclusion, it can be stated that the use of an actuarial assessment tool, such as the RAST, is an improvement on informal, subjective assessments traditionally used by Tasmania Police to assess risk of re-offending. The RAST increases the rigour and accountability of the process of risk assessment. Additionally, it provides a transparent record of decision-making processes with respect to the management of risk and safety of victims. While an analysis of how the RAST is implemented lay outside the scope of this project, it should be noted that there are other protocols in place that impact upon the actions and decisions that follow the determination of a RAST score; for example, the admiralty scale and the capacity for professional over-ride by supervisors. Furthermore, the RAST is one tool among a suite of tools employed by Tasmania Police to assist in the management of risk and safety.

This report has provided the details of a statistical analysis of incidents in which the RAST was used in order to determine the validity of the RAST with respect to the Tasmanian population. It has demonstrated that in its current form the RAST has modest predictive utility and is thus comparable to other risk assessment tools in the field of criminal justice. Finally, the analysis has identified some potential improvements to the RAST schedule that could increase its predictive utility from ‘modest’ to ‘good’. These recommendations are identified in the final section of this report.

Recommendations

Recommendation 1:

That consideration be given to redefining the criterion variable more narrowly (e.g. limiting it to physical violence). This would enable the development of a risk assessment tool with greater predictive validity. It should be noted, however, that this may be considered inappropriate in the context of current policy given that the *Family Violence Act 2004* purposefully defines family violence in a manner that is inclusive of a wide range of behaviours. The RAST has been developed as a tool that attempts to assess risk in the context of this legislation.

Recommendation 2:

That consideration be given to the RAST schedule being revised in the following ways:

a. the number of items on the schedule reduced to include only those items that are significantly correlated with repeat offending;

b. the rating system and scores changed to reflect the likelihood scores obtained through the modelling of data using logistic regression;

c. the cumulative effects of the items investigated further and the scores adjusted accordingly. For example, stalking and breaching might be given a combined rating to reflect the cumulative effect of these two factors.

Recommendation 3:

That consideration be given to trialling and evaluating a revised RAST schedule. One method would be to apply the new scoring system to the data that has been analysed to date. The analysis could be re-run to determine whether the new scoring system enables a better separation of high-, medium- and low-risk offenders.

Recommendation 4:

That consideration be given to including the factors identified as impacting on the likelihood of re-offending and the relationships between them in a training package for Tasmania Police members.

Recommendation 5:

That consideration be given to undertaking further research to:

- evaluate the impact of police interventions on patterns of re-offending;

- increase the available knowledge and understanding of patterns of family violence through further analysis of data collected by the RAST and the Aide Memoire; and

- investigate patterns of behaviour associated with stalking through a more detailed analysis of data collected by the RAST.

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APPENDIX A