
The Use of Risk and Need Factors in Forensic Mental Health Decision-Making and the Role of Gender and Index Offense Severity

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Canadian legislation makes Review Boards (RBs) responsible for rendering dispositions for individuals found Not Criminally Responsible on account of Mental Disorder (NCRMD) after considering public safety, the mental condition of the accused, and his/her potential for community reintegration. We reviewed 6,743 RB hearings for 1,794 individuals found NCRMD in the three largest Canadian provinces to investigate whether items from two empirically supported risk assessment measures, the Historical Clinical Risk Management-20 and the Violence Risk Appraisal Guide, were considered. Less than half the items were included in expert reports or in RBs' reasons for dispositions, and consideration of these items differed according to gender and index offense severity of the accused. These items included evidence-based risk factors and/or legally specified criteria: mental health, treatment, and criminal history. These results illustrate the gap between research on risk factors and the integration of this evidence into practice. In particular, we recommend the implementation of structured measures to reduce the potential for clinicians to be unduly influenced by gender and offense severity. Copyright © 2015 John Wiley & Sons, Ltd.

RISK FACTORS FOR REVIEW BOARD DECISIONS

Internationally, the number of people who are entering the forensic psychiatric system is dramatically increasing (Jansman-Hart, Seto, Crocker, Nicholls, & Côté, 2011; Priebe *et al.*, 2005); Canada is no exception (Crocker *et al.*, in press; Latimer & Lawrence, 2006; Seto *et al.*, 2001). There are two main avenues for entering the forensic system in Canada: first, as a result of being found unfit to stand trial; that is, unable to meaningfully participate in the criminal proceedings due to a serious mental illness or other mental disability; secondly, following a verdict of Not Criminally

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Responsible on account of Mental Disorder (NCRMD, i.e. not having criminal intent at the time of the offense).

Individuals who are found NCRMD are under the jurisdiction of provincial or territorial Review Boards (RBs), which are independent tribunals established to determine the disposition of the accused. Legislation instructs RBs to consider a number of criteria when rendering a decision, including the need to protect the public, the mental condition of the accused, the reintegration of the accused into society, and the other needs of the accused (s. 672.54, *Criminal Code*).¹ The RB has three disposition options: absolute discharge, conditional discharge (typically living in the community while subject to conditions determined by the RB), or detention in hospital. At the time of this study, these reviews had to be carried out at least annually for all persons found NCRMD and the RB was required to render the disposition that is the least onerous and least restrictive for the accused.²

Case law provides further guidance with respect to the appropriate disposition decision, stipulating that for detention, the individual must present a risk of significant harm – substantial risk of trivial harm does not suffice, nor does trivial risk of substantial harm – and the risk cannot be speculative (*Winko v. British Columbia* [Forensic Psychiatric Institute], 1999). However, no guidelines are provided on how to assess the accused's risk of violence and make this decision. The RB relies on the information that is presented to them for the hearing and conducts an individual assessment of the accused at regular disposition hearings.

A major component of the information a RB relies upon is an expert report (typically submitted by the treating psychiatrist, often in collaboration with a clinical team), focusing on the individual's mental and physical health, behavior, treatment involvement, and notable events since the index offense and/or the previous RB hearing (see Crocker, Nicholls, Charette, & Seto, 2014). Ideally, the expert report also provides relevant information pertaining to empirically supported risk factors for violence and items relevant to the legislative criteria (Heilbrun, 2009). Unfortunately, to date, there is relatively little research regarding the extent to which empirically supported or legally relevant risk factors are implemented into practice by clinicians, or whether RBs consider these factors in rendering their decisions.

Empirically Supported Risk Factors

Over the past 30 years, research has established key risk factors for violence. Andrews and Bonta (2010) identified the “central eight” factors, the best-established risk/need factors in the prediction of criminal conduct, including the “big four” – (1) history of criminal behavior, (2) antisocial personality pattern, (3) procriminal attitudes and cognitions, and (4) antisocial associates – and the “moderate four” – (5) education/employment, (6) family/marital, (7) leisure/recreation, and (8) substance

¹ With the introduction of Bill C-14, the Not Criminally Responsible Reform Act (enacted July 2014), the legislation now states “When a court or Review Board makes a disposition under subsection 672.45(2), section 672.47, subsection 672.64(3) or section 672.83 or 672.84, it shall, taking into account the safety of the public, which is the paramount consideration, the mental condition of the accused, the reintegration of the accused into society and the other needs of the accused,…”

² With Bill C-14, legislation now states the disposition must be “necessary and appropriate in the circumstances.” In addition, for cases involving “high risk” NCRMD accused, the RB has the option of waiting for up to 3 years to review their cases, instead of the current annual review.

abuse. A recent meta-analysis by Bonta, Blais, and Wilson (2014) similarly showed that these eight domains were significantly related to both general and violent recidivism for mentally disordered offenders (see also Skeem, Winter, Kennealy, Loudon, & Tatar, 2014). For violent recidivism, the strongest predictors were antisocial personality pattern, procriminal attitudes and cognitions, and criminal history.

In addition to identifying risk factors, researchers have developed numerous risk assessment tools for different populations, including mentally disordered offenders. Two well-known and empirically validated measures for violence risk assessment are the Historical Clinical Risk Management-20 (HCR-20; Douglas, Hart, Webster, & Belfrage, 2013; Webster, Douglas, Eaves, & Hart, 1997) and the Violence Risk Appraisal Guide (VRAG; Quinsey, Harris, Rice, & Cormier, 1998, 2006). The HCR-20 is a structured professional judgment guide comprising 20 risk factors that were selected based on a review of scientific, theoretical, and professional literature, and are categorized into three domains: historical (H) – 10 risk factors that may have been present at any time during the person's life; clinical (C) – five items addressing recent and current functioning; and risk management (R) – five items focused on future circumstances. The VRAG is an actuarial measure comprising 12 static items that had the strongest statistical association with violent reoffending in the development sample of over 600 mentally disordered offenders (Quinsey *et al.*, 1998, 2006).

Despite their differences, research has demonstrated both the HCR-20 and VRAG have moderate to large associations with violence (Douglas & Reeves, 2010; Rice, Harris, & Hilton, 2010), including within forensic psychiatric samples (see Douglas *et al.*, 2014; Harris, Rice, & Cormier, 2002); thus, both measures can be useful with respect to the public safety criterion (*Criminal Code* Section 672.54). Other items might be relevant to the legally specified criteria as well. Although Bonta and colleagues found that clinical factors were not significantly associated with recidivism, the C and R scales from the HCR-20 are relevant to the mental health, reintegration and other needs criteria (*Criminal Code* Section 672.54). Further, according to the risk-needs-responsivity (RNR) model (Andrews & Bonta, 2010), risk management should be titrated to the level of risk the individual presents, the criminogenic needs of the offender, and the offender's personal learning style and abilities. Items such as those on the HCR-20 provide information relevant to risk and identifying needs, and thus decision-making that takes this information into account is likely to be more effective than decision-making that considers other non-criminogenic related information.

Research Examining Risk Assessments and Review Board Decisions

Despite research demonstrating the importance of empirically supported risk factors in risk assessment and management (Bonta *et al.*, 2014; Latessa, 2014), mental health professionals may consider non-supported factors (e.g., need for restraint/seclusion while in care) to be more relevant (Elbogen, Mercado, Scalora, & Tomkins, 2002). In a study of RB decisions, Hilton and Simmons (2001) found no association between an actuarial assessment of risk for violence, as captured by VRAG (Quinsey *et al.*, 1998) scores, and decisions to transfer patients from maximum to lower security levels, but did find that physical attractiveness was associated with transfer decisions.

In a study of RB reasons for dispositions in British Columbia, Whittemore (1999) found that RBs took into account a wide range of factors, falling into three broad categories: behaviors (e.g., past and current assaultive behavior); (2) mental health factors

(e.g., current symptoms of mental illness, insight, current compliance with treatment); and (3) reintegration factors (e.g., availability of social support, availability of accommodations). In a more recent study, Côté, Crocker, Nicholls, and Seto (2012) found that few factors from the HCR-20 (Webster *et al.*, 1997) were referred to during RB hearings for a sample of forensic psychiatric patients from Quebec. Two items, previous violence (H1) and major mental illness (H6), were almost always considered relevant. An additional four factors (H5, substance use problems; H9, personality disorder; C1, lack of insight; and C3, active symptoms of major mental illness) were discussed in a small majority of the cases (over 50%). Although many HCR-20 items were not discussed during the RB hearings, these same factors were often identified as present by RAs who had completed interview and file-based risk assessments. For example, prior supervision failure (H10) was discussed in 41% of the hearings, 34% of psychiatrists' reports, and 29% of the reasons for decision, but was coded as present by the RAs for 72% of the sample. In general, the frequency with which items from the HCR-20 were discussed during the RB process was much lower than what was expected based on the RA's risk assessments.

Risk and Gender

Research has demonstrated that risk factors and risk assessment measures perform similarly for women and men. Specifically, the central eight risk factors are applicable to women offenders, and in fact, the big four should be revised to the big five for women in order to include substance abuse (Andrews *et al.*, 2012). Similarly, research has demonstrated that the HCR-20 performs comparably with women (Douglas & Reeves, 2010) and the VRAG has been applied successfully to women as well (Coid *et al.*, 2009; Eisenbarth, Osterheider, Nedopil, & Stadtland, 2012). However, an important question is whether clinicians and decision-makers attend to risk factors equally for men and women. Coontz, Lidz, and Mulvey (1994) found that mental health staff spent twice as long asking questions pertaining to violence during interviews with male psychiatric inpatients than during interviews with females. The findings suggest the clinicians were more concerned about male violence, despite considerable research suggesting that violence is often as much a concern for female psychiatric patients in hospital (Lam, McNiel, & Binder, 2000; Nicholls, Ogloff, & Douglas, 2004; Nicholls, Brink, Greaves, Lussier, & Verdun-Jones, 2009) or the community (Newhill, Mulvey, & Lidz, 1995; Robbins, Monahan, & Silver, 2003). McDermott and Thompson (2006) concluded that management of women's illness, rather than dangerousness, appeared to be the primary factor in the release decision in their review of the conditional release decision-making process in the East Louisiana Mental Health System. In addition, in a large sample of Canadian NCRMD accused, it was found that women had significantly fewer prior offenses, NCRMD findings, and convictions than men (Nicholls *et al.*, in press) and were more likely to receive an absolute discharge than men, likely reflecting the fact that the women may present less risk of violence than the men (Crocker *et al.*, 2014).

Risk and Index Offense Severity

Index offense severity is not associated with risk for violent recidivism (Bonta, Law, & Hanson, 1998). In fact, Bonta *et al.*'s (1998) meta-analysis of predictors of violent

recidivism found that violent offense history was a better predictor of violent recidivism than a violent index offense. Despite this research, severity of index offense has been found to be a strong predictor of release decisions: those with a more severe index offense are more likely to be detained for a longer period of time (Callahan & Silver, 1998; Crocker *et al.*, 2010; Crocker *et al.*, 2014). More conservative decisions about individuals who have committed more severe index offenses may be reflected in the reporting of a greater number of risk factors.

Current Study

The aim of the current study is to expand our knowledge of forensic mental health decision-making, particularly RB dispositions. This study investigates whether items from the HCR-20 (Webster *et al.*, 1997) and VRAG (Quinsey *et al.*, 1998, 2006) are discussed in expert reports, and to what degree these variables are mentioned by RBs in their reasons for dispositions, and to explore whether this is affected by gender of the accused or severity of the index offense. Based on previous research, we expected that relatively few items would be discussed in the expert reports or in the reasons for decision (Côté *et al.*, 2012). It was also expected that the items discussed would differ for male and female NCRMD accused (Coontz *et al.*, 1994; McDermott & Thompson, 2006; Skeem *et al.*, 2005) and that a greater number of items would be discussed when the index offense was more severe (Callahan & Silver, 1998; Crocker *et al.*, 2010; Crocker *et al.*, 2014).

METHODS

The National Trajectory Project was an archival, longitudinal study examining a cohort of Canadian individuals found NCRMD in British Columbia (BC), Ontario (ON), and Québec (QC). The full methodology is described in Crocker *et al.* (in press; see also Crocker, Charette *et al.*, in press; Crocker, Charette, & Seto *et al.*, in press; Crocker *et al.*, 2014; Crocker, Nicholls, Seto, Charette *et al.*, in press; Nicholls *et al.*, in press). Details relevant to the current analyses are presented here. All relevant institutional review boards approved this project.

Sample

The sample comprised 1,794 men ($n = 1,514$) and women ($n = 280$) found NCRMD between May 2000 and April 2005, who had at least one hearing with a RB (QC = 1,089, ON = 483, BC = 222). Due to time and budget constraints, time frames varied across the provinces. The ON sample comprises all adults with an NCRMD verdict between January 1, 2002 and April 30, 2005. The BC sample comprises all adults with an NCRMD verdict between May 1, 2001 and April 30, 2005. In QC, there were 1,964 individuals with an NCRMD verdict between May 1, 2000 and April 30, 2005. A random sampling procedure using a finite population correction factor was applied to each of 17 justice administrative regions of QC in order to obtain a geographically representative sample. All analyses are weighted according to the representativeness of QC justice administrative regions (see Crocker *et al.*, in press). Thus, the sample represents the full population of NCRMD adults for BC

and ON within their respective time frames and a regionally stratified random sample for QC. These 1,794 individuals were involved in 6,743 RB hearings within the study time frame (BC = 1,053; ON = 2,185; QC = 3,505). The average number of hearings per individual was 3.14 (SD = 2.10) and the median number of hearings per individual was three.

Procedure

For each case, trained RAs reviewed RB files for a period of 5 years prior to the index verdict, through to December 31, 2008. Sociodemographic and clinical data were collected from the psychiatrists' reports, which may have included details provided by additional team members (e.g., psychologists, social workers, nurses). Offense severity was coded using the Crime Severity Index, based on the average Canadian sentence length by offense type (Wallace, Turner, Matarazzo, & Babyak, 2009). Severity of the offense for this sample ranged from 8.92 to 7,041.75, with an average index of 471.39 (SD = 1,366.72) and median index of 77.38, where higher scores represent greater offense severity. Due to its highly skewed distribution, a log (ln) transformation was applied. Items from risk assessment measures (described in the following section) were coded for their presence or absence within expert reports and RB decisions.

Risk Assessment Measures

The HCR-20 (Webster *et al.*, 1997) and VRAG (Quinsey *et al.*, 2006) were used as templates for coding items in the expert reports and RB rationale. These measures were selected due to their strong psychometric properties and empirical support in relevant samples and settings (see Douglas & Reeves, 2010; Rice *et al.*, 2010). The objective of the coding was to determine the extent to which items were reported (i.e., mentioned) by clinicians and cited by RBs in their reasons for decision. As such, RAs coded the items as "present" (= the item was mentioned and is present for this individual); "absent" [= the item was mentioned and is absent (not present) for this individual]; "mentioned but uncodable" (= the item was mentioned, but it is unclear whether the factor is relevant to the accused); or "not mentioned" (= the item was not mentioned). For the purposes of this study, the risk factor codings were dichotomized into two categories: "mentioned" (present or absent) or "not mentioned."³

When this study started in QC, the VRAG was not included. Upon the inclusion of the VRAG in the study with the addition of ON and BC, 834 files had been completed in QC. All files completed after this time included the VRAG. In addition, RAs in QC returned to a random sample of previously completed files ($n = 421$) to code the VRAG. Unfortunately, due to practical constraints, not all files could be reviewed a second time and as such, there is a smaller sample for VRAG assessments compared to HCR-20 assessments (Expert Reports: HCR-20 = 6,469, VRAG = 5,511; RB rationale: HCR-20 = 6,558, VRAG = 5,603 hearings; the majority of individuals' files contained more than one report/hearing).

³ To clarify, the dichotomous coding reflects whether the report or RB transcript made any mention of a variable. For instance, if substance abuse was discussed in the report, it would be coded as present regardless of whether the patient presented with no, mild, moderate or serious substance abuse problems.

Interrater reliability

A total of 12 raters were involved in the data collection (BC = 4; ON = 2; QC = 6) and each coded between 51 and 2,341 hearings ($M = 848.67$, $SD = 708.28$). Interrater reliability of the HCR-20 and VRAG codings was examined using 1,835 RB reports (27% of the hearing sample) associated with 573 individuals found NCRMD. For expert reports, the average kappa for the HCR-20 was 0.78 ($H = 0.84$, $C = 0.75$, $R = 0.69$) and 0.68 for the VRAG. For the RB reasons for decisions, the average kappa for the HCR-20 was 0.76 ($H = 0.83$, $C = 0.73$, $R = 0.67$) and 0.72 for the VRAG.

Analytic Strategy

Mixed effects multiple logistic regression models (also called hierarchical linear models, multi-level models) were conducted to examine the characteristics of the individuals that predicted whether an item was mentioned at each hearing. Due to individuals having more than one hearing and in order not to violate the assumption of independence of observations, we opted for a model that included a random effect at the individual level to account for the unobserved individual heterogeneity (Raudenbush & Bryk, 2002). The models predicted mention of the relevant item based on both gender and index severity and also controlled for the following variables: age at the index offense, the time after the index verdict, and the province, due to concerns regarding differences in item use as a reflection of setting (e.g., the HCR-20 was developed in BC, and the VRAG was developed in ON). In order to obtain the average probability of an item being mentioned, and as we are interested in the effect of level-2 predictors (i.e. gender and severity of the offense), independent variables were grand-mean centered (Enders & Tofghi, 2007). The average probability is then obtained by $[\exp(b)_{\text{intercept}} / (1 + \exp(b)_{\text{intercept}})]$. All analyses were completed using R (R Development Core Team, 2014) and the nlme package (Pinheiro, Bates, DebRoy, Sarkar, & R Core Team, 2014).

RESULTS

Variables Most Often Discussed in Expert Written Reports and Review Boards' Rationale for Decisions

We examined how often a risk assessment measure was completed as part of the evaluation, as this might be indicative of how often an item is mentioned. Overall, a complete risk assessment measure was completed infrequently (17% of hearings) (Crocker *et al.*, 2014); specifically, the use of the HCR-20 and VRAG was rare (8% and 9% of hearings, respectively). Clearly, empirically validated risk assessment measures were not often used; however, it is still possible that individual risk items from these measures would be discussed within the process and this was our main interest. The mean number of HCR-20 items included in expert reports was 8.59 ($SD = 3.71$, range 0–20) and the mean number of VRAG items included was 5.10 ($SD = 2.97$, range 0–12). By HCR-20 domain, the mean number of items was as follows: H = 5.13 ($SD = 2.66$, range 0–10), C = 2.73 ($SD = 1.19$, range 0–5) and R = 0.74 ($SD = 1.02$, range 0–5).

As Table 1 demonstrates, items referred to in the expert reports appeared to focus on three major areas: mental health (HCR-20, major mental illness, active symptoms of major mental disorder, lack of insight, substance use; VRAG, meets DSM III criteria for schizophrenia, meets DSM III criteria for personality disorder), treatment (HCR-20, unresponsive to treatment) and criminal history (HCR-20, previous violence).

Table 1. Frequency of risk factors mentioned in expert reports and review boards' (RB) rationale for decisions

Risk factor	Expert reports total [<i>n</i> (valid %)]	RB's rationale total [<i>n</i> (valid %)]	Expert and RB's rationale [<i>n</i> (valid %)]
<i>HCR-20 items</i>	(<i>N</i> = 6,573)	(<i>N</i> = 6,673)	(<i>N</i> = 6,518)
H1. Previous violence	5,082 (77)	5,739 (86)	4,714 (72)
H2. Young age at first violence	2,910 (44)	2,341 (35)	1,764 (27)
H3. Relationship instability	1,870 (29)	895 (13)	693 (11)
H4. Employment problems	2,460 (37)	1,133 (17)	973 (15)
H5. Substance use problems	4,507 (69)	3,831 (57)	3,467 (53)
H6. Major mental illness	6,041 (92)	5,974 (90)	5,613 (86)
H7. Psychopathy	908 (14)	174 (3)	160 (2)
H8. Early maladjustment	2,075 (32)	997 (15)	778 (12)
H9. Personality disorder	4,003 (61)	3,452 (52)	3,213 (49)
H10. Prior supervision failure	3,832 (58)	3,843 (58)	3,200 (49)
C1. Lack of insight	4,822 (73)	4,829 (72)	4,014 (62)
C2. Negative attitudes	960 (15)	485 (7)	395 (6)
C3. Active symptoms of mental illness	5,288 (81)	4,346 (65)	4,070 (62)
C4. Impulsivity	1,494 (23)	942 (14)	773 (12)
C5. Unresponsive to treatment	5,357 (82)	5,103 (76)	4,528 (70)
R1. Plans lack feasibility	720 (11)	557 (8)	354 (5)
R2. Exposure to destabilizers	908 (14)	884 (13)	580 (9)
R3. Lack of personal support	916 (14)	974 (15)	533 (8)
R4. Non-compliance with remediation attempts	1,666 (25)	2,295 (34)	1,196 (18)
R5. Stress	666 (10)	470 (7)	342 (5)
<i>VRAG items</i>	(<i>N</i> = 5,701)	(<i>N</i> = 5,802)	(<i>N</i> = 5,644)
V1. Hare Psychopathy Checklist-Revised	1,008 (18)	155 (3)	146 (3)
V2. Elementary school maladjustment	897 (16)	180 (3)	146 (3)
V3. Meets DSM-III criteria for any personality disorder	4,912 (86)	4,612 (80)	4,234 (75)
V4. Age at index offense	1,542 (27)	1,911 (33)	959 (17)
V5. Lived with both biological parents to age 16	1,403 (25)	443 (8)	386 (7)
V6. Failure on conditional release prior to index offense	2,257 (40)	2,014 (30)	1,497 (27)
V7. Criminal charges prior to index offense for non-violent offenses	2,554 (45)	2,774 (48)	1,768 (31)
V8. Marital status	1,947 (34)	992 (17)	887 (16)
V9. Meets DSM-III criteria for schizophrenia	5,153 (90)	4,948 (85)	4,597 (81)
V10. Victim injury (most serious) for index offense	2,050 (36)	2,363 (41)	1,744 (31)
V11. History of alcohol problems	2,215 (39)	1,261 (22)	1,020 (18)
V12. Sex of victim	3,125 (55)	3,671 (63)	2,770 (49)

Note: Items prefixed by H, C or R denote Historical Clinical Risk Management-20 (HCR-20) items in the historical, clinical, or risk management domains. Items prefixed by V denote Violence Risk Appraisal Guide (VRAG) items.

Regarding RBs' rationale for the disposition, the mean number of HCR-20 factors mentioned was 7.38 (SD = 2.74) and the mean number of VRAG factors mentioned was 4.39 (SD = 2.04, range 0–11). For the HCR-20 domains, the means were H = 4.25 (SD = 1.86, range 0–10), C = 2.35 (SD = 1.10, range 0–5) and R = 0.78 (SD = 0.93, range 0–5). There was considerable similarity between the expert reports and the reasons for decision provided by the RBs in terms of the number of variables discussed ($r = 0.96$; $p < 0.001$). Table 1 provides the percentage of cases where both the expert report and RBs' written decisions mentioned the same item in the same hearing process. Again, the items discussed most frequently reflected mental health, treatment, and criminal history.

Predicting Mention of Risk Factors in Expert Reports and RB Rationale for Decision

Another approach to identifying the most frequently mentioned risk factors is to examine the average probabilities based on the intercept from logistic regression analyses while maintaining other characteristics constant. Tables 2 and 3 present the results of mixed-effects logistic regression models predicting the mention of each risk factor in the expert reports and RB rationale, respectively. The "mention" of a risk factor refers to what the clinicians are actually attending to and include within their written report, regardless of whether the item is present or absent for the individual. The average probability of these models can be interpreted as the predicted probability of the outcome and, as the predictors have been grand-mean centered, as an average adjusted mean controlling for level-1 (i.e. time since the index verdict) and level-2 (i.e., province, age, gender) predictors (Enders & Tofghi, 2007). Consistent with the frequencies and percentages presented in Table 1, the probabilities indicate that the risk factors related to mental health, treatment, and criminal history are most likely to be mentioned (expert reports, Table 2; RB rationale, Table 3).

Table 2 presents the odds ratios for gender and index severity in predicting whether the risk factors were mentioned in the expert reports. Controlling for age at index offense, time since index verdict, province, and index severity, expert reports were more likely to mention relationship instability (H3), impulsivity (C4), stress (R5) and marital status (VRAG) when the accused was a woman, whereas experts were more likely to mention substance use (H5), psychopathy (H7 and VRAG), and unresponsive to treatment (C5) when the accused was a man. As an example of interpreting the odds ratios in Table 2, after controlling for the other factors in the model, the odds of experts mentioning substance use problems (H5) for women were approximately one-third the odds of mentioning substance abuse problems for men (OR = 0.31). For index offense severity, since the predictor is log-transformed, the odds ratios can be interpreted as an increase by $0.2[\exp(b/100)]$ times in the odds that the expert will mention past violent behavior (H1) for every 1% increase in the severity of the index offense, after controlling for the other factors. In terms of the severity of the index offense, a more severe index offense increased the likelihood of a mention of previous violence (H1), young age at first violence (H2), relationship instability (H3), lack of personal support (R3), stress (R5), age at index offense (VRAG), and sex of victim (VRAG) being mentioned in the expert report, but reduced the likelihood the clinician referenced prior supervision failures (H10) and non-compliance with remediation attempts (R4) (Table 2).

Table 2. Probability of mention in the expert report, and summary of mixed-effects logistic regression results for gender and severity as predictors of mention, for each risk assessment item

Items predicted	Predictors					
	Average probability ^a			Gender		Severity
	%	(95% CI)	Exp(<i>b</i>)	(95% CI)	Exp(<i>b</i>)	(95% CI)
HCR-20 items						
H1. Previous violence	91.66	(90.25–92.88)	0.92	(0.61–1.37)	1.25	(1.10–1.41) ***
H2. Young age at first violence	28.08	(24.35–32.13)	0.63	(0.36–1.09)	1.17	(1.01–1.35) *
H3. Relationship instability	5.36	(4.04–7.09)	3.06	(1.51–6.19) **	1.26	(1.04–1.53) *
H4. Employment problems	18.63	(15.28–22.52)	0.59	(0.31–1.15)	0.99	(0.84–1.17)
H5. Substance use problems	85.90	(83.61–87.93)	0.31	(0.20–0.48) ***	0.95	(0.84–1.08)
H6. Major mental illness	98.75	(98.30–99.08)	0.87	(0.49–1.52)	1.07	(0.90–1.26)
H7. Psychopathy	0.38	(0.22–0.66)	0.11	(0.03–0.37) ***	1.07	(0.84–1.37)
H8. Early maladjustment	9.64	(7.72–11.99)	0.74	(0.38–1.43)	1.14	(0.97–1.35)
H9. Personality disorder	79.84	(75.90–83.27)	1.33	(0.87–2.03)	1.06	(0.94–1.20)
H10. Prior supervision failure	66.89	(62.98–70.58)	0.87	(0.55–1.37)	0.71	(0.63–0.81) ***
C1. Lack of insight	78.94	(77.44–80.37)	0.82	(0.65–1.04)	0.95	(0.89–1.02)
C2. Negative attitudes	2.56	(2.07–3.17)	0.74	(0.40–1.37)	1.04	(0.90–1.20)
C3. Active symptoms of mental illness	87.10	(85.89–88.22)	0.85	(0.65–1.10)	1.01	(0.94–1.08)
C4. Impulsivity	9.51	(8.39–10.76)	1.65	(1.14–2.38) **	0.92	(0.83–1.02)
C5. Unresponsive to treatment	86.18	(85.02–87.26)	0.79	(0.63–0.99) *	0.97	(0.91–1.03)
R1. Plans lack feasibility	4.64	(4.06–5.30)	0.94	(0.63–1.41)	1.03	(0.93–1.14)
R2. Exposure to destabilizers	3.73	(3.17–4.38)	0.77	(0.47–1.26)	0.96	(0.85–1.09)
R3. Lack of personal support	4.88	(4.22–5.64)	1.04	(0.68–1.58)	1.17	(1.05–1.31) **
R4. Non-compliance with remediation attempts	19.33	(17.96–20.78)	1.09	(0.85–1.41)	0.87	(0.81–0.93) ***
R5. Stress	1.80	(1.47–2.21)	1.92	(1.13–3.26) *	1.16	(1.00–1.34) *
VRAG items						
V1. Hare psychopathy	1.10	(0.68–1.77)	0.34	(0.16–0.73)	0.98	(0.81–1.18)
V2. Elementary school maladjustment	0.01	(0.00–0.05)	0.48	(0.01–18.32)	1.14	(0.54–2.43)
V3. Meets DSM-III criteria for any personality disorder	95.55	(94.61–96.33)	1.07	(0.66–1.73)	0.99	(0.87–1.12)
V4. Age at index offense	11.36	(9.57–13.44)	1.03	(0.64–1.65)	1.21	(1.07–1.38) **
V5. Lived with both biological parents to age 16	1.51	(0.97–2.36)	1.17	(0.43–3.19)	1.08	(0.84–1.39)
V6. Failure on conditional release prior to index offense	10.04	(6.56–15.07)	0.91	(0.30–2.81)	0.97	(0.73–1.31)
V7. Criminal charges prior to index offense for non-violent offenses	33.68	(29.59–38.03)	0.86	(0.50–1.46)	1.10	(0.95–1.26)
V8. Marital status	8.23	(6.02–11.15)	4.56	(2.03–10.25)	1.22	(0.98–1.52)

V9. Meets DSM-III criteria for schizophrenia	97.94	(97.39–98.38)	0.92	(0.51–1.68)	1.01	(0.86–1.18)
V10. Victim injury	5.65	(3.77–8.41)	0.87	(0.29–2.61)	1.23	(0.92–1.64)
V11. History of alcohol problems	11.52	(7.25–17.81)	1.09	(0.35–3.36)	0.87	(0.64–1.17)
V12. Sex of victim	58.10	(52.91–63.11)	1.21	(0.67–2.18)	1.33	(1.13–1.56) ***

Note: Regression analyses were conducted for each item entering the variables time, province, age, gender, and index offense severity. Time made a significant contribution to the model for items H1, H2, H4, H6, H7, H8, H10, V1, V2, V4, V7, V8, V9, V10, and V12. Province made a significant contribution to the model for each item except R1, R5, and V2. Age made a significant contribution to the model for each item except H1, H4, H6, C1, C3, C5, R4, R5, V2, V3, V6, V7, V9, V11, and V12. Complete results available from the authors on request. Items prefixed by H, C, or R denote Historical Clinical Risk Management-20 (HCRM-20) items in the historical, clinical, or risk management domains. Items prefixed by V denote Violence Risk Appraisal Guide (VRAG) items.

^aThe average probability is based on the intercept of the models and represents the probability of an item to be mentioned, everything kept equal after grand-mean centering the independent variables; it is calculated by $[\exp(b)_{intercept}/(1 + \exp(b)_{intercept})]$.

^bThe reference group for gender is male.

^cHigher severity scores represent more severe index offenses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Table 3. Probability of mention in review boards' rationale for decision, and summary of mixed-effects logistic regression results for gender and severity as predictors of mention, for each risk assessment item

Items predicted	Average probability ^a			Predictors			Severity ^c (95% CI)	
	%	(95% CI)		Exp(<i>b</i>)	Gender ^b			Exp(<i>b</i>)
		(95% CI)			(95% CI)			
HCR-20 items								
H1. Previous violence	95.88	(95.12–96.52)	0.69	(0.45–1.06)	1.40	(1.21–1.61)	***	
H2. Young age at first violence	21.45	(19.47–23.57)	0.63	(0.45–0.88)	1.01	(0.93–1.11)	**	
H3. Relationship instability	0.03	(0.01–0.08)	1.51	(0.21–11.06)	1.16	(0.67–2.00)		
H4. Employment problems	6.94	(6.07–7.93)	0.46	(0.31–0.69)	1.04	(0.95–1.14)	***	
H5. Substance use problems	63.34	(60.32–66.26)	0.25	(0.18–0.36)	0.96	(0.87–1.06)	***	
H6. Major mental illness	93.97	(93.21–94.64)	0.92	(0.67–1.27)	1.02	(0.93–1.11)		
H7. Psychopathy	0.12	(0.05–0.28)	0.25	(0.04–1.60)	1.10	(0.83–1.45)		
H8. Early maladjustment	2.97	(2.43–3.63)	1.11	(0.65–1.90)	1.07	(0.94–1.23)		
H9. Personality disorder	54.58	(51.59–57.54)	1.01	(0.73–1.39)	1.06	(0.97–1.16)	***	
H10. Prior supervision failure	58.29	(54.84–61.67)	0.59	(0.40–0.87)	0.69	(0.61–0.76)	*	
C1. Lack of insight	75.74	(74.31–77.12)	0.81	(0.65–1.00)	0.94	(0.88–0.99)		
C2. Negative attitudes	1.23	(0.95–1.57)	0.40	(0.18–0.88)	1.10	(0.94–1.28)		
C3. Active symptoms of mental illness	67.67	(66.11–69.20)	0.81	(0.67–0.99)	0.99	(0.94–1.04)		
C4. Impulsivity	5.02	(4.37–5.77)	1.26	(0.84–1.90)	0.95	(0.85–1.06)		
C5. Unresponsive to treatment	80.07	(78.82–81.27)	0.90	(0.73–1.10)	1.00	(0.95–1.06)		
R1. Plans lack feasibility	3.14	(2.67–3.68)	0.98	(0.63–1.52)	1.01	(0.90–1.13)		
R2. Exposure to destabilizers	4.54	(3.92–5.25)	0.60	(0.38–0.95)	0.98	(0.88–1.10)	**	
R3. Lack of personal support	6.81	(5.95–7.80)	1.19	(0.85–1.66)	1.13	(1.04–1.24)	***	
R4. Non-compliance with remediation attempts	31.57	(30.05–33.14)	1.10	(0.90–1.35)	0.82	(0.77–0.86)	***	
R5. Stress	1.59	(1.30–1.95)	1.81	(1.09–3.01)	1.26	(1.10–1.44)	***	
VRAG items								
V1. Hare psychopathy	0.16	(0.08–0.32)	0.23	(0.04–1.49)	1.08	(0.82–1.42)		
V2. Elementary school maladjustment	0.01	(0.00–0.05)	1.23	(0.03–47.17)	1.06	(0.45–2.52)		
V3. Meets DSM-III criteria for any personality disorder	86.08	(84.73–87.33)	0.80	(0.59–1.08)	1.05	(0.97–1.14)		
V4. Age at index offense	19.36	(17.09–21.86)	0.78	(0.56–1.08)	1.06	(0.97–1.16)		
V5. Lived with both biological parents to age 16	0.50	(0.33–0.75)	1.11	(0.46–2.68)	0.96	(0.77–1.19)		
V6. Failure on conditional release prior to index offense	15.63	(13.63–17.86)	0.85	(0.55–1.29)	0.95	(0.85–1.06)		
V7. Criminal charges prior to index offense for non-violent offenses	44.81	(42.51–47.12)	0.90	(0.69–1.17)	1.00	(0.94–1.08)	*	
V8. Marital status	0.45	(0.28–0.73)	4.99	(1.94–12.86)	1.38	(1.03–1.83)		
V9. Meets DSM-III criteria for schizophrenia	89.19	(88.16–90.15)	0.91	(0.68–1.23)	1.01	(0.94–1.09)		

V10. Victim injury	10.51	(7.46–14.61)	0.59	(0.21–1.65)	1.10	(0.83–1.45)
V11. History of alcohol problems	6.52	(5.48–7.74)	0.76	(0.50–1.13)	0.96	(0.86–1.06)
V12. Sex of victim	76.78	(72.96–80.21)	0.60	(0.35–1.05)	1.25	(1.07–1.46)

Note: Regression analyses were conducted for each item entering the variables time, province, age, gender, and index offense severity. Time made a significant contribution to the model only for items H2, H4, H10, C5, R1, R5, V4, V6, V7 V8, V9, and V11. Province made a significant contribution to the model for each item except H3 and V2. Age made a significant contribution to the model only for items H2, H5, H8, H9, H10, C2, C4, R1, R2, R3, V5, V6, V8, and V10. Complete results available from the authors on request. Items prefixed by H, C or R denote Historical Clinical Risk Management-20 (HCR-20) items in the historical, clinical, or risk management domains. Items prefixed by V denote Violence Risk Appraisal Guide (VRAG) items.

^aThe average probability is based on the intercept of the models and represents the probability of an item to be mentioned, everything kept equal after grand-mean centering the independent variables; it is calculated by $[\exp(b)_{intercept}/(1 + \exp(b)_{intercept})]$.

^bThe reference group for gender is male.

^cHigher severity scores represent more severe index offenses.

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

The same analyses were repeated to examine the predictors of risk factors being mentioned in the RBs' rationales for decisions (Table 3). Again, this refers to the risk factors RBs are attending to when providing their rationale, not whether the item was present or absent for the individual. A number of risk factors were more likely to be mentioned when the accused was male (after controlling for age, time, province, and offense severity): young age at first violence (H2), employment problems (H4), substance use problems (H5), prior supervision failure (H10), negative attitudes (C2), active symptoms of mental illness (C3), and exposure to destabilizers (R2). The likelihood of stress (R5) and marital status (VRAG) being mentioned was increased when the case involved a female accused. Severity of the index offense also influenced the likelihood of certain risk factors being mentioned, after controlling for age, time, province, and gender. With an increase in index offense severity, previous violence (H1), lack of personal support (R3), stress (R5), marital status (VRAG) and sex of the victim (VRAG) were more likely to be mentioned. In contrast, an increase in offense severity reduced the likelihood of mentioning prior supervision failure (H10), lack of insight (C1), and non-compliance with remediation attempts (R4). The interaction effects for gender and index offense severity were tested for each model and were not significant.

DISCUSSION

Our findings are consistent with previous research on the salience of empirically supported risk factors in forensic decision-making (Elbogen *et al.*, 2002; Hilton & Simmons, 2001). On average, less than half of the risk factors from two of the most empirically supported violence risk assessment measures, the HCR-20 (Webster *et al.*, 1997) and VRAG (Quinsey *et al.*, 2006), were included in expert reports or in RB reasons for decision. Not surprisingly, given high rates of agreement between expert recommendations and RB decision-making (Crocker *et al.*, 2014; Hilton & Simmons, 2001), there was considerable similarity in the items most often attended to in the expert reports and in the RB rationales, allowing us to speak to the result generally.

Risk Factors and Legal Criteria

The risk factors most frequently mentioned across expert reports and RB decisions tended to fall into three broad categories: mental health (major mental illness, problems with substance use, personality disorder, active symptoms of major mental illness, lack of insight, DSM III schizophrenia diagnosis), treatment (prior supervision failure, unresponsive to treatment), and criminal history (previous violence, sex of victim). Our findings suggest that forensic decision-makers do consider risk factors that are empirically valid and/or are relevant to the legal criteria. To reiterate, current legislation requires RBs to consider "the need to protect the public from dangerous persons, the mental condition of the accused, the reintegration of the accused into society, and the other needs of the accused" (*Criminal Code* Section 672.54). The risk factors within the mental health category (e.g., diagnosis, active symptoms) are directly relevant to the criterion regarding the mental condition of the accused. Moreover, factors related to the individual's criminal history are clearly relevant to the criterion regarding the need

to protect public safety. Finally, supervision and treatment compliance items are relevant to the reintegration needs of the offender and an individual's past and current compliance with treatment and supervision is highly relevant to their anticipated future compliance. According to the needs principle of the RNR model (Andrews & Bonta, 2010), an individual's criminogenic needs should be targeted in treatment. This model has been shown to apply to individuals with mental disorder (Skeem *et al.*, 2014), and, with this in mind, it is important to identify those needs for successful community reintegration.

Unfortunately, many variables that are relevant to an accused's reintegration and risk management, such as the risk management factors of the HCR-20, tended to be seldom discussed. When considering a person's reintegration into the community, issues such as the appropriateness of the accommodation and the community the person is returning to, the extent of social support, and the presence of potential destabilizers are all useful information. Although Whitemore (1999) found that reintegration factors were referred to by RBs in 26–44% of hearings, the results from the current study indicated that clinicians and RBs referred to these factors in only 10–15% of hearings (with the exception of R4: non-compliance with remediation attempts).

Risk Factors and Gender

Overall, the results from the reports examined in the present study demonstrate some overlap in the variables attended to in expert reports regardless of the gender of the accused. There was no significant difference with respect to many of the mental health risk factors (e.g., major mental illness, lack of insight, active symptoms) and criminal history factors (e.g., previous violence, victim injury), after controlling for age, time, province, and offense severity. Problems with substance use were more likely to be mentioned for men, which may reflect actual gender differences within this sample (Nicholls *et al.*, 2014), and also due to the fact that there is a greater likelihood of discussing an item that is present rather than absent (Crocker *et al.*, 2014). Risk factors related to relationships (relationship instability, marital status) and stress were discussed more frequently for women than for men.

In the reasons for decision, there were again some notable gender differences in risk factors that were mentioned. A range of risk factors from the HCR-20 were discussed more frequently for men than for women (e.g., employment problems, substance use problems, and supervision failure). Two items appeared more often for women than for men: marital status and stress. Our findings support previous research indicating that there is some difference in risk factors that are attended to in risk assessments for men and women (Coontz *et al.*, 1994; McDermott & Thompson, 2006; Skeem *et al.*, 2005).

It is interesting that relationship-focused risk factors were discussed more frequently for women. One possible reason for this is the notion that female offending is often committed in the context of coercive relationships with criminal men (Andrews *et al.*, 2012), suggesting that understanding a woman's intimate relationship may be important in assessing her risk. The women in the current sample were more likely to be in a relationship than were the men (Nicholls *et al.*, in press), which may also explain why this type of risk factor was discussed more frequently for women. Unfortunately, without more detail regarding the context of the discussions focused on relationships, we cannot further determine how these risk factors were being used to make a decision.

Risk Factors and Offense Severity

Previous research has shown that NCRMD individuals with more severe offenses are more likely to be detained for longer periods than individuals with less severe offenses (Callahan & Silver, 1998; Crocker *et al.*, 2010; Hilton & Simmons, 2001). Crocker, Nicholls, Charette, & Seto (2014) found that this is true with the current sample as well: those with a more severe index offense were detained for longer than individuals with more minor offenses. This may explain why a greater number of risk factors were discussed when there was a more severe index offense (after controlling for age, time, province, and gender). On the one hand, it is possible that individuals who commit more serious index offenses have lengthier criminal histories and a greater number of risk factors, or it could simply be that because they are under the RB supervision for longer, more information is accumulated and, as such, the RBs discuss these factors. On the other hand, it is possible that RBs focus on the severe index offense, and provide more extensive explanations, including many risk factors, in order to justify their decisions. It is worth noting that RBs are often under high levels of public scrutiny, in addition to their own personal pressure and sense of responsibility in their role regarding the safety of the public, particularly with high-profile cases (Crocker *et al.*, 2014); thus it is not surprising that they might discuss a greater number of risk factors in these types of cases.

Strengths and Limitations

The variables examined in the present study were guided by two widely implemented and well established measures; the HCR-20 and VRAG are perhaps two of the most well regarded violence risk assessment measures in the field. Moreover, we were examining the implementation and uptake of each measure in their province of origin. The HCR-20 was developed in BC and the VRAG in ON, and the study was completed in settings in which these measures are integrated into policy and practice. As such, our results may well be overestimating the extent to which empirically valid measures are informing decision-making in forensic practice. A particular strength of the study is that these findings reflect the extent to which these risk factors are taken into consideration by clinicians and RBs to be relevant to violence risk assessments in actual clinical decision-making. Finally, this study involved a large sample from multiple sites in Canada and we obtained a good level of interrater reliability in our codings.

This study is limited by the reliance on archival records, restricting us to what was documented in the files and recorded in the reasons for decision. It is possible that other risk factors were considered and discussed, but not documented. Similarly, we do not know the importance of absent items. It is possible that clinicians considered items but did not include them in the report if the item was not present for the individual. The focus of this study was on whether a risk factor was mentioned, not whether it was present for an accused or how it influenced the final recommendation of the clinician or the ultimate decision of the RB. It is also worth noting that the HCR-20 and VRAG have opposing views with respect to some items, such as the influence of major mental illness (e.g., the HCR-20 assumes it increases risk, whereas in the VRAG, schizophrenia is associated with decreased risk). The current study cannot determine how the RBs are interpreting this item when making a decision. Our study focused on the variables from two risk assessment measures, but there are numerous other

empirically validated risk scales with empirically supported risk factors available, as well as additional non-empirically supported factors (e.g., physical attractiveness; Hilton & Simmons, 2001) that may influence RB decisions that were not included in this study. It is unclear the extent to which other factors play a role in the decision-making process. The current study relied on files from 2000 to 2008 and it is possible that practices may have changed in recent years. Finally, although our data were obtained from the three provinces with the largest number of NCRMD accused, the forensic populations and the decision-making processes may differ across jurisdictions both within Canada and across other countries.

CONCLUSION

The current study speaks to the need to continue to support and investigate the translation and implementation of risk factors from empirically supported risk measures into practice within forensic psychiatric systems. Our results indicate that only a subset of the risk factors, as operationalized in two well-validated risk measures, is mentioned when clinicians and RBs provide their rationale for recommendations and decisions. Developing policies that ensure greater structure in risk assessments that guide decision-making relevant to public safety and treatment planning could provide clinicians and RBs with the tools necessary to make more effective, empirically supported decisions. It is essential that a wide spectrum of evidence-based risk factors are taken into consideration and communicated when making such important decisions at the intersection between public safety and individual rights and freedoms.

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